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Can enhancing consciousness of control ideology  
mitigate the impact of poverty on perseverance?

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# Can enhancing consciousness of control ideology mitigate the impact of poverty on perseverance?

by Seemanti Ghosh\*

## Abstract

I show that *perseverance* is affected under the influence of poverty. Further, perseverance among adolescents can be fostered by treating *locus of control*. However, this treatment can effectively mitigate the impact of poverty only when delivered by a relatable role model. Older participants display significantly less perseverant behaviour when primed with poverty. Perseverance of older participants responds significantly more malleably to treatment sessions facilitated by a role model, relative to younger participants. Females are significantly less responsive to male role models. This evidence comes from evaluating a lab-in-the-field experiment conducted in India with 236 urban poor adolescents.

JEL classification: C91, C93, D91, I24, I28, I31, J24, O12

**Keywords:** experiment, non-cognitive, grit, perseverance, locus of control, poverty, psychology of poverty

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# 1. Introduction

It has now been established that non-cognitive skills are incontestably significant for human capital accumulation (Heckman, Stixrud, & Urzua, 2006; Borghans, Duckworth, Heckman, & Weel, 2008). Their predictive power for education, labour market and life outcomes is considered indistinguishable from that of cognitive skills (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Kautz, Heckman, Diris, Weel, & Borghans, 2014; Bowles, Gintis, & Osborne, 2001). This article particularly focuses on *perseverance*, a non-cognitive factor that underlies gritty behaviour. There is evidence that poverty has a detrimental effect on *perseverance* i.e. the poor give up sooner (Sharafi, 2019). This evidence also follows the broad literature on the psychology of poverty, which shows that the poor are reluctant to make economically superior choice from a set of alternatives, even when readily available (Bertrand, Mullainathan, & Shafir, 2004; Duflo, Kremer, & Robinson, 2004; Currie, Grogger, Burtless, & Schoeni, 2001). This impact of poverty on perseverance has serious economic ramifications as gritty behaviour it is integral to successful life outcomes, over and above IQ and conscientiousness (Duckworth, Peterson, Matthews, & Kelly, 2007; Eskreis-Winkler, Duckworth, Shulman, & Beal, 2014; Robertson-Kraft & Duckworth, 2014; Duckworth & Duckworth, 2014). Although we know that perseverance is malleable by interventions that aim to alter beliefs about productivity of effort (Alan, Boneva, & Ertac, 2019; Alan & Ertac, 2019), it is still unknown whether such educational interventions can mitigate the impact of poverty on perseverance.

This article contributes to this gap in the literature. I present results from a lab-in-the-field experiment conducted with 236 adolescents from urban poor localities in Bangalore city in Karnataka (India). The novel experimental design used a pair of treatments acting in a ‘simulating-counteracting’ manner, allowing me to determine whether the counteracting intervention is effective in mitigating the impact of the intervention that simulates poverty mentally. The identification strategy is as follows. In the first round, the treatment group is primed with words linked to poverty to simulate poverty mentally and the control group is primed neutrally. The method of priming<sup>1</sup> has been used previously to study the effect of poverty on cognitive abilities (Mani, Mullainathan, Shafir, & Zhao, 2013) and productivity (Kaur, Mullainathan, Oh, & Schilbach, 2019). In the second round, three groups are crosscut across the first-round treatment and control groups and the counteracting intervention is

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<sup>1</sup> Bertrand and Duflo (2017) summarizes studies that use priming to investigate the effect of stereotype threat.

administered. The counteracting intervention is designed to treat *locus of control* through an interactive art session. This intervention is delivered by a role model in one treatment group; without a role model in a second treatment group and a third group receives a placebo art session to capture participation effect. Immediately after I measure the impact on *perseverance* using a real effort-chance task similar to Abeler et al. (2011). I use this novel experimental design to evaluate the effect of two treatments acting in a ‘simulating-counteracting’ manner in isolation. It is conjectured that the ‘counteracting’ treatment can be deemed effective in mitigating the impact of the ‘simulating’ treatment if the outcome variables are not significantly distinguishable, measured right after the second-round treatment.

While researchers are still learning about the causal mechanisms between poverty and perseverance, there is strong evidence of malleability of adolescents’ perseverance, which can be achieved using belief-altering interventions (Bettinger, Ludvigsen, Rege, Solli, & Yeager, 2018; Alan & Ertac, 2019). This literature treats perseverance not as a fixed ability, but rather as a series of repeated choices. Therefore, as a choice perseverance is considered sensitive to beliefs such as self-efficacy and locus of control (Coleman & DeLeire, 2003; Duckworth, Peterson, Matthews, & Kelly, 2007; Cobb-Clark & Schurer, 2013; Cobb-Clark, 2015). All the earlier belief-altering interventions have been related to a common concept that is referred to by psychologists as the ‘growth mindset’<sup>2</sup>. This mindset promotes the idea that through consistent effort against all failures one can improve their ability. They used short videos, mini case studies, classroom activities, etc.

This study uses a 45-minute ‘reflection session’ that promotes the relationship between action-outcome contingency by enhancing the consciousness about causality between outcomes and actions from the participants’ own life. The session is designed to shift the generalised expectancy of reinforcements as more internal to self than external i.e. *internal* versus *external* locus of control<sup>3</sup> (see Rotter, 1966). In addition, given the efficacy of role models in motivating behaviour change (Bettinger & Long, 2005; Stipek, 1980; Jensen & Oster, 2009; La Ferrara,

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<sup>2</sup> See psychology literature on “growth mindset” (Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, & Dweck, 2007; Yeager & Dweck, 2012; Dweck, 2012; Yeager, et al., 2016).

<sup>3</sup> Locus of control has been independently associated with several economic phenomenon in education (Crandall, Katkovsky, & Crandall, 1965; Bar-Tal & Bar-Zohar, 1977), human capital investment (Coleman & DeLeire, 2003), labour market (Andrisani, 1977; Piatek & Pinger, 2010; Cobb-Clark & Tan, 2011).

Chong, & Duryea, 2012; Beaman, Duflo, Pande, & Topalova, 2012; Bernard, Dercon, Orkin, & Taffesse, 2015; Dalton, Zia, Rüschenpöhler, & Uras, 2018; García-Holgado, Díaz, & García-Peñalvo, 2019), I also evaluate the impact of the reflection session when delivered by a relatable role mode (RM).

I conduct this lab-in-the-field experiment in collaboration with an NGO called ‘Dream a Dream’<sup>4</sup> from Bangalore city in Karnataka (India). This NGO partners with schools located in the urban poor localities of Bangalore and attended by students from poor households and provides them with after-school life-skill training that focuses on non-cognitive development. This after-school programme is conducted regularly on weekdays by facilitators, some of whom are graduates of the same after-school programme. This study is conducted in one of the English-medium partner schools of the NGO with 236 students between grades 4 and 9 (ages 9 to 17) enrolled in the after-school programme.

The lab-in-the-field experiment is conducted during after-school hours and the total length of the programme is designed to be two and a half hours. The treatments are delivered by facilitators from the NGO’s after-school programme after a week of piloting in a non-related school. Conducting the experiment using the NGO’s after-school setting allowed any experimenter demand effects to be controlled through non-deceptive obfuscation (Zizzo, 2010). The modules, the delivery, the facilitators and the environment are maintained similar to those in the regular after-school programme. In fact, the content of the reflective session is inspired by one of the after-school programme’s modules called ‘River of life’, which was initially developed by the NGO in collaboration with Partners for Youth Empowerment (PYE Global) and Grassroots Soccer. Informed consent is obtained after declaring that the researchers were interested in studying the impact of the after-school programme.

The results suggest that the impact of poverty on perseverance is significantly negative, conforming to earlier reported evidence (Sharafi, 2019). The poverty primed group reported likely to be significantly less perseverant ( $z$ -EF 1.31 sd lower relative to neutrally primed, significant at 0.001). Simultaneously, the poverty primed group also displays significantly more external self-reported locus of control ( $z$ -locus 0.87 sd lower significant at 0.001; revealed choice of locus of control 0.15 pp lower significant at 0.001). The reflection session, both with

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<sup>4</sup> Find more details on their work at ‘[Dream A Dream – empowering at risk children](#)’

and without the RM had strikingly positive effect. However, the impact of poverty priming could only be effectively mitigated when delivered by a role model. When delivered by a role model, the impact of poverty priming was not only mitigated, but those who had been primed with poverty turned out to be significantly more perseverant than those neutrally primed (1.09 sd higher, significant at 0.001). Their locus of control, both self-reported and revealed choice were significantly higher than that of the neutrally primed group (1.09 sd higher significant at 0.001 and 0.10 pp higher significant at 0.05, respectively). Heterogenous effects are observed by age, NGO years and gender. The beliefs of females are found to be significantly less responsive to the session delivered by a male role model, which confirms earlier findings (Lockwood & Kunda, 1997; Bettinger & Long, 2005). The 4<sup>th</sup> year NGO candidates are significantly less perseverant when primed with poverty relative to 1<sup>st</sup> year candidates. Also, the participants in the 4<sup>th</sup> age quantile responded significantly better to the session delivered by a role model and significantly worse to the session without a role model relative to 1<sup>st</sup> age quantile, suggesting lesser malleability of beliefs with age. Therefore, early start is key (Heckman & Kautz, 2012; Heckman, Stixrud, & Urzua, 2006; Heckman, Pinto, & Savelyev, 2013).

This study contributes to the literature that investigates the role of ‘mindset’ interventions in altering economic behaviours among adolescents (Alan & Ertac, 2019; Alan, Boneva, & Ertac, 2019; Bettinger, Ludvigsen, Rege, Solli, & Yeager, 2018; Levitt, List, Neckermann, & Sadoff, 2016; Bettinger & Long, 2005; Nguyen, 2008; Beaman, Duflo, Pande, & Topalova, 2012). This study mainly focuses on finding hard evidence on whether such interventions are effective in mitigating the impact of poverty’s experience on perseverance. Therefore, it directly contributes to the poverty trap literature on behavioural economics, which studies the role of internal constraints in perpetuating poverty trap (Ghosal, Jana, Mani, Mitra, & Roy, Forthcoming; Dalton, Ghosal, & Mani, 2016; Bernard, Dercon, Orkin, & Taffesse, 2014). I also propose a novel laboratory experimental design that can be used in future studies to test the efficacy of a pair of treatments that may act in a similar ‘simulating-counteracting’ manner.

This article is organised as follows. Section 2 details the design of the lab-in-the-field experiment and outcome variables. Section 3 presents the data collection strategy and baseline characteristics. Section 4 summarises the descriptive results. Section 5 presents the estimation strategy and main results. Section 6 gives the conclusion. All appendix material can be found in the Online Appendix.

## **2. Design and Outcome Measurement**

### **2.1. Content of the Intervention**

#### ***2.1.1. First-round simulating treatment: Priming***

Priming is the process in which the present circumstances incidentally influence the activation of stored social knowledge, which triggers subsequent behavioural responses without the person's being aware of this influence (Higgins, 1996; Higgins & Eitam, 2014). The method of priming works by affecting the non-conscious form of human memory, where the individual is unaware that familiar visuals or words are triggering his or her emotions in relation to the topic. In this study, I use priming as the first round of treatment to simulate poverty mentally and create socioeconomic variation between the treatment and control group. The treatment group (AP) is primed with words linked to poverty that are connected with the experience recorded in 'Voices of the Poor'<sup>5</sup>. Priming has been commonly used in the literature to activate emotions related to poverty and study their impact on various outcomes (Mani, Mullainathan, Shafir, & Zhao, 2013; Kaur, Mullainathan, Oh, & Schilbach, 2019; Sharafi, 2019). The control group (NP) is primed neutrally with words unrelated to poverty. Since the participants in this study came from poor families where they have lived a life of hardship since birth, both at home and in the neighbourhood, it is hypothesised that stored knowledge related to their experience of poverty would be activated when treatment group participants are primed.

The entire length of the priming session is scheduled for 45 minutes and is designed to consist of two consecutive activities since evidence suggests that prolonged priming leads to more pronounced behavioural effects (Dijksterhuis & Knippenberg, 1998). The first priming activity is 'story reading'. The group to be primed with words related to poverty are given a story about a girl from a disadvantaged background, as seen in Figure A.1 in Online Appendix. The group to be primed neutrally is given a passage about India, as seen in Figure A.2 in Online Appendix. The stories are handed out to the participants by the facilitators and the participants are given 10 minutes to read through the story. This is followed by the second priming activity, which is a widely used method where participants are asked to 'spot the odd word' from a jumbled sentence, which forms a sentence when rearranged (Bargh, Chen, & Burrows, 1996). The

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<sup>5</sup> In the 'voices of the poor' by World Bank (Narayan, Chambers, Shah, & Petesch, 2000) people were quoted describing the experience of poverty as, "...exhaustion and poverty of time; exclusion, rejection, isolation and loneliness; bad relations with others, including bad relations within the family; insecurity, vulnerability, worry, fear and low self-confidence; and powerlessness, helplessness, frustration and anger" (p.12).

facilitators put down the jumbled words on the blackboard and the participants are asked to think of the answer. Unbeknownst to the participants of the treatment group (AP), the odd words are related to the experience of poverty, whereas for the control group (NP), the odd words are random with no specific link to poverty (Figures A.2 and A.3 in Online Appendix).

