Pre-analysis Plan for "Transforming School Climate by Harnessing Adolescent Demand for Autonomy"

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March 2022

1 Introduction

We evaluate an educational program that aims to improve the school climate in socioeconomically disadvantaged post-primary schools by leveraging adolescents' natural demand for autonomy. The innovative nature of the intervention is that it aims to channel adolescents' struggle for independence into the effort of transforming their schools' climate. To do this, the intervention indirectly targets adolescents' beliefs about their ability to control their own lives and influence their environment, i.e., their locus of control. This indirect targeting works by giving a stronger sense of autonomy to select adolescents (senior students), we refer to as "student teachers," to convey the importance of these beliefs to their younger peers (junior students). This unique implementation style is expected to improve individual outcomes of both adolescents (student teachers and their close networks) and their younger peers. By internalizing what they teach, we expect the student teachers to take responsibility for transforming their surroundings, help mitigate bad behavior and establish good norms in their schools. We expect these changes to materialize mainly through their improved internal locus of control. We also expect junior peers to be directly affected by these teachings, adopt good behavioral norms, and have improved internal locus of control.

We first select student teachers based on their in-degree centrality in friendship networks, popularity, and emotional intelligence scores. These select students were given a curriculum to cover one hour per week for 5 months in junior classes with mostly hands-off guidance from designated interns. The trial involves 65 middle schools in the Turkish province of Diyarbakir. Student teachers were chosen from grades 7 and 8 (senior years in middle school), and they teach 5th and 6th-grade students, respectively (junior years in middle school) in their own schools.

We performed the randomization and selected student teachers after collecting baseline data from all 65 schools in Fall 2021. We first assigned 32 schools to treatment and 33 to

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control by assigning 50% ex-ante probability to each status. We then randomly assigned 33 control schools to two arms: Arm 1: placebo interactions arm (16 schools) and pure control arm (17 schools), again assigning 50% ex-ante probably to each arm. The placebo arm aims to rule out the effects that might stem from mere interaction between student teachers and juniors and, therefore, pin down the pure effect of the content of the curriculum. The pure control serves as the policy-relevant control group as it represents the status-quo in Turkish middle schools. Both treatment and placebo treatment cover the period between December 2021 and April 2022. Endline fieldwork is planned for April-May 2022.

2 Outcomes and Hypotheses

We will test the effectiveness of the program with respect to a wide range of outcomes. To construct our outcomes, we use five main data collection tools:

- Surveys

- Incentivized experiments

- Social networks

- Cognitive tests

- Administrative records

Our primary outcomes of interest can be grouped into five categories.

- Incentivized games: We will design novel incentivized games to capture the desire to work for a community and the stance against anti-social behavior.

- Cognitive Tests: We will conduct math and verbal tests in the class. The research team will prepare these tests based on the national curriculum of the relevant grade level. Performances in these tests will constitute our objective measures of math and verbal performances.

- Administrative Records: These are official disciplinary referrals and absenteeism.

- Social Networks: Friendship and support networks

- Surveys: We will measure mental well-being, belongingness, behavioral norms

Our secondary outcomes are survey outcomes to explore the mechanism of change:

- Internal and external locus of control

- Impulsivity

- Social confidence, sense of autonomy

- Emotional intelligence

Our central hypothesis is that the program will improve overall school climate and individual social and emotional outcomes. We conjecture that the main mechanism will be improved social confidence, internal locus of control, and the feeling of autonomy.

3 Empirical Models

Below, we lay out the empirical specification that we will use to estimate the effect of the intervention.

3.1 Benchmark Model

To test the null hypothesis that the program had no impact on the outcome y, we estimate the average treatment effect conditioning on baseline covariates that are predictive of the outcome of interest:

$$y_{is} = \alpha_0 + \alpha_1 T_s + X'_{is}\gamma + Other_{is} + \delta_b + \varepsilon_{is}$$

where T_s is a dummy variable which equals 1 if school s is in the treatment group and zero otherwise, and X_{is} is a vector of observables for student i in school s that are potentially predictive of the outcome y. These include demographics, baseline cognitive and sociocognitive skills, IQ (measured by Raven's Progressive Matrices, Theory-of-Mind, convergent thinking, and outcome variables collected at baseline. $Other_{is}$ captures other variables (for particular outcomes) that might be added for specific regressions, and δ_b are strata (district) fixed effects. Because we expect full compliance, the estimated $\hat{\alpha}_1$ is the average treatment effect on the treated. We will cluster the standard errors at the school level and make multiple hypotheses testing adjustments.

3.2 Placebo Treatment

Because the program involves interns visiting classrooms and student teachers doing activities with junior students, we designed a placebo arm to isolate the effect of the content of the educational program.

For this, we will estimate the following empirical specification:

$$y_{is} = \alpha_0 + \alpha_1 T_s + \alpha_2 T_s^p + X'_{is}\gamma + Other_{is} + \delta_b + \varepsilon_{is}$$

where T_{is} is again a dummy variable which equals 1 if the student i in treated school s zero otherwise. T_{is}^p is a dummy variable which equals 1 if the student i in placebo school s zero otherwise.

4 Heterogeneous Treatment Effects: Direct Effects, Indirect Effects, and Spillover Effects

We will estimate the effects separately on junior students, which we refer to as "direct effects," select student teachers, which we refer to as "indirect effects," and the network of select student teachers, which we refer to as "spillover effects."

5 Power Calculations

For all power calculations, we assume 95% confidence intervals and 80% power. Below table presents our power calculations.

Variables	Clusters in Treatment	Clusters in Control	Cluster Size	N	Mean	MDE	SD	ICC	Percent Change
Turkish Score	32	33	350	22750	4.294	0.571	2.456	0.109	0.133
Math Score	32	33	350	22750	3.914	0.535	2.372	0.103	0.137
Bullying in Class	32	33	350	22750	0.470	0.047	0.499	0.016	0.100
Bullying in School	32	33	350	22750	0.490	0.046	0.500	0.015	0.094
Sensitivity to World Issues	32	33	350	22750	3.413	0.095	0.881	0.021	0.028
Locus of Control	32	33	350	22750	3.200	0.073	0.542	0.035	0.023
Impulsivity	32	33	350	22750	2.116	0.035	0.570	0.005	0.017
Perspective Taking	32	33	350	22750	3.166	0.105	0.659	0.049	0.033
Mental Wellbeing	32	33	350	22750	3.040	0.049	0.524	0.015	0.016
Belonging	32	33	350	22750	2.858	0.068	0.660	0.019	0.024
Autonomy	32	33	350	22750	2.593	0.052	0.581	0.014	0.020
In-Degree Friendship	32	33	350	22750	2.767	0.373	2.613	0.039	0.135