COLLEGEBOUND BOOST:
SOWING TANGIBLE HOPE (STH) INTERVENTION
RESEARCH PLAN

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This study will address the following research questions (RQs) through a multi-arm randomized controlled trial (RCT):

RQ1) What is the impact of providing quarterly CSA deposits ($250 per quarter for 12 months) to families with children's savings accounts (CSAs) on the outcomes listed above?

a. CSA assets and savings behaviors?
b. Parent educational expectations for their children?
c. Parent-reported child social and emotional development?

RQ2) What is the impact of providing quarterly CSA deposits ($250 per quarter for 12 months) and guaranteed income payments ($500/month for 24 months) to families with children's savings accounts (CSAs) on the outcomes listed above compared to a:

a. No-treatment control condition
b. Quarterly CSA deposits only condition
c. *Guaranteed income payments* + quarterly deposits condition

By comparing the quarterly deposits condition to the effect of the *guaranteed income* + quarterly deposits condition we will indirectly assess the impact of guaranteed income. However, the estimate of this effect will include the independent impact of guaranteed income and any additional interactive effect of guaranteed income with quarterly deposits.

Overview of Project Design

Impact Study

This multi-arm experimental study is designed to test the impact of each of the interventions above independently against a no-treatment control group or against another treatment group on the outcomes of interest. The quarterly deposits condition will test the impact of combining the two interventions relative to a no-treatment control or relative to the quarterly deposit only condition in isolation. Together these analyses will not only provide rigorous evidence of impact but also useful information on the relative impacts of each intervention to allow for cost-effective policy decisions.

Sample

To recruit eligible participants, a subcontractor, *Pan Atlantic,* will combine name and address information with phone banks to recruit a total of 1,000 families to participate in the study. All families will be screened to ensure eligibility (CSA account holder, household income of no more than 300% of the federal poverty guideline (FPG), resident of the City of Saint Paul). Families will be asked to provide verbal consent to participate (a waiver of documentation of consent will be requested from the University of Michigan Institutional Review Board) and will subsequently be contacted a week later by email or phone to confirm participation. Those who respond to a follow-up inquiry will be included in the study. This ensures that the sample of respondents provide accurate contact information and that they will respond to the study team. We expect this secondary follow-up will insure higher survey response rates for the study.

Random Assignment

We will employ a rolling random assignment approach to assign CSAs to each condition. That is, eligible account holders who consent and respond to the second communication will be randomly assigned to one of three conditions: 1) no-treatment control; 2) quarterly CSA deposits only, or 3) a combined condition including quarterly deposits and guaranteed income. Because each treatment can begin as soon as random assignment occurs, we will be able to conduct random assignment for each account holder immediately after the consent process. After random assignment, households randomly assigned to one of the three intervention conditions will be notified. Following an intent-to-treat (ITT) approach, this study will examine the impact of each of the two treatment conditions outlined above across a 24-month timeframe though consent procedures will allow for subsequent longitudinal follow-up. This study will leverage extant program and savings data (at 6, 12, 18, and 24 months) and survey data (at 12 and 24 months) to conduct the proposed analyses following based on time since random assignment. The proposed design will provide an unbiased estimate of impact on the outcomes listed above by employing random assignment of account holders to condition. Indeed, this design meets What Works Clearinghouse (WWC) Standards of Evidence without reservations if we observe no baseline differences or differential attrition and limited overall attrition.

To facilitate equivalence on characteristics of account holders at baseline, we will block our ITT sample of 1,000 households using 3 blocking variables including: (1) age of child (born January-June of 2020, July-December 2020, January-June of 2021, July-December 2021, or January-May of 2022), (2) family saver status (no contributions, made at least one contribution; and (3) total assets within the account (<$100, $101-500, $501-1,000, >$1,000). Within each block, account holders will be randomly assigned to one of three conditions using a random number generator that ensures assignment of one family to each condition within each block for every three families in the order they sign-up. Following random assignment, we will conduct statistical analyses to assess baseline equivalence (detailed further below under **Potential Threats to Internal and External Validity**).

Implementation Study

An implementation study will assess the fidelity of implementation of each intervention independently. For guaranteed income, this includes assessing whether funds were deposited (or checks sent and cashed) as scheduled for each family, and whether communication about these deposits was delivered to each recipient. For quarterly CSA deposits, this includes assessing whether funds were deposited to program accounts as scheduled for each child, and whether communication about these deposits was delivered to each family. For each family assigned to one of the treatment conditions, we will categorize implementation for each intervention as low, moderate, or high implementation to contextualize impacts and to support complier average treatment effect analyses (see Analytic Approach).