### ***2.1.2. Second-round counteracting treatment: Reflection session***

The aim of the second-round treatment is to effectively counteract the hypothesised impact of mentally simulating poverty in the first round on the outcome variable perseverance. Based on earlier studies (Alan & Ertac, 2019), it is conjectured that treating locus of control would motivate participants to persevere harder. Therefore, the reflection session aims to shift the generalised expectancy of reinforcements as more internal to self than external. It is a 45-minute deeply reflective session where participants are asked to reflect on various situations from their past. The idea of action-outcome contingency is promoted by enhancing their consciousness of the causality between outcomes and actions in their life, e.g. if they list good grades as a positive outcome, the facilitator helped them to understand the role of their hard work in achieving that result. The session included activities such as sketching, reflecting and writing, as seen in Figure A.4 in Online Appendix.

The curriculum asks participants to draw a river symbolic of their own life where smooth water phases are associated with good outcomes in their life, the sudden twists and turns are associated with bad outcomes in their life that may have led to a change in the direction of their life and boulders and rocks are symbolic of obstacles or external constraints in their life. The facilitator asked the participants to identify events from their own life with the smooth phase, rough phase and boulders. The facilitator helped the participants to identify their own actions or missing actions associated with the outcome. The intervention uses self-reflection as a tool to establish their consciousness about action-outcome contingency. The key message emphasised is that there are rocks and boulders that act as obstacles, giving the river of life twists that are not wished for; however, if one focuses on what one can control rather than external factors one cannot control, the river will take the best shape possible. The intervention avoids using words such as ‘effort’ or ‘perseverance’ but only focuses on words such as ‘control’, ‘self’, ‘action’ and ‘internal’ to avoid any experimenter demand effects (Zizzo, 2010).



The material of the intervention is inspired by the NGO's original 'River of life' module that was developed by the NGO in collaboration with Partners for Youth Empowerment (PYE Global) and Grassroots Soccer. However, changes are made to suit the aim of this treatment. The session is delivered by in-house facilitators of 'Dream a Dream'. Most of the facilitators are graduates of the NGO's after-school programme and therefore they also serve as relatable role models for the current students. However, since there is detailed evidence for the significant positive influence of relatable role models (Bettinger & Long, 2005; Nguyen, 2008; Dalton, Zia, Rüschenpöhler, & Uras, 2018), two versions of this intervention is administered: the reflective session delivered without a RM (T1) and with a relatable RM (T2). In T1, the intervention is delivered by a facilitator who belong to a middle-class background and is not a graduate of the NGO. Whereas in T2, it is delivered by a facilitator who is a graduate of the NGO, born in a relatively poor household similar to participants and is currently moderately successful working as a facilitator in the NGO. In treatment group T2, the facilitator begins the sessions with "I am \_\_. I come from \_\_ (name of the urban poor locality in Bangalore that the participants would recognise). I am currently working as a facilitator for children and adolescents. I am a graduate of Dream a Dream's after school programme. Just like you, I used to attend these sessions". The remainder of the session is identical in T1 and T2. A placebo treatment group T0 receives only an art session where they are asked to sketch or paint their favourite picture using colour, pencils, crayon, etc. within 45 minutes. The placebo group helps to rule out any participation effect.

## **2.2. Evaluation design**

The identification strategy of this study involves two rounds of treatment that by design act in a 'simulating-counteracting' manner. In the first round, the treatment group (AP=118) is primed with words related to poverty and the control group (NP=118) is primed neutrally with words unrelated to poverty. In the second round, three treatment groups across AP and NP are crosscut – the 'placebo art session' (T0=56), the 'reflection session without RM' (T1=90) and the 'reflection session with RM' (T2=90). The 2x3 design resulted in six treatment groups, as illustrated in Table 1. The six groups are named by their first-round priming group name, suffixed by the number of their second-round treatment group. Participants are assigned to the six groups AP0 (n=28), AP1 (n=45), AP2 (n=45), NP0 (n=28), NP1 (n=45) and NP2 (n=45)

through stratified randomisation by grade<sup>6</sup>. The sample allocation by grade is given in Table B.2 in Online Appendix for 244 participants. Six participants dropped out of the NGO's programme before the study proceeded. The power calculation based on Ghosal et al. (Forthcoming) is presented in Table B.3 in Online Appendix.

The data on baseline indicators pre-treatment ( $t=0$ ) is collected a week prior to the experiment kick-off. The experiment is conducted according to the schedule in Table B.4 in Online Appendix. On the day, the assigned grade is assembled according to the schedule at the beginning of the after-school hours and all participants are given a badge coloured either red or blue and with a number assigned 0, 1 or 2 on it along with their unique identification number. The colour of the badge determined the group for the first-round priming treatment (blue=NP; red=AP) and the number on the badge determined the group for the second-round counteractive treatment (0=T0; 1=T1; 2=T2). The participants are then divided into the blue and red groups and led into different rooms for their respective priming sessions. Post-priming, the participants are immediately led to their respective T0, T1 or T2 room, determined by the number on their badge. The participants are unobtrusively divided into groups in both rounds without their knowledge that they are attending different sessions. Outcome variables are measured immediately after the second-round sessions are complete for post-treatment ( $t=0$ ) measures. Both rounds of treatments are designed to be 45 minutes each and, together with the outcome measurement, the total length of the experiment is approximately two and a half hours.

I evaluate the priming effect using DiD estimates of outcome for AP0 and NP0. I evaluate the impact of T1 using DiD estimates of outcome for AP1 and NP1. T1 is deemed effective in counteracting the impact of poverty priming if there is no significant difference in the post-treatment measures of the outcome variables between AP1 and NP1. Similarly, I evaluate the impact of treatment T2 using DiD estimates of outcome for AP2 and NP2. The experimental design does not allow for the evaluation of RM effect in isolation. However, T2 represents the dynamic complementarity between reflection session and RM.

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<sup>6</sup> The NGO collects data on non-cognitive skills (Interacting with Others, Overcoming Difficulties and Solving Problems, Taking Initiative, Managing Conflict, Understanding and Following Instructions) of students beginning of the session, using the LSAS scale (Kennedy, Pearson, Brett-Taylor, & Talreja, 2014). Baseline analysis of the 2015-2016 data revealed significant association with grade as seen in Table B.1 in Online Appendix.

**Table 1: 2x3 Treatment group allocation**

		Counteract: Reflection Session		
		Placebo Art Session (T0)	Reflective Session w/o RM (T1)	Reflective Session with RM (T2)
Simulate:	Poverty Priming (AP)	AP0=28	AP1=45	AP2=45
Priming	Neutral Priming (NP)	NP0=28	NP1=45	NP2=45

NP0: Neutral priming (NP)+Placebo art session (T0); NP1: Neutral priming (NP)+Reflection session w/o RM (T1); NP2: Neutral priming (NP)+Reflection session with RM (T2); AP0: Poverty priming (AP)+Placebo art session (T0); AP1: Poverty priming (AP)+Reflection session w/o RM (T1); AP2: Poverty priming (AP)+Reflection session with RM (T2)

## 2.3. Measurement of Outcomes Variables

### 2.3.1. Locus of control: Likert type scale

The most commonly used measure of control expectancies in psychology literature is Rotter's (1966) 29-item Internal-External (I-E) Scale. The I-E Scale has not only been used widely for diverse populations, such as adolescents (Klingman, Goldstein, & Lerner, 1991), women going through divorce (Morgan, 1988), therapy clients (Foon, 1986; Harper, Oei, Mendalgio, & Evans, 1990) and Bosnian refugees living in Norway (Van Selm, Sam, & Van Oudenhoven, 1997), but has also been used in differing forms both in terms of number of items and scale of the item (e.g. John, Gentry, Tansuhaj, Manzer, and Cho (1988) translated I-E Scale into a 6-item Thai version with a 5-point Likert-type scale). The I-E Scale has been sparingly validated among Indians (Khanna & Khanna, 1979; Parsons & Schneider, 1974; Carment, 1974). The aim of this study was to measure the general sense of control among adolescents for which Rotter's (1966) I-E Scale fit the need adequately. The I-E scale is not unidimensional (Hersch & Scheibe, 1967; Mirels, 1970; Reid & Ware, 1973). Generally, there are three dimensions: (a) systems control (b) personal control and (c) general control ideology (Carment, 1974). I use items under 'general control ideology' based on classifications suggested by studies in psychology (Parsons & Schneider, 1974).

I adapt the 29-item scale with dichotomous response categories to a 5-item Likert-type scale, as given by Figure A.5 in Online Appendix. The wordings are changed infrequently to make it

relatable for the target population. Taking into consideration the socioeconomic context of the participants, Q2 and Q3 on the questionnaire are situational questions. Nevertheless, I maintain integrity to the theme of the original question on the I-E Scale. I formulate the questions based on a third-person character named Hari to minimise self-reporting biases, since participants might have felt too self-conscious to give an honest opinion when addressed in the first person. The principal component factor analysis and Cronbach's alpha for the scale used are presented in Table B.5 and Table B.6 respectively, in Online Appendix. Participants did not report any trouble with understanding the questionnaire and the average time taken to complete the five questions was 15 minutes.

Each question has ordered options with ascending values. Subsequently, the individual scores for all five questions are added up to determine the total score, with the maximum achievable score being 26 points. This forms the measure for self-reported locus of control (*locus*). For statistical estimation purposes, I further convert the variable *locus* to its standardised form *z*-*locus* using the baseline mean and standard deviation of the placebo group T0.

### ***2.3.2. Perseverance: Real Effort-Chance Task***

The real effort-chance task is designed to estimate *perseverance* through failures when one has a choice just to depend on chance, inspired by the 'Skill versus Chance' structure (Rotter, Liverant, & Crowne, 1961). The task consisted of two activities, one that only required perseverance with effort and one that only required perseverance with chance. Each activity had multiple levels with increasing difficulty. Levels achieved in the effort activity provides the outcome *perseverance with effort* (EF) and the levels achieved in the chance task provides measure of *perseverance with chance* (CH). There are many different approaches to measure perseverance, but the two most significant factors that are common to all the different measures of perseverance are keeping at a task despite repeated failures and withstanding discomfort to achieve a goal (Thornton, 1939). A third outcome  $\emptyset$  is also measured.  $\emptyset$  measures the share of effort in the total score, representing the revealed choice of locus of control.

In the effort activity, the participants are presented with a grid that contained a combination of green and blue digits (see Figure A.6 in Online Appendix) and the target is to count the number of blue digits within a stipulated time. Every level is time-bound. The levels are explained in

Table B.7 in Online Appendix. This activity does not require any task-specific ability or prior knowledge, performance is easily measurable, there is little learning possibility and the task is boring to ensure that there was a positive cost of effort, similar to the earlier approaches (Abeler, Falk, Goette, & Huffman, 2011). Difficulty increases with each level. For the first three levels, difficulty increases only in terms of the length of the activity; from the fourth level, difficulty increases in terms of the required pace. For the chance activity, participants are required to roll a certain number of dice together and obtain the same number on all the dice. With each level, one extra die is added to the challenge. Therefore, with each additional die, the probability of a successful outcome decreases as the random factor increases.

Success at a particular level is decided when a participant achieved the target set for that level. In addition, if a participant entered a level, whether or not they are able to successfully clear the level, point is allotted. For both the effort and the chance activity, if the participant failed to achieve the target of a particular level in one trial, they are allowed to try again as many times as they wished. Before each round started, the facilitators offered the participants the chance to choose between (1) continue with another trial if they failed the last or move to the next level if they succeeded in the current level, (2) switch to the other activity, (3) quit. An opportunity is given to switch back and forth between both the activities. A participant's turn ended when they no longer wished to pursue either of the activities.

The number of levels achieved in each activity decided the score for that activity. The participants are told that it is a competition and the goal should be to maximize the joint score. The participants are briefed about both the activities and they are made aware of which is an effort activity, and which is a chance activity. The criterion for judgement is explicitly mentioned as the total score irrespective of the choice of activity. The task is not incentivised with individual incentives. However, it is declared as a competition for top three medals. The score achieved in each activity is treated as the outcome variable of perseverance with effort (EF) and chance (CH). I calculate the *z-scores* of EF and CH using the mean and standard deviation of the control group (T0) at  $t=0$ , generating *z-EF* and *z-CH* respectively for statistical analysis. I also calculate  $\varnothing$ , the share of effort to the total score achieved. The higher the value of  $\varnothing$ , the more internally oriented the participant is.

### 3. Data and Baseline Statistics

The NGO has 40 partner schools in the after-school programme. The selection criteria that I use are medium of study (English), co-education, after-school programme running for at least four years at the time of study, school located in urban poor locality and headteacher ready to co-operate. I collect pre-treatment data at  $t=0$  on outcome variables a week prior to the field experiment week, with 236 students between grades 4 and 9 who are enrolled in the school's after-school programme for the academic year 2015–2016. Any student who is not part of the after-school programme is excluded from the study as the study is conducted during after-school hours. We are informed that the most common reasons for students not being part of the programme is distance of home from school or other logistical reasons. To collect information about the participants' backgrounds, a household survey is conducted with the mothers.

