Analysis plan for
Sustainability in a dynamic public goods game

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1 Set-Up

We study the "sustainability game." In every round every player chooses how much of his/her endowment to contribute to the public account, which determines the endowments in the next round. If the sum of contributions is below a given threshold, the next round's endowments are reduced. Contributing according to the threshold is called *Cooperation*. Contributing zero is called *Defection*. The efficient strategy profile is *Cooperation* of all players. In the baseline setting, *T-Baseline*, *Defection* is the unique (symmetric Markov-perfect) equilibrium. In the setting without strategic interaction, *T-OnePlayer*, *Cooperation* is the unique equilibrium. In the setting with a lower threshold, *T-LowThreshold*, both *Defection* and *Cooperation* are equilibria.

2 Primary Hypotheses

- **Without strategic interaction, *Cooperation* is more often played and *Defection* is less often played.**
  - Justification: With strategic interaction, *Defection* is the unique equilibrium; without strategic interaction, *Cooperation* is the unique equilibrium. This game-theoretic prediction captures free-riding incentives.

  - Analysis: Compare frequency of contributing near *Cooperation* and near zero between *T-Baseline* and *T-OnePlayer*. Also compare contributions between these treatments, where without strategic interaction higher contribution shares are expected.

- **Without strategic interaction, the threshold is reached more often.**
  - Justification: same as above.
  - Analysis: Compare frequency of reaching the threshold and levels of endowments between *T-Baseline* and *T-OnePlayer*.

- **When the threshold is lower, *Cooperation* is more often played and *Defection* is less often played.**
  - Justification: With the baseline threshold, *Defection* is the unique equilibrium; with the lower threshold *Cooperation* becomes an additional equilibrium.
  - Analysis: Compare frequency of contributing near *Cooperation* and near zero between *T-Baseline* and *T-LowThreshold*.

- **When the threshold is lower, it is reached more often.**
  - Justification: same as above.
  - Analysis: Compare frequency of reaching the threshold and staying sustainable between *T-Baseline* and *T-LowThreshold* in comparison to this difference for random contributions.

Secondary Hypotheses:

- **Agreeable people contribute more.**
  - Justification: Agreeableness includes measures of altruism, trust, and morality, all of which could naturally correlate positively with cooperation in our game.

  - Correlate contribution shares with agreeableness (in each treatment). Same for groups, i.e., average agreeableness and average contribution shares.

- **People with high cognitive ability more often play *Cooperation* and more often play *Defection*.**

  - Justification: People with high cognitive ability might more often play the game-theoretic equilibrium.
  - Analysis: Compare individuals with high and low Raven score with respect to frequency of contributing near *Defection* (in *T-Baseline* and *T-LowThreshold*); with respect to frequency of contributing near *Cooperation* (in *T-OnePlayer* and *T-LowThreshold*); and with respect to waste (in each treatment).