Increasing School Enrollment Rates in Developing Countries Using Norm-Nudging

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We applied principles of norm-nudging to design a randomized controlled trial aimed at improving student enrollment rates and reducing drop-out rates of schools in developing communities. This intervention describes a cost-effective, SMS-based method of administering our norm-nudge to household decision-makers, i.e., the parents, in villages of Andhra Pradesh, India.

Introduction

Importance of Education

According to a paper by Pervez Zamurrad Janjua and Usman Ahmed Kamal (2011), education is the most significant contributor to poverty alleviation. Education is the fundamental building block for sustainable development in any country around the world. Inclusive and quality education for all is the fourth SDG described by the United Nations. Education and its effect play a role in every sphere of society be it labor productivity, poverty, trade, technology, health, income distribution, and family structure. Developing countries are in dire need of an inexpensive intervention.

No country has attained steady economic growth without substantial investment in human resources. Previous studies have shown significantly large returns to various types of accumulation of human capital: basic education, science, training, learning-by-doing, and aptitude (Ozturk, 2008). According to a WorldBank report in 2010: “Reducing poverty without increasing people’s capabilities by educating them does not prevent them from falling back into poverty and does not guarantee better living conditions”. Educating people allows them to build better lives by earning higher wages, which translates into higher levels of food security and better health. On a national economic level, a more educated society leads to a more stable workforce, which prevents the nation from regressing back into poverty.

According to the World Economic Forum, 2015: “Providing every child with quality education would boost GDP by an average 28 percent per year in lower-income countries and 16 percent per year in high-income countries.” This translates to 51 million children dropouts and routinary absenteeism of approximately 46 percent of children in the 11-16 year age bracket the next 80 years (ASER, 2015). The distribution of education plays a pivotal role here. In most nations, unequal education access appears to have a detrimental impact on per capita income. Thus equitable education is indispensable to economic development. An accessible and equitable education system promotes not only economic development, but also increases productivity, and generates a higher individual income per capita (Ozturk, 2008).

Indian Education System

India, the focus of this study, has made progress relating to overall economic and developmental aspects. From 2011 to 2015, India saw about more than 90 million people, escaping poverty which has led to a reduction in poverty from 46 percent to 13 percent from 1995-2015 ("Overview", 2020), which is a huge decrease in the number of people living below the poverty line. India also saw a significant GDP growth rate of 6.1 percent and an increase in exports of about USD 330 billion due to India’s booming manufacturing sector ("Export Import Data Bank", 2018). Despite overall economic progress, India’s education sector still presents dismal facts and figures. As of 2015, India currently witnesses a 25 percent overall illiteracy rate which has the potential to make individuals regress back to a state of poverty. Moreover, there is a 17 percent drop out rate for children between 11-16 years. This translates to 51 million

children dropouts and routinary absenteeism of approximately 46 percent of children in the 11 to 16 year age bracket (ASER, 2015). Children are forced to drop out and work as child laborers and according to official estimates, India has approximately 17 million children in the workforce ("Underprivileged Children Situation in India - CRY America", 2020). Policy-related interventions can partly solve logistical factors contributing to low school enrollments like lack of funding, infrastructure, geographical distance between home to school, and hunger. However, social factors like not sending girls to school, gender stereotypes, child marriage, and lack of aggregate demand for education require social norm-centric interventions. India needs social norm centric interventions because of the alarming results in the Annual Status Education Report (ASER, 2015).

Target Location

To address the above issues with a field experiment, we target a rural region of a south-eastern state of India, Andhra Pradesh. Andhra Pradesh is the tenth most populous state in India with nearly 50 million inhabitants with 21 percent living in multidimensional poverty. The overall literacy rate of Andhra Pradesh at 67.7 percent is well below the national average of 74.1 percent. This pattern is reflected in the levels of literacy between both males and females. Andhra Pradesh's 75.6 percent male literacy rate is lower than the 80 percent-plus in all other states and lower than the 82.1 percent national average. The 59.7 percent female literacy rate is also lower than 60 percent plus in other states and is slightly lower than the 65.5 percent national average (National et al., 2020). It can often be difficult to carry out experiments in rural areas, but with the fast adoption of cell phones, it makes this particular intervention possible. 84 percent of residents in rural Andhra Pradesh have access to cell phones and SMS messages.