Blocked Random Assignment

Potential Threats to Internal and External Validity

Below we outline potential challenges and proposed solutions for both internal and external validity.

Internal Validity

The inferences that we make about the impact of each treatment condition (or combinations of treatments) are based on the Neyman-Rubin-Holland (NRH) approach to causality. This approach relies on counterfactuals and potential outcomes (Holland, 1986, 1988; Rubin, 1974, 2004). A primary threat to internal validity is nonequivalence of units at baseline, which in this case refers to differences between characteristics of account holders (and characteristics of corresponding students and families) in the treatment and control groups that exceed a recommended threshold (e.g., standardized mean difference of 0.25 or greater per WWC evidence standards). Our blocked approach to random assignment mitigates these risks by imposing internal controls to ensure equal representation of account holders varying in the age of their child, their saver status, total assets in the CSA within in each condition. In addition to this control as part of the random assignment procedure, we will assess baseline equivalence on these variables and all other available pretreatment variables available via extant data from CBSP or via a pre-screening interview or questionnaire.

We address a second potential threat to internal validity—attrition and/or differential attrition from intervention—by using an intent-to-treat (ITT) approach for all primary analyses of impact on CSA contribution outcomes. That is, all households in the treatment groups or control group will be included in analyses, regardless of receipt of CSA or income funds.

Using an ITT approach also addresses a third potential threat to validity, "crossovers," which are households in the control group who are exposed to treatment. Because we are able to track distribution of funds for quarterly CSA deposits to program accounts or receipt of guaranteed income (e.g., cashing of check or receipt of direct deposits), we will be able to identify any households assigned to one condition that unintentionally participates or receives access to treatments from the other conditions. We will descriptively summarize any incidents of crossover. In event that crossovers are detected in the sample, the outcomes of all households will be examined using their original ITT assignment to condition.

External Validity

External validity focuses on generalizability. Because our sample will include economically disadvantaged parents or guardians of young children who were auto-enrolled in CBSP, our findings will likely generalize to similar families in other urban environments. However, because all participants will have actively consented to participate, and because these individuals will not be randomly sampled from a broader population, our findings may be less or not applicable to similar families who chose not to participate, or who never responded to outreach communications during the recruitment process.

Statistical Power

We used PowerUp! to calculate the minimal detectable effect size (MDES) for continuous outcomes (Dong & Maynard, 2013) for an individual random assignment study. Power analyses assume a significance level alpha of 0.05 (two-tailed test), statistical power beta of 0.80, an equal probability of assignment to each condition, and approximately 40 percent of the outcome variance explained by CSA-level covariates (prior contribution, prior total value). Following these assumptions, **we are powered to observe a minimal detectable effect size (MDES)=0.168. For survey outcomes, the MDES would be 0.189, 0.202, 0.218 and 0.239 respectively for 80%, 70%, 60% and 50% response rates on the survey.**

Data Collection

The outcomes used to address RQs 1 & 2 will be obtained from two data sources: (1) extant financial data from the CSAs obtained at 6, 12, 18 and 24 months after random assignment; and (2) a survey of participating parent/guardians of children with CSAs at 12 and 24 months after random assignment for each participant. We will obtain financial data for the N=1,000 CSA account holders from CollegeBound Saint Paul under an existing data sharing agreement. We also will work with Pan Atlantic to administer a survey to all N=1,000 families and provide a $40 gift card for completing the survey.

CSA measures. To assess CSA savings and savings behaviors, we will calculate (at minimum) the following metrics for analysis at 6 and 12 months following random assignment:

- **Any CSA contribution.** A binary indicator for whether a family made at least one contribution to the CSA since random assignment.
- **Number of contributions.** A count of the number of contributions made to the student's CSA since random assignment.
- **Total contribution value.** The total value of all contributions made to the student's CSA since random assignment.
- **Average contribution value.** The average value of contributions made to the student's CSA since random assignment.
- **Participation in CBSP incentivized activities.** A binary indicator for whether a family receive an incentive in their CSA for participation in a CBSP incentivized activity.
- **Number of CBSP incentivized activities.** A count of the number of incentives received for participation in CBSP incentivized activities since random assignment.
- **Total CSA value.** The total CSA assets in dollars (including, assets, contributions and incentives) since random assignment.

All other outcomes measures will be measured via the parent survey administered 12 and 24 months after random assignment. We will determine the final measures in collaboration with CBSP but expect to minimally include validated measures of parent educational expectations for their children, parent financial literacy and capability, and if possible (based on the age of children), parent-reported child social and emotional development. Whenever possible, the survey will leverage measures employed in the SEEK OK study to allow for replication of key findings.