I present summary statistics of the overall sample and treatment groups by individual and household indicators in Table 3. As observed in Table 3 Panel A, the sample is gender-balanced, 93% of participants come from households that belong to the religious majority of India (Hinduism), 83% lives within 15 minutes' travel time from school and 14% within 30 minutes, implying that schooling is quite localised. Table 3 Panel B provides a summary of parental attributes: a sizeable proportion of parents are illiterate (16% mothers and 23% fathers), most parents are educated until school level (78% mothers and 67% fathers), a very small proportion have attended college (5% mothers and 8% fathers) and only a relatively negligible proportion have attended university (1% mothers and 2% fathers). Maternal employment rate is quite high (65%); however, mothers are employed mostly in unskilled jobs as tailors, house help, daily wage labourers, etc. In Table 3 Panel C, it can be observed that the homes are mostly overcrowded, with an occupancy rate of 4.27 people per bedroom and 86% of the households have a basic standard of living, measured by access to sanitation facilities, supply of clean drinking water and electricity and a kitchen (Schoon, et al., 2002). Table 3 Columns (8) and (9) provide results of the one-way ANOVA after comparing the means across treatment groups. In Column (9), the significance of Bartlett's statistic for school starting age, religion, mother and father's education (=college), family size and occupancy rate suggest that there was no homogeneity of variances across treatment groups for these variables and therefore a one-way ANOVA is not possible. However, the insignificant F-statistics in Column (8) for the remaining indicators suggest that the treatment groups are statistically balanced.

I present summary statistics and one-way ANOVA results for pre-treatment outcome variables at t=0 in Table 2. In Table 2 Panel A, the overall mean baseline score for locus of control (locus) on the 5-point Likert Scale is 15.44 (SD=3.18), the overall mean number of levels achieved by the participants in the effort activity (EF) at t=0 is 1.82 (SD=0.68) and 1.89 (SD=0.48) for the chance activity (CH). Therefore, participants are indifferent between the choice of effort activity and chance activity to maximise their score at t=0 (overall mean  $\emptyset$  =0.48). Thus, the generalised expectation of reinforcements at t=0 is neither too external nor too internal to self. Table 2 Panel B presents the summary statistics on the z-scores that are further used for statistical estimates. In Table 2 (Panel A & B), the insignificant F-statistics suggest that there is no significant difference in outcome variables (z-locus and z-EF) between treatment groups. Mean comparison for z-CH cannot be carried out as the Bartlett's statistic is significant.

**Table 2: Outcome variables at baseline (t=0)**

<i>Treatment Groups</i>	locus		EF		CH			
<b>Panel A</b>	Mean	SD	Mean	SD	Mean	SD		
NP0 (n=28)	16.14	3.12	1.93	0.66	1.93	0.54		
NP1 (n=45)	15.04	2.68	1.80	0.79	1.98	0.58		
NP2 (n=45)	15.11	3.68	1.80	0.69	1.87	0.34		
AP0 (n=28)	15.57	3.13	1.93	0.60	1.86	0.45		
AP1 (n=45)	15.96	2.87	1.78	0.52	1.82	0.53		
AP2 (n=45)	15.16	3.50	1.76	0.74	1.87	0.40		
Overall (n=236)	15.44	3.18	1.82	0.68	1.89	0.48		
Bartlett's Statistic	6.98		8.99		16.05**			
F-statistic	0.82		0.42		-			
	z-locus		z-EF		z-CH		$\emptyset$	
<b>Panel B</b>	Mean	SD	Mean	SD	Mean	SD	Mean	SD
NP0 (n=28)	0.22	0.98	0.16	0.98	0.09	1.13	0.49	0.13
NP1 (n=45)	-0.13	0.84	-0.03	1.16	0.19	1.22	0.46	0.17
NP2 (n=45)	-0.10	1.16	-0.03	1.03	-0.04	0.72	0.48	0.14
AP0 (n=28)	0.04	0.98	0.16	0.89	-0.06	0.94	0.50	0.14
AP1 (n=45)	0.16	0.90	-0.06	0.77	-0.13	1.12	0.49	0.11
AP2 (n=45)	-0.09	0.54	-0.09	1.10	-0.04	0.84	0.47	0.14
Bartlett's Statistic	6.08		8.99		16.05**		8.82	
F-statistic	0.82		0.42		-		0.49	

Note: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; NP0: Neutral priming (NP)+Placebo art session (T0); NP1: Neutral priming (NP)+Reflection session w/o RM (T1); NP2: Neutral priming (NP)+Reflection session with RM (T2); AP0: Poverty priming (AP)+Placebo art session (T0); AP1: Poverty priming (AP)+Reflection session w/o RM (T1); AP2: Poverty priming (AP)+Reflection session with RM (T2); z-scores have been calculated using baseline mean and standard deviations of treatment group T0;  $\emptyset$  = [effort levels/ (effort levels + chance levels)]

**Table 3: Balance checks, One-way ANOVA**

Socioeconomic Indicators	Overall (1)	NP0 (2)	NP1 (3)	NP2 (4)	AP0 (5)	AP1 (6)	AP2 (7)	F-statistic (8)	Bartlett's Statistic (9)
<i>Panel A: Individual (n=236)</i>									
Age (Yr.)	11.95 (1.83)	11.75 (1.58)	11.95 (1.94)	12.00 (1.73)	11.90 (1.86)	11.95 (1.93)	12.05 (1.95)	0.10	2.15
Gender (=female)	0.50 (0.50)	0.43 (0.50)	0.53 (0.50)	0.56 (0.50)	0.46 (0.51)	0.53 (0.50)	0.47 (0.50)	0.36	0.00
School Starting Age (Yr.)	4.03 (1.10)	4.13 (0.87)	3.63 (0.73)	4.02 (0.79)	4.25 (0.96)	3.92 (0.75)	4.36 (1.84)	-	65.47***
Religion (=Hindu)	0.93 (0.26)	0.93 (0.26)	0.89 (0.32)	1.00 -	0.85 (0.36)	0.96 (0.21)	0.91 (0.29)	-	12.10**
Religion (=Muslim)	0.03 (0.17)	0.07 (0.26)	0.05 (0.21)	- -	0.04 (0.19)	0.02 (0.15)	0.02 (0.15)	-	16.24**
Religion (=Christian)	0.04 (0.20)	0.86 (0.36)	0.84 (0.37)	0.91 (0.29)	0.79 (0.42)	0.87 (0.34)	0.76 (0.43)	-	20.54***
Travel (t_schl (<15min.))	0.83 (0.37)	0.82 (0.39)	0.84 (0.37)	0.82 (0.39)	0.82 (0.39)	0.91 (0.29)	0.78 (0.42)	0.62	6.67
Travel (t_schl (15-30min.))	0.14 (0.34)	0.18 (0.39)	0.09 (0.29)	0.16 (0.37)	0.14 (0.36)	0.09 (0.29)	0.18 (0.39)	0.59	7.57
Travel (t_schl (30-45min.))	0.03 (0.16)	- -	0.04 (0.21)	0.02 (0.15)	0.04 (0.19)	- -	0.04 (0.21)	0.66	5.97
Travel (t_schl (>45min.))	0.00 (0.07)	- -	0.02 (0.15)	- -	- -	- -	- -	0.85	-
<i>Panel B: Parental (n=231)</i>									
Mother_Edu (=none)	0.16 (0.37)	0.14 (0.36)	0.21 (0.41)	0.18 (0.39)	0.07 (0.27)	0.11 (0.32)	0.20 (0.41)	0.78	8.49
Mother_Edu (=school)	0.78 (0.42)	0.75 (0.44)	0.77 (0.43)	0.80 (0.41)	0.81 (0.40)	0.82 (0.39)	0.73 (0.45)	0.32	1.40
Mother_Edu (=college)	0.05 (0.22)	0.07 (0.26)	0.02 (0.15)	- -	0.11 (0.32)	0.07 (0.25)	0.07 (0.25)	-	18.83**
Mother_Edu (=university)	0.01 (0.09)	0.04 (0.19)	- -	0.02 (0.15)	- -	- -	- -	0.95	1.71
Father_Edu (=none)	0.23 (0.42)	0.21 (0.42)	0.21 (0.41)	0.27 (0.45)	0.19 (0.40)	0.16 (0.37)	0.32 (0.47)	0.84	3.33
Father_Edu (=school)	0.67 (0.47)	0.71 (0.46)	0.74 (0.44)	0.66 (0.48)	0.67 (0.48)	0.76 (0.43)	0.50 (0.51)	1.74	1.37
Father_Edu (=college)	0.08 (0.27)	0.04 (0.19)	0.02 (0.15)	0.05 (0.21)	0.11 (0.32)	0.07 (0.25)	0.18 (0.39)	-	45.98***
Father_Edu (=university)	0.02 (0.15)	0.04 (0.19)	0.02 (0.15)	0.02 (0.15)	0.04 (0.19)	0.02 (0.15)	- -	0.30	4.38
Mother_Employed (=1)	0.65 (0.48)	0.64 (0.49)	0.65 (0.48)	0.61 (0.49)	0.70 (0.47)	0.60 (0.50)	0.70 (0.46)	0.33	0.33
<i>Panel C: Familial (n=236)</i>									
Family Size	4.50 (1.37)	4.36 (0.83)	4.51 (1.38)	4.29 (0.63)	4.75 (2.20)	4.38 (0.75)	4.78 (1.89)	-	94.46***
Occupancy rate	4.27 (0.95)	4.11 (0.97)	4.22 (0.91)	4.29 (0.63)	4.39 (1.14)	4.08 (0.74)	4.51 (1.26)	-	27.04***
Standard of Living (=Basic)	0.86 (0.35)	0.86 (0.36)	0.84 (0.37)	0.91 (0.29)	0.82 (0.39)	0.82 (0.39)	0.87 (0.34)	0.37	4.70
Tenure (=Rent)	0.84 (0.37)	0.86 (0.36)	0.84 (0.37)	0.91 (0.29)	0.79 (0.42)	0.87 (0.34)	0.76 (0.43)	0.99	8.58
N		28	45	45	28	45	45		

Note: Standard Deviations are presented in parenthesis; Column (1)–(7) present simple means; Column (8) & (9) reports one-way ANNOVA statistics; NP0: Neutral priming (NP)+Placebo art session (T0); NP1: Neutral priming (NP)+Reflection session w/o RM (T1); NP2: Neutral priming (NP)+Reflection session with RM (T2); AP0: Poverty priming (AP)+Placebo art session (T0); AP1: Poverty priming (AP)+Reflection session w/o RM (T1); AP2: Poverty priming (AP)+Reflection session with RM (T2); Except age, school starting age, family size and occupancy rate, all other means are presented as percentage; \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