Barriers to Education

There are many reasons for low enrollment rates, distance from a school, financial restrictions, social and cultural norms which our study can potentially target. While some policy-related interventions have proven to be quite effective, such as providing financial assistance and building more schools, it is terribly expensive and cost-prohibitive. However, social factors like not sending girls to school, gender stereotypes, child marriage, and lack of aggregate demand for education require social norm-centric interventions and also tend to be much less expensive. Enrolling a child in school is just the first step, keeping them in school is as equally important. There were many reasons cited by parents to withdraw their children from school. One reason was gender-discrimination and gender-stereotyped biases. According to surveys and focus groups, it was clear that the villagers mostly prefer sending boys to the school than the girls (ASER, 2015). Parents were of the view that girls need not be provided education on par with the boys. Parents of girl children said that enrolling or retaining the girl child in school would cause trouble in finding a suitable groom for marriage. According to them, it was far easier to settle down the marriage of an uneducated girl or girl with lesser education than the girl with higher education. Moreover, the marriage of uneducated girls can be performed earlier than the ones who pursue higher education which means reducing their

responsibilities earlier. An educated girl is seen to be a burden on aged parents as she is expected to get married much later. Other reasons included redirecting their children to help their mothers in local cigarette manufacturing and earning money for survival and female members' marriages. Thus the major reasons include poverty and economic hardship which made it difficult for parents to keep their children in school leading them to force children into work to assist in household and agricultural activities. All this clearly shows that adding to the family income and receiving help in household activities appear to be their immediate concerns of the parents and not the long-term benefits from education (Rena, 2007).

Background

Previous Efforts by the Indian Government

The Indian government has introduced incentivization programs like mid-day meal programs in schools in Andhra Pradesh that aims to improve the wellbeing of children at the primary and upper primary levels, enable deprived children belonging to disadvantaged groups, attend school more frequently, and help them concentrate on classroom activities. These programs have shown to have a significantly positive impact on enrollment and retention for children (Singh and Gupta, 2013), however, there has been a lack of much more cost-effective, social-norm driven campaigns and interventions that tackle social norms issues at the grassroots level.

Previous Nudge Strategies

When people don't do what they should, despite it being better for themselves, and for the greater good, it may sound simple to just make that the law, i.e., create policy. However, forcing someone to do something isn't an effective way to drive sustained behavior change, because we like to feel in control of our choices (Broom, 2003). We do things because we want to do them, so when others try to influence our decisions, we don't just go along, we push back. We eat things that we shouldn't, we don't exercise as much as we should, and we avoid doing what others suggest because we don't want to feel like someone else is controlling us. According to Jonah Berger, a professor at Wharton,

> "*Our innate anti-persuasion radar raises our defenses, so we avoid or ignore the message or, even worse, counter-argue, conjuring up all the reasons why what someone else suggested is a bad idea. Sure, the governor said to stay home but they're overreacting. Maybe the virus is bad in some parts of the country, but I don't know a single person who has gotten it. And besides, many people who get it are fine anyway, so what's the big deal? Like an overzealous high school debater, they poke and prod and raise objections until the persuasive power of the message crumbles."*

Understanding people's biases and heuristics allows us to create messages that cater to them and drive change in behavior. Effective behaviorally-based messages have proven to be effective (Gopalan et al, 2016). The effectiveness of messages could vary based on whether a message is how it is framed, and based on the desired behavioral outcome. Gain-framed or loss-framed (framed to emphasize the potential gains or losses relating to performing or not performing the targeted health behavior) may be more effective in certain situations. Targeting low-risk behaviors such as dietary changes or exercise suggest that gain-framed messages may be more effective than loss-framed messages. However, when financial losses are a highlighted consequence of not engaging in the targeted behavior a loss-framed message will be more effective.