Implementation measures. For quarterly CSA deposits*,* we will code whether funds were deposited to program accounts as scheduled for each child, and whether communication about these deposits was delivered to each family. For guaranteed income*,* we will code whether funds were deposited (or checks sent and cashed) as scheduled for each family, and whether communication about these deposits was delivered to each recipient. Also, as highlighted earlier, we will categorize implementation for each intervention for each child's family as low, moderate, or high implementation based on thresholds collaboratively established with project partners.

Analysis Plan

Below, we outline the analysis approach for this study.

Missing Data. There will be no missing data outcomes based on extant data because calculation of outcomes will be based on extant CSA account activity, which is directly observable within the system administrative data. For any missingness on covariates included in impact models, we will employ mean imputation and dummy covariate adjustment following Puma et al. (2009). For missing outcome data based on surveys, we will employ listwise deletion for impact analyses and conduct sensitivity analyses that use multiple imputation or inverse probability weighting to adjust for bias associated with missing outcome data—two approved methods in current WWC evidence standards.

Impact Analyses. To test the ITT estimates of impact of being randomly assigned to one of the intervention conditions relative to a no-treatment control group (or another intervention condition) on continuous outcomes, we will model blocks as fixed effects to account for the unique effects of each block (which effectively controls for age of child, saver status, total CSA assets). Except for the treatment indicator, each predictor will be centered around its grand mean. For continuous outcomes, the impact model will be as follows:

$$Y_i = \beta_0 + \beta_1{*}(Treatment)_i + \beta_2{*}(ParentCharacteristics)_i + \beta_3{*}(Block)_i + e_i \qquad (1)$$

Y_i is the outcome for child (CSA) i, β_0 is the average child (CSA) outcome, β_1 is the impact of the intervention condition relative to control (or another treatment condition), $ParentCharacteristics_i$ is a vector of indicators for demographic characteristics (ethnicity, gender obtained from program and/or recruitment eligibility screening), $Block_i$ is a vector of binary indicators representing fixed effects of Block for child (CSA) i, e_i is the random error associated with the estimated outcome for child (CSA) i.

Analyses of binary outcomes will remove the residual term e_i and replace the continuous outcome Y_i with $\eta_i = \log(\varphi_i / 1 - \varphi_i)$, which is the log of the odds of an outcome (e.g., being a saver), φ_i is the probability of that outcome for child (CSA) i, e_i is the error associated with the estimated log odds of that outcome for child (CSA) i.

Complier average causal effect (CACE). We will supplement our ITT analyses with CACE analyses for each outcome. CACE, also referred to as "local average treatment effect" (Angrist, Imbens, & Rubin, 1996; Gennetian, Morris, Bos, & Bloom, 2005), represents the treatment effect on those who comply with their treatment assignment (i.e., compliers). CACE is not treatment-on-the-treated (TOT), as the latter is the treatment effect on both compliers and always-takers—those who would receive treatment regardless of treatment assignment. Because CACE captures the effect of externally induced changes in the treatment received, the purpose of most interventions in the social sciences (Gennetian et al., 2005), it is more policy relevant than TOT.

We will estimate the effect of each intervention separately on compliers using an instrumental variable approach particularly well suited for CACE analysis in an experimental context (Angrist et al., 1996; Gennetian et al., 2005; Schochet & Chiang, 2009). Lottery-based random assignment will be a natural instrument because the random assignment procedure is expected to have a positive effect on implementation of each intervention and implementation of each intervention is likely to be the only plausible path through which the random assignment procedure could improve outcomes. It is unlikely that any child or their family consenting to participate in the study would deliberately do or experience the opposite of the assignment received, regardless of assignment. Thus, all three key assumptions under which the instrumental variable approach produces an unbiased estimate for CACE (nonzero causal effect of treatment assignment on treatment receipt, exclusion restriction, and monotonicity [no defiers]) are likely to hold.

Specifically, using the Stata program *ivreg2* (Baum, Schaffer, & Stillman, 2010), we will obtain the predicted probability of implementing each intervention with moderate or high fidelity for each child/family based on a linear probability model. Specifically, we will estimate the probability that each household achieves at least moderate levels of implementation. This predicted probability of implementation will be used to predict each outcome. The equation used to predict each outcome will be similar to the main impact model except that the binary treatment indicator will be replaced with the predicted probability of implementation. The coefficient for the predicted probability of implementation with at least moderate fidelity represents the effect of each intervention on outcomes for children/families that comply with random assignment.