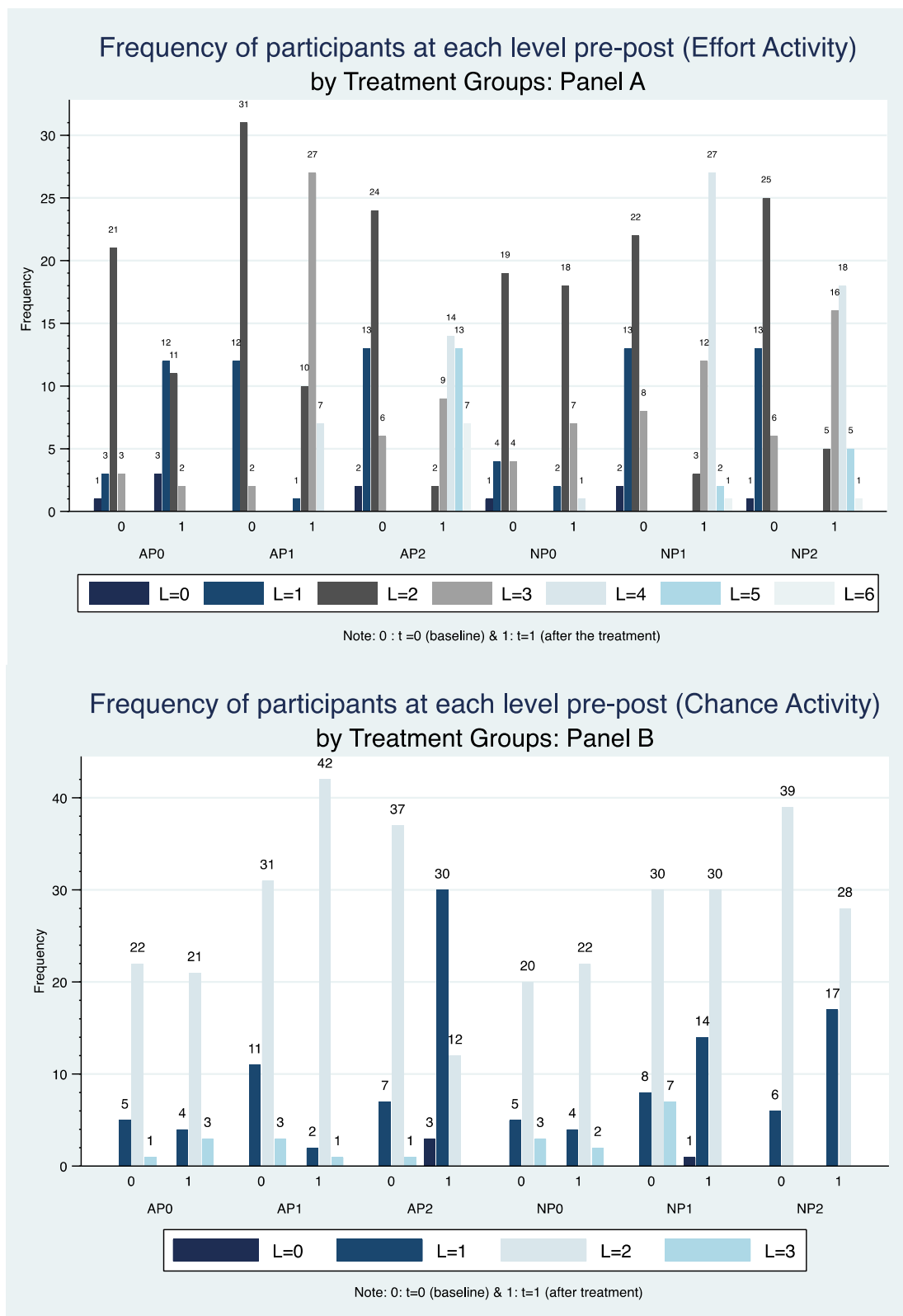


## 4. Descriptive Results

Figure 1 Panel A illustrates frequency of participants at each level both at  $t=0$  and  $t=1$  for the effort activity. At  $t=0$  across all treatment groups, the modal level is 2<sup>nd</sup> level and the highest level achieved is 3<sup>rd</sup> level. It is noteworthy that at  $t=0$ , in five of the treatment groups (excluding AP1) there is at least one participant who chose not to do the effort activity at all whereas at  $t=1$ , only AP0 has three participants who chose not to do the effort activity at all. Also, at  $t=1$  the modal level varies by treatment group; for NP0 it is 2<sup>nd</sup> level, for NP1, NP2 and AP2 it is 4<sup>th</sup> level, for AP0 it is 1<sup>st</sup> level and for AP1 it is 3<sup>rd</sup> level. Thus, for NP1, NP2, AP1 and AP2 the modal level increases from  $t=0$  to  $t=1$ , for NP0 it remains same and for AP0 it decreases. This outcome can be possibly explained by the fact that NP1, NP2, AP1 and AP2 receives the reflection session (T1 and T2), AP0 is primed with poverty but receives only placebo, and NP0 is primed neutrally and receives placebo. At  $t=1$ , the highest level achieved in the effort activity is level 6 compared to level 4 at  $t=0$ . In Figure 1, Panel B illustrates frequency of participants at each level both at  $t=0$  and  $t=1$  for the chance activity. The modal level is consistent across treatment groups at  $t=0$  and  $t=1$  (2<sup>nd</sup> level). The main difference between  $t=0$  and  $t=1$  in the chance activity is at level 0. At  $t=0$ , no participant passes the opportunity to try the chance activity to score points. However, at  $t=1$  there is one participant in NP1 and three participants in AP2 who chose not to try the chance activity at all.

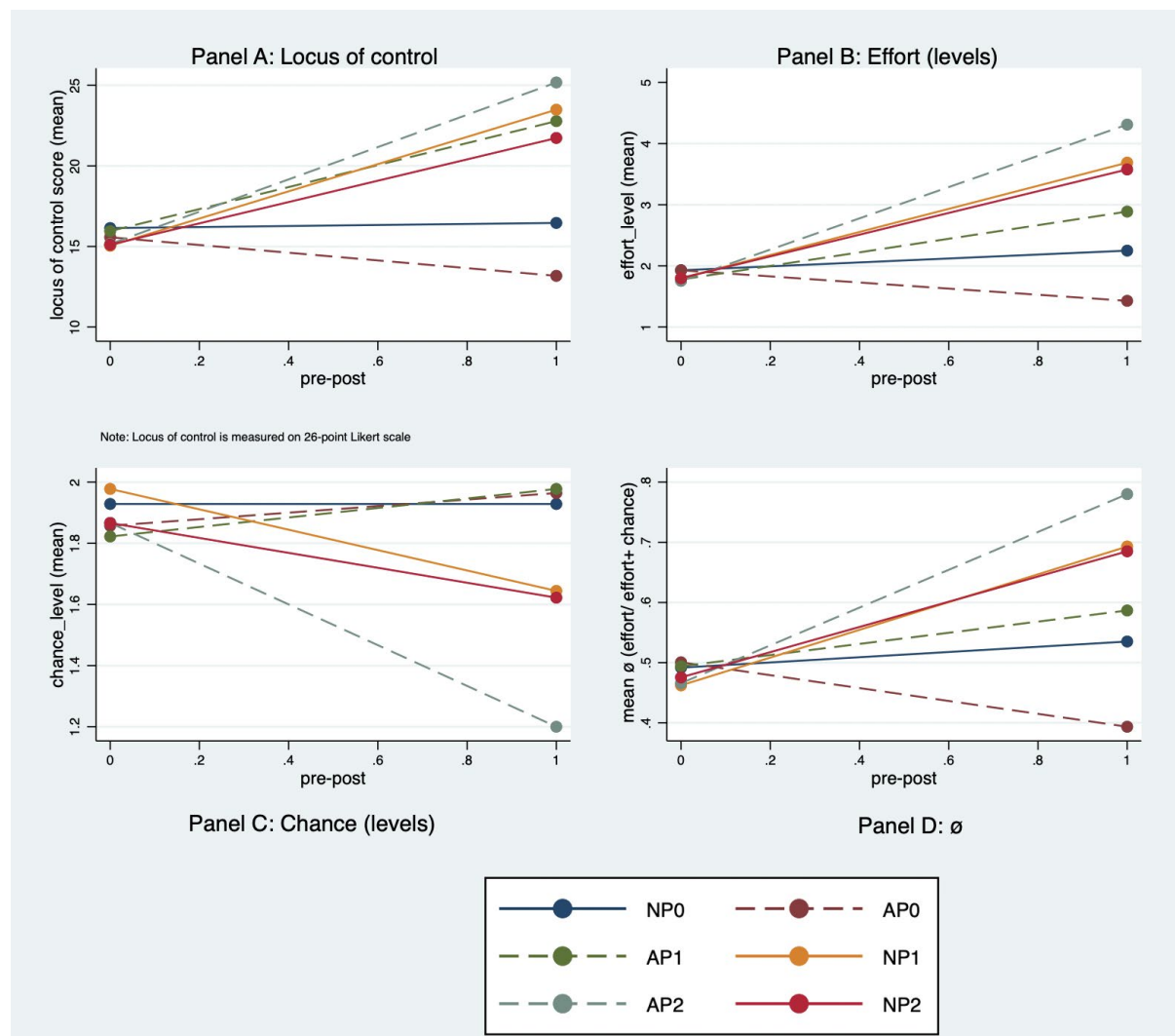
Figure 2 Panels A, B, C and D plot point estimates of the outcome variables for all treatment group averages at  $t=0$  and  $t=1$ . There is no substantial increase or decrease for NP0 in Panel A [ $t=0$ : 16.14 (SD=3.12) and  $t=1$ : 16.46 (SD=3.26)], Panel B [ $t=0$ : 1.93 (SD=0.66) and  $t=1$ : 2.25 (SD=0.65)], Panel C [ $t=0$ : 1.93 (SD=0.54) and  $t=1$ : 1.93 (SD=0.47)] or Panel D [ $t=0$ : 0.49 (SD=0.13) and  $t=1$ : 0.54 (0.10)]. There is a somewhat bigger decrease for AP0 in Panel A [ $t=0$ : 15.57 (SD=3.13) and  $t=1$ : 13.18 (SD=3.14)], Panel B [ $t=0$ : 1.93 (SD=0.60) and  $t=1$ : 1.43 (SD=0.79)], and Panel D [ $t=0$ : 0.50 (SD=0.14) and  $t=1$ : 0.39 (0.16)]. The most noticeable shift for AP0 is in Panel D for  $\emptyset$ . This is potentially as a result of poverty priming as AP0 receives only a placebo counteracting treatment in the second round. All of the other four treatment groups NP1, NP2, AP1 and AP2 witnesses a substantial increase in Panels A, B and D and a decrease in Panel C. This is possibly due to the treatment effects from T1 and T2. I analyse in further sections whether these treatment effects are able to mitigate the impact of poverty priming. AP2 witnesses the highest increase and highest decrease.

**Figure 1: Effort Activity Levels (t=0 & t=1)**



Note: NP0: Neutral priming (NP)+Placebo art session (T0); NP1: Neutral priming (NP)+Reflection session w/o RM (T1); NP2: Neutral priming (NP)+Reflection session with RM (T2); AP0: Poverty priming (AP)+Placebo art session (T0); AP1: Poverty priming (AP)+Reflection session w/o RM (T1); AP2: Poverty priming (AP)+Reflection session with RM (T2)

**Figure 2: Point estimates (Outcomes) by Treatment Group**



Note: Panel A-D displays the point estimates for outcome variables locus of control, effort level, chance levels and  $\sigma$  by the six treatment groups ; NP0: Neutral priming (NP)+Placebo art session (T0); NP1: Neutral priming (NP)+Reflection session w/o RM (T1); NP2: Neutral priming (NP)+Reflection session with RM (T2); AP0: Poverty priming (AP)+Placebo art session (T0); AP1: Poverty priming (AP)+Reflection session w/o RM (T1); AP2: Poverty priming (AP)+Reflection session with RM (T2)

## 5. Estimation and Main Results

### 5.1. Estimation Strategy

This study has two rounds of treatment, the poverty simulating priming treatment in first-round (AP & NP) and the counteracting reflection session in the second-round (T0, T1 & T2). Therefore, the 2x3 design ends up in six different treatment groups NP0, AP0, NP1, AP1, NP2 and AP2. I estimate the treatment effects on outcome variables using the below specification:

$$Y_{ijkgt} = \alpha_g + \beta T_j + \rho T_k + \gamma Post_t + \delta T_j * Post_t + \theta T_k * Post_t + \varphi T_j * T_k + \eta T_j * T_k * Post_t + \varepsilon_{ijkgt} \quad (1)$$

where,  $Y_{ijkgt}$  indicates the outcome variable of interest for the  $i^{th}$  individual, assigned to  $j^{th}$  treatment group in first round (AP or NP),  $k^{th}$  treatment group in second round (T0, T1 or T2), studying in grade  $g$  and at time  $t$  ( $t=0$  or  $t=1$ ). The coefficient  $\alpha_g$  denotes the grade fixed effects since randomization is done after stratification by grade and the experiment is conducted for each grade on a separate day, therefore grade fixed effects improves efficiency (Bruhn & McKenzie, 2009).  $T_j$  is equal to 1 if the participant belongs to the adversity priming group (AP), 0 otherwise (NP). The coefficient  $\beta$  captures the average difference in outcome variable when one belongs to AP relative to NP.  $T_k$  is equal to 1 if the participant belongs to placebo (T0), equal to 2 if belongs to ‘reflection session w/o RM’ (T1) and 3 if belongs to ‘reflection session with RM’ (T2). The coefficient  $\rho$  captures the average difference in outcome variable when one belongs to T1 and T2 relative to T0.  $Post_t$  is equal to 1 for outcome variable at  $t=1$ . The coefficient  $\gamma$  compares outcome variable at  $t=1$  relative to  $t=0$ . The coefficients  $\delta$ ,  $\theta$ ,  $\varphi$  and  $\eta$  measures the effect of complementarities between combinations of  $T_j$ ,  $T_k$  and  $Post_t$ .

Further, to estimate the efficacy of priming treatment in first round and counteracting treatments T1 and T2 in second-round I calculate difference-in-difference (DiD) estimates using the below specification for each of the second-round treatment groups T0, T1 and T2.

$$Y_{ijgt} = \alpha_g + \beta T_j + \gamma Post_t + \delta T_j * Post_t + \varepsilon_{ijgt} \quad (2)$$

where,  $Y_{ijgt}$  indicates the outcome variable of interest for the  $i^{th}$  individual, assigned to  $j^{th}$  treatment group in first round (AP or NP), studying in grade  $g$  and at time  $t$  ( $t=0$  or  $t=1$ ). Both  $T_j$ ,  $Post_t$ ,  $\beta$  and  $\gamma$  imply the same as equation (1).  $\delta$  measures the average change in individual outcome from  $t=0$  to  $t=1$  when the participant belongs to the treatment group AP. Therefore, given that both NP and AP goes through the same treatment in second round for T0, T1 and T2, equation (2) when estimated only for T0 provides us insight on whether or not simulation of poverty through priming was effective, when estimated for T1 and T2 respectively provides insight on whether T1 and (or) T2 was effective in mitigating the impact of priming on AP. If T1 and (or) T2 are effective,  $\delta$  should not be significant. The DiD approach mitigates the potency of any time-variant or time-invariant factors to affect the results. Standard errors are robust and clustered at household level.

## 5.2. Impact of poverty priming treatment

I estimate the effect of first round priming treatment using specification (1) in Table 4 and compute DiD estimates for AP0 and NP0 using specification (2) in Table 5 (Panel A). Table 4 (Columns 1–2, Row 3) suggests that the poverty primed AP group has a self-reported locus ( $z$ -locus) of 0.87 sd and a revealed choice of locus ( $\emptyset$ ) 0.15 pp lower (both significant at 0.001) relative to the neutrally primed NP. The AP group also reports significantly lower effort ( $z$ -EF) 1.31 sd (significant at 0.001) relative to the NP group. Therefore, the simulation of poverty is deemed effective as the results conform to earlier reported evidence that suggests that poverty has a detrimental effect on perseverance (Sharafi, 2019). The AP group exhibits significantly higher external control ideology and is significantly less perseverant relative to the NP group. These effects are also replicated in Table 5 (Panel A, Column 3), suggesting that there is no effect from mere participation. Whether or not the counteracting treatments treating locus of control in the second round are able to mitigate this impact on perseverance is discussed in the following sections.