We have also seen behaviorally-driven texting used to improve education-related outcomes in rural areas of the U.S.A. (Castleman et al., 2015). However, the focus of their messages has been on individual students, and they used 'information' as the behavioral lever (Rare, 2020) to change behavior, whereas we would want to administer something more general, more scalable. Information is considered a soft psychology-based commitment device (Bryan, 2010), hence we wanted to apply a stronger device like social norms. There is a lot of research using social norms, even within SMS messaging. The OECD used text messages to decrease corrupt officials in Colombia. Evan Lieberman and colleagues provide a clear example of how simple the distribution of information can cause change. This study is an essential reference, because, first, it is one of few to overlap with investigations conducted by Lieberman et al. (2014) touching on the need and potential benefits of introducing broad factual information as a base to increase civic engagement and second, it cements the efficacy of SMS interventions in influencing outcomes when questions asked are closed-ended and varied using empirical vs. normative information (Observatory of Public Sector Innovation, 2017).

Since social norms dictate many actions of people in close-knit communities (Bicchieri, 2005) in rural India, we would like to test how effective social norms-related messages can be to improve education-related outcomes.

Intervention Design

Pre-Study

Before launching the main intervention, we propose conducting a pre-study in our target village where a research team will run focus groups and qualitative interviews. The goals of this pre-study are as follows:

- To understand people's reference groups for education-related decisions in households. The reference group identified will be used in the SMS-content.
- To understand who are the decision-makers in households for education-related decisions for children. Is it just parents or other caregivers like grandparents too?

- Measure the existence of stronger incumbent norms that may nullify the norm-nudge we are trying to achieve.

Main Experimental Design

The experiment will have two groups as follows:

Control (Group A)	Treatment (Group B)	Outcome Variables
No social norm messages (n = 60)	Social norm messages (n = 60)	Attendance Drop-out rate

Experiment Steps

After obtaining the required information from the pre-study, we will launch the experiment in our target village in Andhra Pradesh. The total duration of the experiment is expected to last for two years. We will perform the following five steps — Recruitment, Attendance Check, Attendance Feedback, Weekly Norm-Nudge, and Monthly Norm-Nudge.

Recruitment

We conducted a power analysis to determine our desired sample size. Assuming an expected effect size of 0.5, a type 1 error rate of 5 percent, and the desired power of 80 percent, we determined the sample size for each treatment to be about 60 students. Hence, the total sample size would be 120.

Based on these calculations, we will contact parents (or other caregivers identified from the pre-study) that have children with ages between 11 and 16. All parents will be given information about the study they will be a part of and will be presented with factual information on the negative consequences of dropping out of school. After 120 parents enroll, they will be randomly sampled into one of our two groups — the control group (A) and the treatment group (B).

The participants will also be incentivized to remain a part of the experiment. The incentives will be aligned with school attendance goals, like free textbooks, school supplies, uniforms, tuition rebates, and take-home ration for students with attendance in the top 10 percent.

Attendance Check

For groups A and B. Daily, parents will be sent the following message to check if their child attended their school that day:

Did your child attend school today?
Please reply 'Yes' or 'No'

Attendance Feedback

For group B. Daily, parents will also receive the following feedback based on their attendance record compared to their reference group:

Your child's attendance record: 22/25
Good job! :-) :-) :-)

The feedback messages will be either '*Good job! :-) :-) :-)*', '*There's room to improve! :-) :-)*', or '*Can do better! :-)*'.

Weekly Norm-Nudge

For group B. Weekly, parents will receive norm-nudge messages based on one of the three norm-change phases (Erik Thulin, 2018) of the study. In Phase I (generate collective demand) the message will be:

Most parents in your community believe it is good for their child to attend school.

In Phase II (coordinate a shift in behavior) the message will be:

33 out of 35 children attended school every day this week in your community.

In Phase III (strengthen the norm) the message will be:

45 out of 50 people in your community believe that children
who drop-out earn less income for their families.

Monthly Norm-Nudge

For group B. Monthly, parents will again receive norm-nudge messages based on one of the three norm-change phases (Erik Thulin, 2020) of the study. On top of that, they will receive an SMS with general results of attendance with the names of the children of all members of the group so that everyone can see the results. Framing factors will be considered to guarantee the messages induce positive responses conducive to the experiment's school attendance goals. For example, if over 30 percent of students skip one day, frame attendance for the day as "a majority of students attended class today" instead of explicitly mentioning the 70 percent. The monthly messages can also include a note to the conditionality of incentives based on attendance.

In Phase I (generate collective demand) the message will be:

53 out of 60 parents in your community believe it is good for their child to attend school.

