Analysis Plan

The MPACT project is designed to address three main research questions. Two questions are whether light-touch behavioral tools and whether tablets improve children test scores. The model to estimate is

$$Y_{ic} = \beta_0 + \beta_1 T1_{ic} + \beta_2 T2_{ic} + \beta_3 T3_{ic} + \beta_4 T4_{ic} + \alpha X_{ic} + \gamma_c + \varepsilon_{ic}$$

where Y_{ic} is primary outcome of child i in classroom c; $T1_{ic}$ is an indicator for belonging to treatment arm 1 (tablet); $T2_{ic}$ is an indicator for treatment arm 2 (MKit); $T3_{ic}$ is for treatment group 3 (MKit plus present-bias text messages); $T4_{ic}$ is for treatment group 4 (MKit plus growth-mindset text messages); X_{ic} is a vector of observable characteristics, including child's baseline test scores, child's demographics, and parent's demographics; γ_c is classroom fixed effects; and ε_{ic} is an error term. The coefficients β_1, β_2, β_3, and β_4 estimate the treatment effects or ITT. This model is estimated with and without observable characteristics. The sample for estimation consists of children in treated classrooms.

Similar regression is run for secondary outcomes (parental attitudes and beliefs on math engagement with children).

We are also interested in heterogeneous effects in five baseline characteristics. We estimate model of the form

$$\begin{aligned} Y_{ic} &= \beta_0 + \beta_1 T1_{ic} + \beta_2 T2_{ic} + \beta_3 T3_{ic} + \beta_4 T4_{ic} + \alpha X_{ic} + \theta Z_{ic} \\ &\quad + \phi_1 T1_{ic} \times Z_{ic} + \phi_2 T2_{ic} \times Z_{ic} + \phi_3 T3_{ic} \times Z_{ic} + \phi_4 T4_{ic} \times Z_{ic} + \gamma_c + \varepsilon_{ic} \end{aligned}$$

where Z_{ic} is the characteristic of interest, and the coefficients ϕ_1, ϕ_2, ϕ_3, and ϕ_4 tell us whether a specific treatment benefit more certain types of children. The characteristics are: (i) indicator equals 1 if child's parent is above the median of our measure of present bias, (ii) indicator equals 1 if child's parent is below the median of our growth-mindset measure, (iii) indicator for child's baseline score below median, (iv) child's sex, and (v) child's race.

The third main research question is whether peer effects exist. To address this, we estimate

$$Y_{ic} = \beta_0 + \beta_1 TC_{ic} + \alpha X_{ic} + \gamma_c + \varepsilon_{ic}$$

where TC_{ic} indicates whether child i was assigned to a treated classroom.

The coefficient β_1 tells us whether students exposed to treated peers score higher than students who were not exposed. This model is estimated with and without covariates. Sample consists of control kids from untreated and treated classrooms.

To investigate whether teachers change their behaviors because of the presence of treated students, we use the model

$$Y_c = \beta_0 + \beta_1 TC_c + \alpha X_c + \varepsilon_c$$

where Y_c is one of our secondary outcomes at the classroom level (teacher's attitudes and beliefs on math engagement with children) and X_c includes teacher's and classroom's characteristics. This model is estimated with and without covariates.