## 5.3. Impact of counteracting treatments

### 5.3.1. Reflection session w/o RM: T1

The aim of the reflection session is to treat locus of control, delivered by a facilitator who does not act as a role model (T1). Table 4 (Columns 1–2, Row 6) suggests that participants in treatment group T1 reports 2.61 sd higher self-reported locus of control ( $z$ -locus), exhibits 0.19 pp higher revealed choice of locus ( $\emptyset$ ) and 2.50 sd higher choice of effort ( $z$ -EF), both significant at 0.001, relative to the placebo group T0 at  $t=1$ . However, Table 4 (Columns 1–4, Row 10) suggests that the outcome of treatment group that is primed with poverty and receives T1 (AP1) does not significantly differ from the treatment group that is primed with poverty and receives T0 (AP0) at  $t=1$ . As previously discussed in Section 5.2, at  $t=1$ , AP0 exhibits a significant negative impact of priming on perseverance. A primary look at the results in Table 4 suggests that, although T1 has a significant positive impact on the outcome variables of locus of control and perseverance, it may not be effective in mitigating the impact of poverty priming on the same variables. Only a further look at Table 5 (Panel B) DiD results for T1 can confirm this conjecture.

**Table 4: Treatment effects on outcome variables at t=1**

	(1)	(2)	(3)	(4)
	<i>z</i> -locus	<i>z</i> -EF	<i>z</i> -CH	$\emptyset$
Post (=1)	0.10 (0.12)	0.51** (0.19)	0.00 (0.26)	0.04 (0.03)
Primed (=1)	-0.18 (0.21)	0.01 (0.21)	-0.14 (0.27)	0.01 (0.03)
Post (=1) # Primed (=1)	-0.87*** (0.17)	-1.31*** (0.29)	0.22 (0.39)	-0.15*** (0.04)
Tgroup (=1)	-0.22 (0.17)	-0.09 (0.21)	0.11 (0.27)	-0.02 (0.03)
Tgroup (=2)	-0.17 (0.17)	-0.07 (0.20)	-0.11 (0.23)	0.00 (0.03)
Post (=1) # Tgroup (=1)	2.61*** (0.13)	2.50*** (0.33)	-0.68 (0.34)	0.19*** (0.04)
Post (=1) # Tgroup (=2)	2.02*** (0.15)	2.32*** (0.36)	-0.50 (0.31)	0.17*** (0.04)
Primed (=1) # Tgroup (=1)	0.47 (0.25)	-0.04 (0.27)	-0.17 (0.36)	0.02 (0.04)
Primed (=1) # Tgroup (=2)	0.16 (0.25)	-0.09 (0.28)	0.14 (0.31)	-0.02 (0.04)
Post (=1) # Primed (=1) # Tgroup (=1)	0.35 (0.20)	0.07 (0.43)	0.78 (0.49)	0.01 (0.06)
Post (=1) # Primed (=1) # Tgroup (=2)	1.96*** (0.26)	2.55*** (0.52)	-1.07* (0.49)	0.26*** (0.06)
Constant	-0.02 (0.14)	-0.09 (0.16)	0.07 (0.20)	0.48*** (0.02)
Observations	472	472	472	472
Grade Fixed Effects	✓	✓	✓	✓

Note: Column (1)-(4) presents treatment effects at t=1 on outcome variables z-score of locus (*z*-locus), z-score of effort activity score (*z*-EF), z-score of chance activity score and observed locus of control ( $\emptyset$ ); Primed (=1):AP, reference category is Primed(=0):NP; Tgroup(=1): T1 and Tgroup (=2): T2, reference category is Tgroup(=0): T0; Standard errors in parentheses; \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; Standard errors are robust and clustered at household level

Table 5 (Panel B, Column 3) shows the DiD estimates of outcome variables for AP1 and NP1. The results show that treatment group AP1 [AP + T1] observes a 0.52 sd drop in *z*-locus, 0.14 pp drop in  $\emptyset$  and 1.24 drop in *z*-EF (all significant at 0.001) relative to NP1 [NP + T1]. Additionally, AP1 is also significantly more likely to be perseverant with the chance activity relative to NP1 (*z*-CH is 0.99 sd higher than NP1). Therefore, T1 is not effective in mitigating the impact of poverty priming on perseverance, although it has a significantly positive treatment effect on the outcome variable *z*-locus and *z*-FE independently.

### ***5.3.2. Reflection session with RM: T2***

The aim of T2 is identical to T1, except that it is conjectured that the delivery of the treatment by RM might be more effective based on earlier evidence. Table 4 (Columns 1–2, Row 7) shows that participants in treatment group T2 reports 2.02 sd higher  $z$ -locus, 0.17 pp higher  $\sigma$  and 2.32 sd higher  $z$ -EF (all significant at 0.001), relative to the placebo group T0. Table 4 (Columns 1–4, Row 11) shows that the treatment group that is primed with poverty and receives T2 (AP2) at  $t=1$  exhibits  $z$ -locus 1.96 sd higher,  $\sigma$  0.26 pp higher and  $z$ -EF 2.55 sd higher (all significant at 0.001) relative to the treatment group that is primed with poverty and receives T0 (AP0). The results indicate that T2 may be effective in mitigating the impact of poverty priming on perseverance.

Table 5 (Panel C, Column 3) shows the DiD estimates of outcome variables for AP2 and NP2. The results show that treatment group AP2 [AP + T2] displays 1.09 sd (significant at 0.001) increase in  $z$ -locus, 0.10 pp (significant at 0.05) increase in  $\sigma$  and 1.24 sd (significant at 0.05)  $z$ -EF relative to NP2 [NP + T2]. AP2 is also less reliant on chance activity 0.86 sd lower (significant at 0.05). This implies that those primed with poverty responded to T2 significantly better than NP2. This can be explained by earlier findings where researchers have reported that a growth mindset works better especially among students at risk (Sriram, 2014; Yeager, et al., 2014; Paunesku, et al., 2015; Yeager, et al., 2016; Bettinger, Ludvigsen, Rege, Solli, & Yeager, 2018). The effect size of  $z$ -EF is relatively larger than usual, which is possibly because it is measured immediately after the treatments and additionally, as suggested earlier, perseverance is a choice that may reflect change even after a minimal belief-altering intervention (Bettinger, Ludvigsen, Rege, Solli, & Yeager, 2018).

The results suggest that the dynamic complementarity between the reflection session and the role model is significantly effective in mitigating the impact of poverty on perseverance and that this shift occurs by a simultaneous shift in the control beliefs. Nevertheless, the question remains whether this change could be brought about by a role model intervention in isolation. It has been shown by earlier studies that role models can be useful in breaking behaviour patterns successfully. Therefore, this investigation is an open research question to be explored for future designs. Table B.8 in Online Appendix captures the DiD estimates of treatment groups AP1 and AP2 to isolate the additional impact of RM.

**Table 5: DiD estimates by Treatment II (T0, T1 & T2)**

	Primed (=1) (1)	Post (=1) (2)	DiD (3)	Session FE
<b>Panel A: Placebo (Treatment II: T0)</b>				
<i>z</i> -locus	-0.14 (0.19)	0.10 (0.12)	-0.87*** (0.17)	✓
<i>z</i> -EF	0.05 (0.19)	0.51** (0.19)	-1.31*** (0.29)	✓
<i>z</i> -CH	-0.14 (0.27)	0.00 (0.26)	0.22 (0.4)	✓
∅	0.02 (0.03)	0.04 (0.03)	-0.15*** (0.05)	✓
N	112	112	112	
<b>Panel B: Reflective Session w/o RM (Treatment II: T1)</b>				
<i>z</i> -locus	0.29** (0.13)	2.71*** (0.06)	-0.52*** (0.11)	✓
<i>z</i> -EF	-0.04 (0.15)	3.01*** (0.27)	-1.24*** (0.33)	✓
<i>z</i> -CH	-0.32 (0.24)	-0.68** (0.22)	0.99** (0.29)	✓
∅	0.03 (0.03)	0.23*** (0.03)	-0.14*** (0.03)	✓
N	180	180	180	
<b>Panel C: Reflective session with RM (Treatment II: T2)</b>				
<i>z</i> -locus	-0.01 (0.16)	2.13*** (0.10)	1.09*** (0.20)	✓
<i>z</i> -EF	-0.07 (0.21)	2.83*** (0.31)	1.24** (0.43)	✓
<i>z</i> -CH	0.00 (0.16)	-0.5** (0.18)	-0.86** (0.30)	✓
∅	-0.01 (0.02)	0.21*** (0.03)	0.10** (0.04)	✓
Observations	180	180	180	

Note: The table presents Difference-in-Difference (DiD) results for t=0 and t=1; Column (3) presents DiD estimates for outcome variables z-score of locus (*z*-locus), z-score of effort activity score (*z*-EF), z-score of chance activity score and observed locus of control (∅); Primed (=1):AP, reference category is Primed(=0):NP; Standard errors in parentheses; \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; Standard errors are robust and clustered at household level

#### 5.4. Heterogenous treatment effects, gender and NGO-time

In Table 7, I summarise DiD estimates of differential treatment effects by gender for T0, T1 and T2. Table 7 (Column 1–2) shows that there is no differential effect of priming by gender. Table 7 (Column 3–4) shows that females in treatment group T1 are expected to exhibit 0.25 sd (significant at 0.01) lower *z*-locus relative to male counterparts at t=1. The results suggest that females in treatment group T1 exhibit significantly more external control ideology at than their male counterparts. This could either be due to existing baseline differences or due to the



priming impact not being mitigated effectively by treatment T1. Table 7 (Columns 5–6) shows that female participants in treatment group T2 report 0.92 sd lower  $z$ -locus (significant at 0.01) and 1.74 sd lower  $z$ -EF (significant at 0.01) relative to male counterparts when both receive poverty priming (AP) in the first round. The differential results suggest that the females react significantly less to the male role model. This can be explained by the fact that earlier evidence suggests females respond better to female role models but males respond indistinguishably to both male and female role models (Lockwood & Kunda, 1997; Bettinger & Long, 2005).

In Table 8, I present DiD estimates of differential effects by the number of years spent in the NGO's after-school programme. Each participant in this experimental study has spent between 1 and 4 years in the NGO's after-school programme. The results in Table 8 (Column 6) show that the participants in treatment group T2, who have spent 2 years with the NGO, report 1.82 sd drop in  $z$ -EF (significant at 0.05) post-treatment relative to first year. However, when primed with poverty, they are likely to observe 2.26 sd (significant at 0.01) higher increase in effort than their first-year counterparts. Fourth-year participants in treatment groups T1 and T2 report  $z$ -locus 0.37 sd and 0.63 sd respectively higher (both significant at 0.01) relative to first years; effort score 1.77 sd higher (significant at 0.05) and 1.70 sd higher (significant at 0.01) respectively relative to first years. Therefore, fourth years overall react more positively to treatments T1 and T2. However, the effect of poverty priming on their perseverance is 1.42 sd higher (significant at 0.01) than first-year counterparts. The only possible explanation is they have more stored knowledge of poverty's dejection and priming activated that knowledge, impacting their perseverance. The fourth years are also significantly less responsive to T1 when primed with poverty.

Similar results are observed in Table 9, which shows DiD estimates by age quantiles. Locus of control of the poverty primed participants in the fourth quantile of age responds significantly lesser to T1 but significantly higher to T2 relative to counterparts in the first quantile. The results suggest that senior participants react more to poverty priming and give up sooner than the junior participants. In addition, once they had given up, their beliefs are less malleable relative to the younger participants. Therefore, early intervention is the key as suggested earlier by the champions of early childhood intervention (Heckman & Kautz, 2012; Heckman, Stixrud, & Urzua, 2006; Heckman, Pinto, & Savelyev, 2013).

**Table 7: Heterogenous effects by gender**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>z</i> -locus	<i>z</i> -EF	<i>z</i> -locus	<i>z</i> -EF	<i>z</i> -locus	<i>z</i> -EF
Female (=1)	-0.26 (0.30)	0.35 (0.28)	0.30 (0.16)	0.30 (0.25)	-0.07 (0.22)	-0.16 (0.28)
Post (=1) # Female (=1)	-0.32 (0.23)	-0.43 (0.37)	-0.25* (0.12)	-0.33 (0.47)	-0.07 (0.20)	-0.06 (0.63)
Primed (=1) # Female (=1)	-0.30 (0.40)	-0.01 (0.39)	-0.31 (0.28)	-0.47 (0.30)	0.55 (0.31)	0.47 (0.45)
Post (=1) # Primed (=1) # Female (=1)	0.42 (0.36)	0.55 (0.57)	0.14 (0.22)	0.38 (0.62)	-0.92* (0.37)	-1.74* (0.87)
Age (Years)	0.00 (0.10)	-0.18 (0.12)	-0.12 (0.09)	-0.02 (0.09)	-0.03 (0.10)	0.03 (0.20)
Constant	0.15 (1.19)	1.97 (1.41)	0.98 (1.07)	-0.14 (1.07)	0.20 (1.18)	-0.44 (2.39)
Observations	112	112	180	180	180	180

Note: Column (1)-(2) presents results for T0; Column (3)-(4) presents results for T1; Column (5)-(6) presents results for T2; Primed (=1):AP, reference category is Primed(=0):NP; Reference category male: female (=0); Standard errors in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Standard errors are robust and clustered at household level