In Phase II (coordinate a shift in behavior) they will receive empirical evidence on top attendees in their reference group:

Top achievers this month:

Krishna Reddy (100/110)
Shobha Naidu (98/110)

In Phase III (strengthen the norm) the message will be:

145 out of 150 people in your community believe that children who drop-out earn less income for their families.

Outcome Variable

The two variables that will be monitored throughout will be attendance-levels and drop-out rates. We will use three different sources to corroborate our data for these variables, first, the attendance records from schools, second, daily SMS feedback, and finally, through periodic unannounced spot-checks by researchers.

Analysis Plan

To test for the difference in our outcome variables, we will use the non-parametric Mann Whitney U test to see if there is a statistically and economically significant difference in means between the two groups.

Behavioral Concepts

The following behavioral concepts were applied when designing this intervention:

1. Insights on changing norms (Bicchieri and Xiao, 2009) are applied in the SMS-content. When understandings of normative and empirical information are not congruent, we frequently see that the empirical information exerts a stronger pull than the normative one.

2. Insights on norm creation (Eric Thulin, Rare, 2018) are applied in the three-phase SMS strategy. There are three crucial steps when trying to create a new norm -- generating collective demand (target behavior should be done, others think target behavior should be done); coordinating a shift in behavior (others are adopting this target behavior); and strengthening the norm (there are negative consequences to be seen acting against the target behavior).

3. Insights on salience (Kim, 2006) are applied by sending daily messages about attendance, making the desired behavior salient. Salient behaviors are more likely to be adopted than non-salient ones.

4. Insights on social comparison (Allcott, 2011) are used when providing attendance feedback with the smiley faces. Comparing households' electricity use to that of their neighbors using smiley faces affected their energy usage.

Conclusion

Expected Results

Our expected results are based on the following hypotheses:

> **H_0**: No difference in attendance between children whose parents receive social norm messages and those who receive factual information only.
>
> **H_A**: The children whose parents receive social norm messages (empirical and normative information) have higher attendance.

We expect our alternative hypothesis to attain significant statistical results. Our expectations follow from the following points.

Our dynamic experimental design pays particular attention to the framing effects highlighted by Gopalan, which establishes the need to vary gain vs. loss framing effects in influencing low-risk behaviors (Gopalan et al., 2016). The simple act of altering our framing effects should, according to the research, suffice to induce a significant statistical variation in our treatment relative to our control group in this scenario.

Secondarily, the study contains incentives, and we propose a conditionality clause for receiving said incentives. A 2018 meta-analysis by Eldad Yechiam focusing on loss aversion highlights the notion that many factors mediate the strength of avoidance to potential losses. With that in mind, there is more than one loss avoidance inducing strategy in our design. We cover framing effects, and variations in reward size, which should trigger the one thing that very often holds and triggers loss aversion in experiments "minus pain is sweeter than plus pleasure." (Yechiam, 2018). Moreover, in the meta-analysis, smaller payoffs will be very appealing in influencing desired behavior by minimizing the perceived potential losses from partaking in the study, as highlighted by Yechiam.

Finally, our messaging feedback follows the same principles covered by the Bogota OECD study on norm-nudging using social information, as analyzed in 2019 by Bicchieri and Dimant. As per Bichiccieri and Dimant's suggestions, we are paying particular emphasis on framing effectively through altering expectations instead of normalizing the operationalized negative behaviors (Bicchieri et al., 2019).

Overcoming Challenges

While the former expectation of results suggests a high level of confidence and positivity in our experimental design, there are some challenges to our implementation and potential outcomes that warrant addressing.

Pre-Existing Norms

One primary concern with our research is the possible effects that Indian society-specific social norms may play in confounding our results. While this may be indeed a source of concern, as suggested by Joseph Henrich, Steven J. Heine, and Ara Norenzayan that data and designs from western educated, rich, industrialized, and democratic (WEIRD) countries may not be generally replicable in opposite settings. Henrich et al., also make note that from an anthropological standpoint, since humans are all members of the same species, they must necessarily follow similar psychological decision-making processes. Proper experiment implementation strategies then, should be used to nullify (partially) said confounders (Henrich et al., 2010). In our case, we decided to opt for the pre-experimental survey as a method to minimize said confounding effects. Since the survey aims to identify reference groups, key decision-makers in each household, and underlying local social norms, we cover three of the main elements suggested by Bicchieri and Dimant to understand the context specifics of social behavior properly and nudge with care (Bicchieri et al., 2019).

