Chronic Sleep Deprivation Among the Poor: A Lab-in-the-field Approach

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Statistical Analysis Plan

The purpose of this document is to outline the statistical analysis plan for analyzing all primary and secondary outcomes registered with clincialtrials.gov collected for "Chronic Sleep Deprivation Among the Poor: A Lab-in-the-field Approach."

The primary outcome is the amount of sleep per participant during each 24-hour period, measured in hours, which was collected using actigraphs.

The secondary outcomes include:

- Blood pressure, systolic, diastolic, pre-hypertensive, and hypertensive.
- Depression, measured by the PHQ-9 questionnaire
- Illness, defined as the number of days ill in the past week
- Inhibitory Control, measured by performance on a Hearts and Flowers test
- Memory, measured by performance on a Corsi memory test
- Attention, measured by performance on a Psychomotor Vigilance Task (PVT)
- Activities of Daily Living, measured by the SF-36 RAND health survey
- Subjective Well-being, measured using three questions from the Gallup survey
- Happiness, measured using two questions adapted from the SF-36 RAND survey and the Gallup poll

For all outcomes, the analysis consists of a regression to determine the effect of each of the five treatment arms, separately, on each outcome. The regression specification follows:

$$\gamma_{id} = \alpha + \beta_1 \cdot Nap + \beta_2 \cdot SleepDevices + \beta_3 \cdot DevicesIncentives + \beta_4 \cdot NapDevices + \beta_5 \cdot NapDevicesIncentives + \delta_i + \varphi_i + \rho_d + \varepsilon_{id}$$

Where γ_{id} is each primary and secondary outcome for every participant i on day d. α is the intercept. β_1 to β_5 capture the treatment effects, compared to the control group, of the nap only, sleep devices only, sleep devices and incentives, nap and sleep devices, and sleep devices, incentives, and nap treatment groups, respectively. δ_i is the baseline measure of the dependent variable for participant i. φ_i is a vector of participant level controls, which include gender and age. ρ_d is a vector of day-level controls, including day in study fixed effects and calendar date fixed effects.

Each coefficient β represents the difference in the outcome variable, comparing each treatment arm to control, that is due to treatment. For each treatment group, the statistics reported are the mean of the control group summed with the respective coefficient, and the standard error of each coefficient estimated by the regression.