**Table 8: Heterogenous effects by NGO year (=1, =2, =3 or =4)**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>z</i> -locus	<i>z</i> -EF	<i>z</i> -locus	<i>z</i> -EF	<i>z</i> -locus	<i>z</i> -EF
Post (=1) # YRNGO (=2)	-0.28 (0.42)	-0.08 (0.45)	-0.07 (0.22)	-1.13 (0.58)	0.07 (0.25)	-1.82** (0.66)
Post (=1) # YRNGO (=3)	-0.21 (0.27)	0.27 (0.64)	0.16 (0.20)	0.50 (0.66)	0.13 (0.27)	-0.01 (0.71)
Post (=1) # YRNGO (=4)	-0.48 (0.31)	-0.18 (0.50)	0.37* (0.18)	1.77** (0.53)	0.63* (0.30)	1.70* (0.81)
Post (=1) # Primed (=1) # YRNGO (=2)	0.26 (0.56)	-1.25 (0.79)	0.10 (0.33)	0.65 (0.77)	0.63 (0.45)	2.26* (1.05)
Post (=1) # Primed (=1) # YRNGO (=3)	0.30 (0.51)	-0.53 (0.81)	-0.29 (0.32)	-0.98 (0.88)	0.02 (0.34)	0.61 (1.03)
Post (=1) # Primed (=1) # YRNGO (=4)	0.28 (0.49)	-1.42* (0.59)	-0.89* (0.37)	-2.01* (0.79)	0.82 (0.49)	0.31 (1.15)
Age (Years)	-0.14 (0.12)	-0.25* (0.12)	-0.11 (0.09)	-0.05 (0.09)	-0.04 (0.11)	0.08 (0.18)
Female (=1)	-0.37 (0.19)	0.22 (0.16)	0.04 (0.11)	0.01 (0.12)	-0.07 (0.11)	-0.33 (0.20)
Constant	2.34 (1.58)	3.32* (1.55)	0.89 (1.15)	0.87 (1.18)	0.67 (1.38)	-0.67 (2.18)
Observations	112	112	180	180	180	180

Note: Column (1)-(2) presents results for T0; Column (3)-(4) presents results for T1; Column (5)-(6) presents results for T2; Primed (=1):AP, reference category is Primed(=0):NP; reference category YRNGO (=1); reference category male: female (=0); Standard errors in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Standard errors are robust and clustered at household level

**Table 9: Heterogenous effects by quantile of age**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>z</i> -locus	<i>z</i> -EF	<i>z</i> -locus	<i>z</i> -EF	<i>z</i> -locus	<i>z</i> -EF
Post (=1) # Primed (=1) # age quantile (=2)	-0.01 (0.57)	-0.69 (0.76)	-0.31 (0.27)	-0.76 (0.75)	0.14 (0.26)	-0.49 (0.91)
Post (=1) # Primed (=1) # age quantile (=3)	0.48 (0.44)	-0.58 (0.72)	-0.45 (0.31)	-0.70 (0.68)	0.42 (0.46)	0.42 (1.04)
Post (=1) # Primed (=1) # age quantile (=4)	0.65 (0.53)	-0.74 (0.77)	-1.09** (0.33)	-1.76** (0.65)	1.19*** (0.31)	-1.05 (1.12)
Female (=1)	-0.51* (0.22)	0.30 (0.17)	0.06 (0.11)	-0.02 (0.12)	-0.03 (0.11)	-0.44* (0.19)
YR @ngo	0.08 (0.11)	-0.26 (0.15)	-0.05 (0.08)	-0.01 (0.13)	-0.02 (0.05)	0.06 (0.13)
Constant	-0.21 (0.51)	0.79 (0.56)	0.36 (0.40)	0.33 (0.53)	0.38 (0.36)	0.81 (0.61)
Observations	112	112	180	180	180	180

Note: Column (1)-(2) presents results for T0; Column (3)-(4) presents results for T1; Column (5)-(6) presents results for T2; Primed (=1):AP, reference category is Primed(=0):NP; Reference category male: female (=0); reference category age quantile (=1); Standard errors in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Standard errors are robust and clustered at household level

## 6. Conclusion

Perseverance through setbacks is integral to achieving successful outcomes in education and the labour market and also for coping with adversity in life. We know that having a higher belief in effort motivates gritty behaviour and this belief is malleable through educational interventions in a classroom setting (Alan & Ertac, 2019; Alan, Boneva, & Ertac, 2019). However, it is simultaneously true that the experience of poverty has a negative impact on perseverance and poor people tend to give up sooner (Sharafi, 2019). There is so far no hard evidence on whether or not belief-altering interventions can mitigate the impact of poverty on the attitude to persevere.

In this article, I present an evaluation of a lab-in-the-field experiment conducted with adolescents aged between 9 and 17 from urban poor localities of Bangalore city in Karnataka (India). It is conjectured that since perseverance is motivated by belief in effort (locus of control), the impact of poverty on perseverance can be mitigated by treating locus of control. The identification strategy uses a novel 2x3 ‘simulating-counteracting’ pair of treatment designs in a lab setting. The first priming treatment aims to simulate poverty mentally and the second counteracting belief-altering treatment aims to mitigate this effect. Outcome is

measured immediately after the second round of treatment using a real effort-chance task. It is presumed that if the counteracting treatment is effective in mitigating the impact of priming, there would be no significant difference in outcome variables between the poverty primed and neutrally primed participants post-treatment. This is a novel design that can be used in the future in a laboratory setting to test the efficacy of a pair of treatments that act in a similar ‘simulating-counteracting’ manner.

The empirical findings confirm that priming with words linked to poverty in a lab-in-the-field setting has a significant negative impact simultaneously on *perseverance* and *locus of control*. An evaluation of the counteracting treatments suggests that treating locus of control is effective in mitigating the impact of poverty on perseverance only when delivered by a relatable role model. As a corollary to this finding, I report differential effect by gender, as the female participants’ locus of control and perseverance is significantly less malleable to the treatment delivered by the male role model. Therefore, for effective mitigation policies for female beliefs and perseverance, using female role models is a more effective approach. The efficacy of the treatments also varies by age group. Senior participants in the NGO’s program are significantly less perseverant when primed with poverty relative to the junior participants. In addition, their beliefs were significantly less malleable to the reflective session delivered without a role model relative to the younger participants. Further, participants in the 4<sup>th</sup> age quantile respond significantly less to only the reflection session; but significantly more malleably when the intervention is delivered by a role model, relative to the participants in 1<sup>st</sup> age quantile. Therefore, to effectively alter beliefs that can mitigate or prevent the impact of poverty on perseverance, early intervention delivered by role models from within the community is key.

Though I do not measure the long-term impact on achievement outcomes as this is only a laboratory experiment, further randomised trials can explore the impact of belief-altering interventions on real economic choices of adolescents. Enhancing consciousness about control ideology can also be critical by itself as it has been suggested that individuals who hold an internal locus of control respond more constructively to obstacles (Brisset & Nowicki, 1973) and people with an external locus of control indulge in self-pitying (Plares, 1968). Therefore, it could be a useful non-cognitive tool for adolescents born to poverty to deal with the adversities of life.

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## For Online Publication

### Appendix A: Figures

#### Figure A.1: Priming activity I (AP) – ‘story reading time’



*Photograph: (instablogs)*

Mita is the second daughter of Keshav and Poornima. Mita is 14 years old. Mita's father works as a daily labour. Mita's mother sells flower outside temple. Mita has three sisters and one brother. Mita's elder sister was not allowed to school and married at 15. Mita has a family of six members. Mita's father earns Rs.300 per day. They live in a small hut in one of the slums. There is no bathroom or kitchen in the house. Six people cook and sleep in the same room. Mita's village does not have electricity. Drinking water facilities is a problem for her village. Mita cooks for the family. Mita's brother goes to school. When there is no food, Mita sleeps hungry. Mita accompanies her mother to sell flowers. Mita has a dream. She wants to go to school. Mita does stitching. Mita had a red frock. Mita's father is looking for a groom for Mita. Mita does not want to get married. Mita wishes to study and work. Girls should be given education. Mita wants to buy new dress for festival. Mita does not have money to buy a new dress. All the girls in the village avoid Mita because she is illiterate. Mita does not like when her parents quarrel over money. Mita has no friends.

**Figure A.2: Priming activity I (NP) – ‘story reading time’**



India is a vast country with second highest population in the world. It is a country with diverse cultures, traditions and beliefs. People in India celebrate unity in diversity. Festivals like Diwali, Holi, Navratri, Ramzan, Christmas etc. are celebrated by people across India and create a sense of brotherhood and cultural unity. Each festival has its religious and cultural importance. India is the land of diverse people belonging to various religions and speaking different languages. Our national language is Hindi. However, there are 22 different official languages spoken in India. It is the birth place of religions such as Hinduism, Buddhism, Jainism, and Sikhism. People in India have diverse dressing styles, different food habits and customs that differ from place to

**Figure A.3: Priming activity II (Questions) – ‘spot the odd word’**

<b>Adversity Priming (Question)</b>	<b>Neutral Priming (Question)</b>
hungry sky blue is	is blue tree sky
old, years mita failure is 14	roses food are red
gutter are red, roses	trees white milk is
broken father works labour, as mita's a daily	blows green wind land the across
mita's temple, flower mother outside sells tree	rains rainy season the egg in it
blows across wind meagre land, the	the is wheel turning sour
of abandoned a has , six mita family	grow in soil boy plants
in rains poverty the it rainy season,	boy old ram year tree a is 14
in small of slums, in a live one they the hardship hut	two grass brothers has ram
brothers, misery two ram has	ram and are ship shyam friends
electricity, village dirty not does mita's have	in east sun west the the rises
neglected of delhi india, the is capital	is capital the dance of delhi india
mita family, the for failure cooks	green sink are trees
are woe green, trees	revolves the the sun around water earth
mita's goes to brother school, suffering	national nepal sport hockey the india of is
the sun, the around bankrupt earth revolves	is tennis bathroom sania mirza a player
sleeps there hungry food when no mita is	has cricket team 31 11 players the
sand and water, mix shortage you cannot	sugar you and cannot mix sand water
sania mirza is unemployed player, a tennis	grass eats meat cow
debt a is he coat, wearing	coat he is wearing goat a
for exercise is cluttered good health,	elder ram cycle brother an has
mother accompanies her mita to sell deficit flowers,	bright blue sun shines
with penniless pencil, write i	exercise for wealth health good is
cow a has legs, four poor	pencil write with i book
none, and malnutrition time for tide wait	the keep on book the table frog
illiterate in sun sets the west,	bag my are there in cows two pencils
dangerous a thing, little knowledge is a inequality	cow four a legs two has
tiger lack carnivorous, is	tiger carnivorous cow is
sets in deprived west, sun the	a soil hot beverage is tea
please shabby open the door,	time for clock tide none and wait
the table, child labour please the book on keep	is thing knowledge life little a a dangerous
broken-down does mita stitching,	the sun in sets west east
had mita red a worn-out frock,	team game single football a is
study to mita child work, wishes and marriage	door tree please the open
powerless the birds chirping, are	please keep the human the table on book
buy dress mita wants new despair festival, to for	the is tiger farmer farming
have does money buy belittle mita to not dress, new a	very water the wide road is
wall, the painter painting the on demean is	roaring are birds chirping the
world, there are seven continents abuse the in	the are singing barking dogs
eating, your scanty wash before hands	green the colour sound trees
cow pauper grass, eats	song the the painter on is wall painting
ram an elder brother, has needy	hari is cycle a book reading
in sun low east, the rises	seven the country in world there continents are
game, a is football excluded	the pour water in the sweater glass
are leaves green, disadvantaged	singing eating hands before wash your

**Figure A.3: Priming activity II (Answers) – ‘spot the odd word’**

<b>Adversity Priming</b>	<b>Neutral Priming</b>
Sky is blue, hungry	Sky is blue, tree
Mita is 14 years old, failure	Roses are red, food
Roses are red, gutter	Milk is white, trees
Mita's father works as a daily labour, broken	Wind blows across the land, green
Mita's mother sells flower outside temple, tree	It rains in the rainy season, egg
Wind blows across the land, meagre	The wheel is turning, sour
Mita has a family of six , abandoned	Plants grow in soil, boy
It rains in the rainy season, poverty	Ram is a 14 year old boy, tree
They live in a small hut in one of the slums, hardship	Ram has two brothers, grass
Ram has two brothers, misery	Ram and Shyam are friends, ship
Mita's village does not have electricity, dirty	The sun rises in the east, west
Delhi is the capital of India, neglected	Delhi is the capital of India, dance
Mita cooks for the family, failure	Trees are green, sink
Trees are green, woe	The earth revolves around the sun, water
Mita's brother goes to school, suffering	Hockey is the national sport of India, Nepal
The earth revolves around the sun, bankrupt	Sania Mirza is a tennis player, bathroom
When there is no food Mita sleeps hungry	The cricket team has 11 players, 31
You cannot mix sand and water, shortage	You cannot mix sand and water, sugar
Sania Mirza is a tennis player, unemployed	Cow eats grass, meat
He is wearing a coat, debt	He is wearing a coat, goat
Exercise is good for health, cluttered	Ram has an elder brother, cycle
Mita accompanies her mother to sell flowers, deficit	Sun shines bright, blue
I write with pencil, penniless	Exercise is good for health, wealth
A cow has four legs, poor	I write with pencil, book
Time and tide wait for none, malnutrition	Keep the book on the table, frog
Sun sets in the west, illiterate	There are two pencils in my bag, cows
A little knowledge is a dangerous thing, inequality	A cow has four legs, two
Tiger is carnivorous, lack	Tiger is carnivorous, cow
Sun sets in the west, deprived	Tea is a hot beverage, soil
Please open the door, shabby	Time and tide wait for none, clock
Please keep the book on the table, child labour	A little knowledge is a dangerous thing, life
Mita does stitching, broken-down	Sun sets in the west, east
Mita had a red frock, worn-out	Football is a team game, single
Mita wishes to study and work, child marriage	Please open the door, tree
The birds are chirping, powerless	Please keep the book on the table, human
Mita wants to buy new dress for festival, despair	The farmer is farming , tiger
Mita does not have money to buy a new dress, belittle	The road is very wide, water
The painter is painting on the wall, demean	The birds are chirping, roaring
There are seven continents in the world, abuse	The dogs are barking, singing
Wash your hands before eating, scanty	Colour the trees green, sound
Cow eats grass, pauper	The painter is painting on the wall, song
Ram has an elder brother, needy	Hari is reading a book, cycle
Sun rises in the east, low	There are seven continents in the world, country
Football is a game, excluded	Pour the water in the glass, sweater
Leaves are green, disadvantaged	Wash your hands before eating, singing