Wealth-Related Effects

A secondary concern related to our research deals with the effects that initial stages of wealth may have on our result and their replicability. Our intervention targets individuals in some of the poorest regions in India. However, it is necessary to clarify that in this stage of the experimental design we do not address specifically how initial levels of wealth may influence our results. It is essential to bring this to attention, as we understand that scrutinizing our results under the lens of expected utility vs. prospect theory, for example, may lead to very different interpretations of the results because of the differences between the theoretical valuations and discounting methods (Munier et al., 1998).

Technological Barriers

A third concern with our research design has to do with technological barriers. While our background data on cell phone ownership in Andhra Pradesh suggests high levels of mobile device ownership, it is wrong to assume that property is equal to actual proficiency in using the devices. Our method to overcome this difficulty is a test-trial, and training before the intervention takes place to ensure everyone is capable of replying as instructed in the experiment. An example of a study that addressed the former issue efficiently adopting the same measure is the Bogota SMS nudging study. By getting the proper technical training and carrying out a trial, the

researchers of the OECD were able to get over a 90% success rate with a high continuation of the experiment by participants (Observatory of Public Sector Innovation, 2017).

Spillover Effects

Finally, a common question in any behaviorally-based intervention is the potential for spillover effects. For example, could limited observable non-adherence to the program cause a negative shift in empirical beliefs leading to the detriment of our results? While the previous question remains to be asked, a five-year longitudinal working paper sponsored by the World Bank on conditional transfer payments to increase female school attendance in neighboring Pakistan sheds light on the one spillover effect evidenced on their case on incentivized school attendance. Andaleeb Alam, Javier E. Baez, and Ximena V. Del Carpio find that spillover effects rather than occurring at a local-community level, are more likely to emerge at the household level if more than person partakes in the study at the same time (Andaleeb et al., 2011). As such, we will be careful to limit participation to a single individual per household.

Looking Ahead

Efficacy Low-Cost Interventions

We hope this research helps to elucidate the potential efficacy of low-cost interventions such as SMS messaging in critical topics such as school attendance, in areas of high need such as Andhra Pradesh, in India. While prior studies have shown how conditional transfer programs may help change behavior, we have also seen how interventions of said nature may also be costly and non-sustainable for longitudinal studies. In our research, we cover framing effects, incentivization through multiple means, and use caring nudge design to leverage social norms and messaging as a mechanism to impact behavior. Through our results, we hope to address some of the holes found in the cited relevant literature in the prior studies that motivated our intervention. We expect our results to expand the behavioral research field by helping scientists get a better grasp of the potential impacts of social normative messaging on reference groups in incentivized norm nudging interventions. We also aim to broaden the understanding of who is the key decision-maker when it comes to education matters in the household, and whether varying household participation in norm nudging can limit spillover effects. In concluding with the presentation of our design, we also raise attention to the following questions, which overlap and align closely with our topic for future research.

Scaling and Implementation

Scaling interventions may always present challenges. In our case, a particular issue paid little attention to is the homogeneity of our sample since we are focusing on a specific region in a country and one particular demographic. The motive to obviate said factor is the little available amount of information in executing said interventions in areas with different cultures, incomes, demographics, and social structures. It lingers, how may these factors affect the responses? Secondarily, we cover the fact that humans, as a species, follow similar psychological

decision-making processes; however, culture needs to be further explored to understand how different ethnic-based norms may affect our understanding of social norms.

Backfiring of Nudges

The third point for future research is related to an aspect covered by Bicchieri and Dimant in their 2019 paper. Research data suggests that repeated exposure to negative behavior and information may lead to normalization of negative behavior. Conversely, may positive actions such as class attendance over a prolonged exposure lead to rebounds in deviation because norms become underrated? In the study previously cited in Pakistan on conditional transfers to increase female school attendance, we saw that having more than one individual participating in an intervention mediated norm reversal; this warrants more profound research. Finally, incentivized interventions have so far only used to address one variable. Could future interventions address more than one variable at a time?

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