## Figure A.4: Reflective Art Session (Treatment II: T1 & T2)

This is a reflection exercise. There will be no judgement about your artistic abilities! Your completed river will not be displayed. It will continue to serve as a personal reflection tool on your discernment journey. In creating your river, please use whatever supplies you need. Materials needed: crayons, coloured pencils, paper, pen, pencil, music to play while they draw

Before you put anything on paper, think briefly about the course of your whole life and reflect on these questions, which frame this exercise: (10 mins)

- If you were able to compare your life with a river, what would the river look like? **When and where are the smooth, flowing waters – those times when everything good is happening and there is ease in your life? Write down five items. For example, if you have ranked in class, received a gift, or went for a good holiday, saw a new place, got any award, won any competition, any experiences that you can remember relating to good/happy.**
- When does the river take a sudden turn (and what caused the turn), or change from smooth waters to rough, tumbling rapids or to an excited rush of water? **Write down five such unhappy/difficult events of your life in this sudden turns of life. For example, bad grades, punishment from guardian, any bereavement, failure at any endeavour, family problems, etc.**
- Are there rocks or boulders falling into your river – unexpectedly landing there, changing its direction forever? **Spot the five biggest challenges of your life according to you and write them down.**
- Are there points at which it flows powerfully and purposefully or seems to slow to a trickle? **Write down two instances each of success or failure. For example, you got excellent grades, or failed an exam, or could not appear for an exam, or won a competition.**

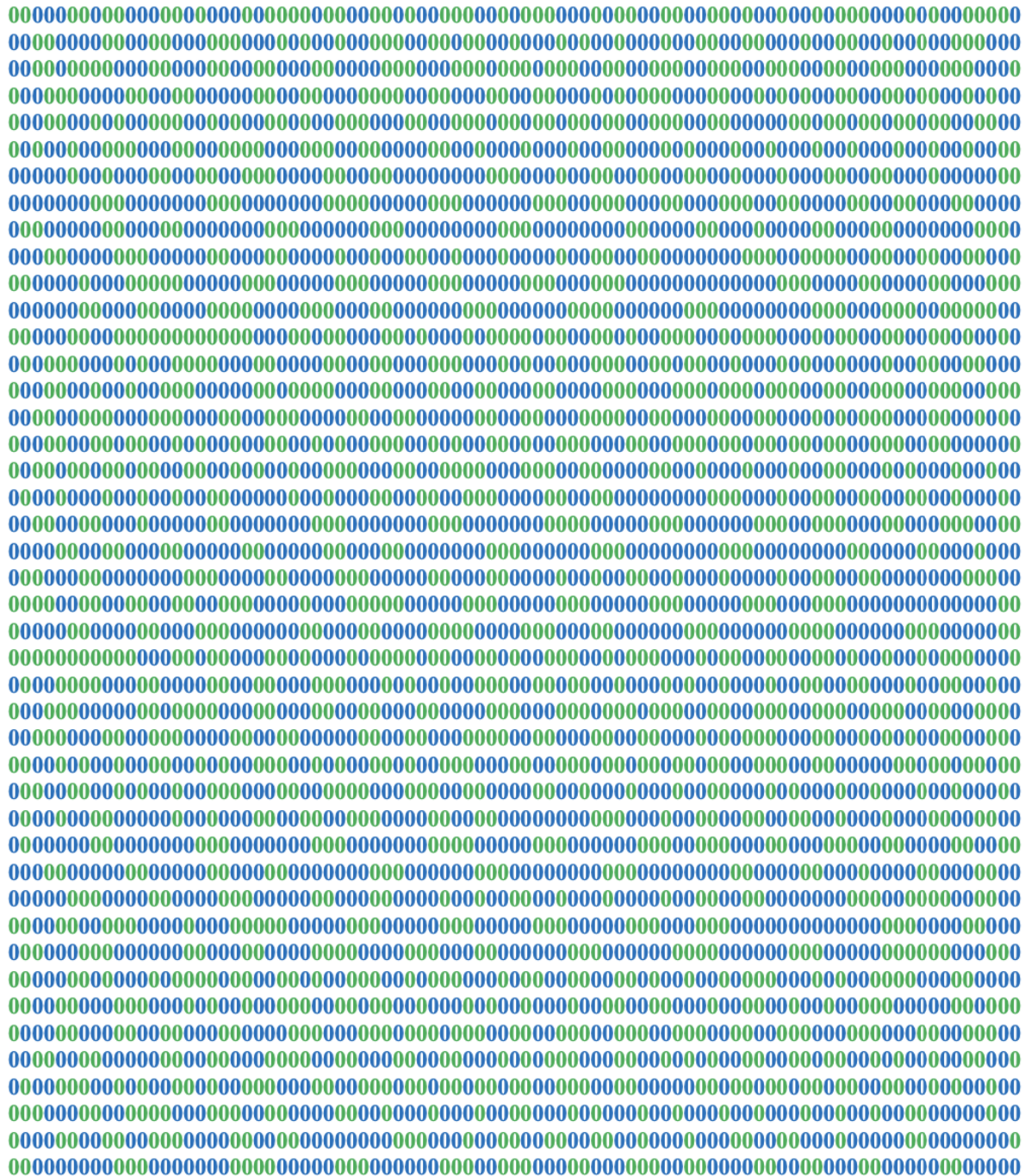
1. Begin with a blank sheet of paper. Draw your river of life: (10 mins)
  - Draw the smooth water
  - Draw the bends and turns
  - Draw the boulders/rocks
  - Draw the rough/forceful waters that leads to changing course of the river
  - With Words/Symbols represent the points you wrote in 1 on your drawing
2. Rivers do not exist in isolation but are always part of a larger ecology. So, too, is human life situated in a larger world. What was going on in the world – family, surroundings, local, social factors – that shaped the flow of YOUR river? Using words/symbols place them on your river. (5 mins)
3. As you look at YOUR river, think about the following with respect to YOUR CONTROL over your life outcomes: Main Reflection (20 mins)
  - In the smooth phases of your life, do you believe you felt sufficient CONTROL over the outcomes in your life?
  - Or, would you assign the smooth phases to chance?
  - If you think you were in CONTROL of the smooth phases of your life, then reflect on the ACTIONS you took to be in control of those good outcomes.
  - If you think the good phases happened only by chance, THINK AGAIN and try to recollect if there were any action that you may have taken that could have influenced the outcome (that you are assuming to be by chance!). For example, you may be thinking that you won the race by chance but may be it is because of the recent increased physical activity level that you have had.
  - Now reflect of the rough/difficult outcomes of your life – do you think they were influenced by the external factors you placed on your river in point 4 or the boulders of your life?
  - Reflect on the boulders of your life. Do you think if you decide to take CONTROL of the direction in which your river flows in, you could resent the effect of boulders? Focus of actions you could take to take CONTROL!
  - What if the boulders are very strong and you fail to fight them? Here the instructors emphasize the significance of making the force of one's actions stronger than the force of obstacle. The instructor gives example, if I give you a hard stick that you are not able to break, if you keep applying force in the right angle, would it/not break at some point? The instructor carries a stick along and gives demo!
  - The instructor concludes by helping the participants understand from their own reflective analysis the importance of channelling one's primary energy towards taking CONTROL of the flow of their own river because "who we are today is a result of our choices"
4. The instructor asks – "If you could take away one phrase from today's session, what would that be?" He prompts the participants but lets them say "taking control of our river". Write this on your river!



## Figure A.5: Outcome measurement: Locus of control

1. If Hari succeeds in life, would it be because of his own effort or will it be a matter of luck? (10-point scale)
  - (a) Reference item 11a – Becoming a success is a matter of hard work, luck has little or nothing to do with it (Rotter, 1966)
  
2. Hari works as a gardener in the house of a school teacher. When he got to know about Hari's love for books, he offered to teach Hari in the evening every day. However, for that Hari needs to finish work and then take out 2 hours every day in the evening and walk 2 Km to go to his house. What would you do if you were Hari?
  - (a) Reference item 11a – Becoming a success is a matter of hard work, luck has little or nothing to do with it (Rotter, 1966). Given this item forms the underlining theme of Q2, the motive is to check whether one believes hard work against odds could lead to success.
  
3. Hari plans to send his sisters to school and not let them work or get them married off soon. What would you do if you were Hari?
  - (a) Reference item 25a - Many times I feel that I have little influence over the things that can happen to me (Rotter, 1966). The aim of Q3 was to see given a choice to influence future outcome, what choices one makes.
  - (b) Reference item 9b- Trusting to fate has never turned out as well for me as making a decision to take a definite course of action (Rotter, 1966).
  - (c) Reference item 28 (CNSIE) - Most of the time, do you feel that you can change what might happen tomorrow by what you do today? (Nowicki & Strickland, 1973)
  
4. Do you think that Hari has control over the direction his life will take?
  - (a) Reference item 28b - Sometimes I feel that I don't have enough control over the direction my life is taking (Rotter, 1966).
  
5. Do you really believe that any child, who faces difficulties in life like Hari, can be whatever he/ she wants to be?
  - (a) Reference item 28a- what happens to me is my own doing (Rotter, 1966).
  - (b) Reference item 2f – Do you really believe a kid can be whatever he wants to be? (Bialer, 1961).

# Figure A.6: Effort Activity Challenge Sheet



## Appendix B: Tables

**Table B.1: LSAS non-cognitive skills and Grade**

	(1) IO	(2) ODSP	(3) TI	(4) MC	(5) UFI
Age (Yr.)	0.66** (0.25)	0.44 (0.26)	0.27 (0.24)	0.59* (0.25)	0.39 (0.24)
Female (=1)	0.58* (0.29)	0.37 (0.30)	-0.15 (0.27)	0.08 (0.30)	0.68* (0.29)
Grade (=5)	-1.97* (0.86)	1.70 (0.89)	1.65* (0.82)	-0.35 (0.89)	-0.09 (0.84)
Grade (=6)	-0.85 (0.91)	3.61*** (0.99)	3.50*** (0.93)	0.72 (0.95)	1.39 (0.90)
Grade (=7)	-1.56 (1.06)	1.37 (1.10)	1.13 (1.06)	-1.56 (1.10)	-0.21 (1.07)
Grade (=8)	-1.71 (1.25)	2.20 (1.33)	2.63* (1.25)	-0.10 (1.29)	1.19 (1.25)
Grade (=9)	-2.31 (1.50)	2.29 (1.58)	1.83 (1.46)	-0.25 (1.52)	0.48 (1.48)
YRNGO (=2)	0.91 (0.70)	-1.90* (0.75)	-1.24 (0.69)	-0.20 (0.72)	-0.26 (0.69)
YRNGO (=3)	0.61 (0.67)	-2.27** (0.71)	-0.88 (0.69)	-0.61 (0.69)	-0.14 (0.67)
YRNGO (=4)	-0.31 (0.64)	-2.37*** (0.69)	-0.93 (0.66)	-1.42* (0.68)	-1.17 (0.66)
cut1	3.38 (2.41)	3.61 (2.53)	2.28 (2.30)	3.85 (2.44)	2.17 (2.35)
cut2	7.50** (2.43)	7.92** (2.60)	4.98* (2.32)	8.06** (2.50)	5.99* (2.38)
cut3	12.20*** (2.58)	11.76*** (2.81)	10.26*** (2.56)	11.39*** (2.61)	10.96*** (2.61)
N	230	230	230	230	230

Notes: Column (1)-(5) presents ordered logit (*ologit*) results from regressing the LSAS non-cognitive skills individual characteristics. Here IO: Interacting with Others; ODSP: Overcoming Difficulties and Solving Problems; TI: Taking Initiative; MC: Managing Conflict; UFI: Understanding and Following Instructions. Reference grade is grade 4 and reference Yrngo is =1. Standard errors are in parenthesis. The estimates are reported as being significant at \*  $p < 0.1$ , \*\*  $p < 0.05$  and \*\*\*  $p < 0.01$ .

**Table B.2: Sample Allocation by Grade**

		T0	T1	T2	Sub-total	Total
Grade 4	AP	8	6	6	20	39
	NP	7	6	6	19	
Grade 5	AP	6	7	7	20	40
	NP	6	7	7	20	
Grade 6	AP	10	7	7	24	48
	NP	10	7	7	24	
Grade 7	AP	6	8	8	22	45
	NP	7	8	8	23	
Grade 8	AP	6	7	7	20	39
	NP	5	7	7	19	
Grade 9	AP	4	6	6	16	33
	NP	5	6	6	17	

Note: AP: poverty priming; NP: neutral priming; T0: placebo art session; T1: reflective session w/o RM; T2: reflective session with RM

**Table B.3: Power calculation**

alpha =	0.05
power =	0.8
delta =	-0.64
m0 =	0.64
ma =	0
sd =	1
Estimated sample size:	
N =	20

Notes: The power calculation has been based on the difference-in-difference effect size of outcome variable ‘self-image’ in Ghosal et. al (Forthcoming). The standard deviation is assumed to be known. Self-image was deemed fair to be used given the absence of any study on locus of control at that time when this study was designed, since self-image is closely associated with locus of control.

**Table B.4: Timeline of Activities**

Programme	Date
Baseline (t=0) data collection on outcome variables (All Grades)	7th January, 2016
Treatment I + Treatment II + Data collection on outcome variables (t=1) - 4th Grade	18th January, 2016
Treatment I + Treatment II + Data collection on outcome variables (t=1) - 5th Grade	19th January, 2016
Treatment I + Treatment II + Data collection on outcome variables (t=1) - 6th Grade	20th January, 2016
Treatment I + Treatment II + Data collection on outcome variables (t=1) - 7th Grade	21st January, 2016
Treatment I + Treatment II + Data collection on outcome variables (t=1) - 8th Grade	22nd January, 2016
Treatment I + Treatment II + Data collection on outcome variables (t=1) - 9th Grade	25th January, 2016

**Table B.5: Principal component factor analysis of Locus of Control questions**

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.832	0.736	0.367	0.367
Factor2	1.096	0.347	0.219	0.586
Factor3	0.749	0.020	0.150	0.736
Factor4	0.729	0.136	0.146	0.881
Factor5	0.593	.	0.119	1.000

Variable	Factor1	Factor2	Uniqueness
Q1	0.674	-0.411	0.377
Q2	0.651	-0.430	0.391
Q3	0.651	0.141	0.557
Q4	0.651	0.320	0.473
Q5	0.326	0.787	0.274

**Table B.6: Cronbach's alpha**

Item	Observations	Sign	Item-test correlation	Item-rest correlation	Average interim correlation	alpha
Q1	420	+	0.6242	0.348	0.1848	0.4755
Q2	420	+	0.6127	0.3323	0.1905	0.4849
Q3	420	+	0.6355	0.3635	0.1791	0.4661
Q4	420	+	0.6464	0.3787	0.1737	0.4567
Q5	420	+	0.4733	0.1559	0.26	0.5843
Test Scale					0.1976	0.5519

**Table B.7: Effort Activity Levels**

Levels	Challenge	Timing
Level 1	Count 15 blue zeros	15 seconds
Level 2	Count 20 blue zeros	20 seconds
Level 3	Count 30 blue zeros	30 seconds
Level 4	Count 15 blue zeros	12 seconds
Level 5	Count 20 blue zeros	15 seconds
Level 6	Count 30 blue zeros	25 seconds
Level 7	Count 35 blue zeros	30 seconds
Level 8	Count 40 blue zeros	35 seconds
Level 9	Count 45 blue zeros	40 seconds
Level 10	Count 50 blue zeros	40 seconds

**Table B.8: DiD estimates for AP1 and AP2**

	(1)	(2)	(3)	(4)
	<i>z</i> -locus	<i>z</i> -EF	<i>z</i> -CH	$\emptyset$
Post (=1)	2.19*** (0.09)	1.77*** (0.20)	0.32 (0.18)	0.09*** (0.02)
Tgroup (=2)	-0.26 (0.16)	-0.04 (0.16)	0.09 (0.20)	-0.03 (0.02)
Post (=1) # Tgroup (=2)	1.03*** (0.20)	2.30*** (0.38)	-1.67*** (0.29)	0.22*** (0.03)
Constant	0.03 (0.11)	-0.24** (0.08)	-0.14 (0.16)	0.49*** (0.01)
Observations	180	180	180	180
Grade Fixed Effects	✓	✓	✓	✓

Note: The table presents Difference-in-Difference (DiD) results for AP1 and AP2; Tgroup(=2): T2, reference category is Tgroup(=1): T1; Standard errors in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Standard errors are robust and clustered at household level

**Table B.9: Heterogenous effects by gender**

	(1)	(2)	(3)	(4)	(5)	(6)
	z-locus	z-EF	z-locus	z-EF	z-locus	z-EF
Post (=1)	0.24 (0.14)	0.70** (0.25)	2.85*** (0.09)	3.18*** (0.38)	2.17*** (0.17)	2.87*** (0.45)
Primed (=1)	0.01 (0.25)	0.06 (0.23)	0.46** (0.16)	0.21 (0.24)	-0.27 (0.24)	-0.31 (0.32)
Post (=1) # Primed (=1)	-1.06 (0.22)	-1.55*** (0.34)	-0.60*** (0.12)	-1.44** (0.48)	1.51*** (0.30)	2.04** (0.63)
Female (=1)	-0.26 (0.30)	0.35 (0.28)	0.30 (0.16)	0.30 (0.25)	-0.07 (0.22)	-0.16 (0.28)
Post (=1) # Female (=1)	-0.32 (0.23)	-0.43 (0.37)	-0.25* (0.12)	-0.33 (0.47)	-0.07 (0.20)	-0.06 (0.63)
Primed (=1) # Female (=1)	-0.30 (0.40)	-0.01 (0.39)	-0.31 (0.28)	-0.47 (0.30)	0.55 (0.31)	0.47 (0.45)
Post (=1) # Primed (=1) # Female (=1)	0.42 (0.36)	0.55 (0.57)	0.14 (0.22)	0.38 (0.62)	-0.92* (0.37)	-1.74* (0.87)
Age (Years)	0.00 (0.10)	-0.18 (0.12)	-0.12 (0.09)	-0.02 (0.09)	-0.03 (0.10)	0.03 (0.20)
Constant	0.15 (1.19)	1.97 (1.41)	0.98 (1.07)	-0.14 (1.07)	0.20 (1.18)	-0.44 (2.39)
Observations	112	112	180	180	180	180

Note: Column (1)-(2) presents results for T0; Column (3)-(4) presents results for T1; Column (5)-(6) presents results for T2; Primed (=1):AP, reference category is Primed(=0):NP; Reference category male: female (=0); Standard errors in parentheses; \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; Standard errors are robust and clustered at household level



**Table B.10: Heterogenous effects by NGO year (=1, =2, =3 or =4)**

	(1)	(2)	(3)	(4)	(5)	(6)
	z-locus	z-EF	z-locus	z-EF	z-locus	z-EF
Post (=1)	0.38 (0.25)	0.53 (0.33)	2.57*** (0.17)	2.55*** (0.42)	1.90*** (0.22)	2.71*** (0.53)
Primed (=1)	-0.40 (0.49)	-0.31 (0.38)	0.41 (0.36)	-0.59 (0.33)	-0.18 (0.26)	-0.43 (0.39)
Post (=1) # Primed (=1)	-1.10** (0.41)	-0.53 (0.33)	-0.19 (0.29)	-0.48 (0.59)	0.65* (0.30)	0.48 (0.82)
YRNGO (=2)	-0.34 (0.52)	-0.07 (0.47)	0.39 (0.35)	-0.02 (0.37)	-0.10 (0.36)	0.04 (0.41)
YRNGO (=3)	-0.50 (0.52)	-0.39 (0.40)	0.16 (0.34)	-0.48 (0.40)	-0.63 (0.38)	-0.35 (0.36)
YRNGO (=4)	-0.25 (0.47)	-0.27 (0.44)	0.00 (0.33)	-1.10* (0.44)	-0.80* (0.34)	-0.90* (0.43)
Post (=1) # YRNGO (=2)	-0.28 (0.42)	-0.08 (0.45)	-0.07 (0.22)	-1.13 (0.58)	0.07 (0.25)	-1.82** (0.66)
Post (=1) # YRNGO (=3)	-0.21 (0.26)	0.27 (0.64)	0.16 (0.20)	0.50 (0.66)	0.13 (0.27)	-0.01 (0.71)
Post (=1) # YRNGO (=4)	-0.48 (0.31)	-0.18 (0.49)	0.37* (0.18)	1.77** (0.53)	0.62* (0.30)	1.70* (0.81)
Primed (=1) # YRNGO (=2)	0.48 (0.66)	0.33 (0.59)	-0.49 (0.44)	0.13 (0.45)	-0.16 (0.37)	0.09 (0.54)
Primed (=1) # YRNGO (=3)	-0.11 (0.62)	0.56 (0.51)	-0.20 (0.43)	0.70 (0.40)	0.52 (0.40)	0.96 (0.55)
Primed (=1) # YRNGO (=4)	0.64 (0.55)	0.55 (0.48)	0.11 (0.44)	1.09* (0.44)	0.23 (0.43)	0.37 (0.58)
Post (=1) # Primed (=1) # YRNGO (=2)	0.26 (0.56)	-1.25 (0.79)	0.10 (0.33)	0.65 (0.77)	0.63 (0.44)	2.26* (1.05)
Post (=1) # Primed (=1) # YRNGO (=3)	0.30 (0.50)	-0.53 (0.80)	-0.29 (0.32)	-0.98 (0.88)	0.02 (0.34)	0.61 (1.03)
Post (=1) # Primed (=1) # YRNGO (=4)	0.28 (0.49)	-1.42* (0.58)	-0.89* (0.37)	-2.01* (0.79)	0.82 (0.49)	0.31 (1.15)
Female (=1)	-0.36 (0.19)	0.22 (0.15)	0.06 (0.11)	0.02 (0.12)	-0.06 (0.11)	-0.34 (0.19)
Constant	0.49 (0.40)	0.06 (0.32)	-0.41 (0.27)	0.26 (0.29)	0.236 (0.29)	0.34 (0.33)
Observations	112	112	180	180	180	180

Note: Column (1)-(2) presents results for T0; Column (3)-(4) presents results for T1; Column (5)-(6) presents results for T2; Primed (=1):AP, reference category is Primed(=0):NP; reference category YRNGO (=1); reference category male: female (=0); Standard errors in parentheses; \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; Standard errors are robust and clustered at household level

**Table B.11: Heterogenous effects by quantile of age**

	(1)	(2)	(3)	(4)	(5)	(6)
	z-locus	z-EF	z-locus	z-EF	z-locus	z-EF
Post (=1)	0.28 (0.22)	0.46 (0.30)	2.33*** (0.13)	2.26*** (0.31)	1.69*** (0.12)	1.59** (0.48)
Primed (=1)	-0.36 (0.44)	-0.19 (0.37)	0.16 (0.31)	-0.67* (0.31)	-0.25 (0.21)	-0.33 (0.34)
Post (=1) # Primed (=1)	-1.16** (0.36)	-0.85* (0.40)	-0.05 (0.24)	-0.52 (0.41)	0.56** (0.19)	1.43 (0.77)
age quantile (=2)	0.47 (0.46)	0.14 (0.35)	-0.75* (0.34)	-0.40 (0.42)	-0.41 (0.39)	-1.23** (0.46)
age quantile (=3)	0.21 (0.39)	-0.18 (0.35)	-0.53 (0.38)	-0.52 (0.46)	-0.48 (0.44)	-0.90 (0.74)
age quantile (=4)	0.63 (0.53)	-1.20 (0.82)	-0.84 (0.54)	-1.11* (0.50)	-1.32** (0.49)	-1.66* (0.83)
Post (=1) # age quantile (=2)	-0.01 (0.42)	-0.19 (0.40)	0.41** (0.16)	-0.05 (0.59)	0.20 (0.18)	0.16 (0.61)
Post (=1) # age quantile (=3)	-0.31 (0.25)	-0.14 (0.51)	0.42* (0.17)	0.75 (0.52)	0.46* (0.21)	1.14 (0.65)
Post (=1) # age quantile (=4)	-0.34 (0.30)	0.82 (0.43)	0.74*** (0.14)	2.52*** (0.44)	1.10*** (0.19)	3.82*** (0.73)
Primed (=1) # age quantile (=2)	-0.02 (0.62)	0.37 (0.63)	0.14 (0.40)	0.68 (0.36)	0.55 (0.37)	0.83 (0.45)
Primed (=1) # age quantile (=3)	0.61 (0.55)	0.24 (0.42)	0.02 (0.42)	0.77* (0.35)	0.52 (0.40)	-0.01 (0.48)
Primed (=1) # age quantile (=4)	0.25 (0.58)	0.20 (0.72)	0.39 (0.40)	1.20** (0.40)	0.24 (0.36)	0.26 (0.53)
Post (=1) # Primed (=1) # age quantile (=2)	-0.01 (0.57)	-0.69 (0.76)	-0.31 (0.27)	-0.76 (0.75)	0.14 (0.26)	-0.49 (0.91)
Post (=1) # Primed (=1) # age quantile (=3)	0.48 (0.44)	-0.58 (0.72)	-0.45 (0.31)	-0.70 (0.68)	0.42 (0.46)	0.42 (1.04)
Post (=1) # Primed (=1) # age quantile (=4)	0.65 (0.53)	-0.74 (0.77)	-1.09** (0.33)	-1.76** (0.65)	1.19*** (0.31)	-1.05 (1.12)
Female (=1)	-0.51* (0.22)	0.30 (0.17)	0.06 (0.11)	-0.02 (0.12)	-0.03 (0.11)	-0.44* (0.19)
YRNGO	0.08 (0.11)	-0.26 (0.15)	-0.05 (0.08)	-0.01 (0.13)	-0.02 (0.05)	0.06 (0.13)
Constant	-0.21 (0.51)	0.79 (0.56)	0.36 (0.40)	0.33 (0.53)	0.38 (0.36)	0.81 (0.61)
Observations	112	112	180	180	180	180

Note: Column (1)-(2) presents results for T0; Column (3)-(4) presents results for T1; Column (5)-(6) presents results for T2; Primed (=1):AP, reference category is Primed(=0):NP; Reference category male: female (=0); reference category age quantile (=1); Standard errors in parentheses; \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; Standard errors are robust and clustered at household level