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# Are Poor People Conditionally Cooperative?

## Contrasting Evidence from a Field-Adapted Contributions Game

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**Abstract**

We study conditional cooperation using a field-adapted conditional contributions game in rural Mozambique, eliciting community members' willingness to contribute to a new public program conditional on how many others contribute. While past studies suggest most people are conditional cooperators (contributing more as others do), most of our sample (57%) are undefined by standard classifications. Instead, our sample's most common types are largely absent from the literature: counter conditional cooperators (contributing less as others do) and v-shaped cooperators, both for monetary donations (30% and 19%) and volunteering (35% and 12%). Our findings motivate future research in both non-laboratory and low-income settings.

**Keywords:** Conditional cooperation, public goods, voluntary contributions, school meals, Mozambique

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# 1 Introduction

Local public goods often rely on community contributions of both money and time, which are at least partly observable and recur across goods and services. Thus, individuals' willingness to contribute conditional on others' contributions has important implications for the success and sustainability of local public goods. We study these issues in rural Mozambique—the poorest country in Southern Africa—via the introduction of a new school meals program that requires community contributions to be successful. In our context, school meals programs are an impure public good: largely non-excludable, in that school meals are free for enrolled students, schooling is free (except the cost of supplies), and enrollment near-universal (94% of study households have at least one child in primary school);[1] and non-rivalrous, in that the non-profit implementer ensures that every student receives the same portion across schools regardless of the number of eligible students. Additionally, the program represents a shared community resource that requires collective action characterized by conditional cooperation—the behavior we study here.

Experimental studies find that at least half of people are "conditional cooperators"—they contribute more when others do. According to foundational work by Fischbacher, Gächter, and Fehr (2001), conditional cooperators make up 50% of all group members. Thöni and Volk (2018) find an even higher average of 61% across 17 studies. Other conventional types identified by Fischbacher, Gächter, and Fehr (2001) and classified by Thöni and Volk (2018) include free-riders who never contribute (19%), unconditional contributors who always give the same amount (4%), and triangle cooperators who increase contributions up to a point and then reduce them (10%). If most people are conditional cooperators, then sharing information about others' contributions in Mozambican communities should boost collective giving. However, nearly all prior studies are from laboratory or online settings in high-income countries, mostly with anonymized student participants (see Appendix Table A.1). Thus, they may not reflect the preferences or behaviors of rural households in sub-Saharan Africa.[2]

In this paper, we implement a field-adapted conditional contributions game, modeled after Fischbacher, Gächter, and Fehr (2001), that elicits incentive-compatible data on households' conditional contributions. First, we find that the literature's standard classification, as defined by Thöni and Volk (2018), leaves 57% of our sample's behavior "unclassified". So, we invert their definitions of conditional cooperators and triangle cooperators and define two previously under-recognized types: counter conditional cooperators, who contribute less as others contribute, and v-shaped cooperators, who reduce contributions up to a point and then increase them as others contribute.[3] We find that the largest category in our sample are counter conditional cooperators at 30%, most of whom were previously unclassified. Second, we collect novel data on willingness to volunteer conditional on others' volunteering behavior

1. By sample definition, all study households had at least one child of primary-school age.

2. For example, communal labor participation in Tanzania responds to social norms (Kerr, Vardhan, and Jindal 2012) and giving in Nairobi slums is shaped by gender norms (Greig and Bohnet 2009).

3. These types were only recently termed in the literature by Bergantino, Gil-Gallen, and Morone (2023) and Schäffer, Král, and Kun (2025), respectively.

and similarly find that counter conditional cooperating is the most common behavior (35%). These results contribute to literature on conditional contributions by documenting the prevalence of two previously under-represented types of contributors whose behavior differs from what has been studied previously in laboratories in high-income countries. We also contribute a replicable, enumerator-led approach for eliciting conditional contributions that adapts these games for use in the field in low-income and low-literacy settings.

# 2 Methodology

## 2.1 Setting and Data

Data come from a baseline survey conducted in June–July 2024 studying a new school meal program (SMP) in Nampula and Zambezia provinces of north-central Mozambique.[4] While most of the food and infrastructure is provided by donors and implementers, the project needs community donations to finance small purchases (e.g., soap) and requires several community members to volunteer as cooks, food servers, and dishwashers. Primary schools run two shifts, Monday through Friday, resulting in 10 weekly school meal shifts requiring 2–3 volunteers each.

We surveyed eight households in 156 communities for a total sample of 1,248 respondents. To be eligible for the study, households needed at least one child of primary-school age, such that they could directly benefit from the SMP. Households are very poor but send an average of 2.4 children to school (94% send at least one), so they benefit substantially from and support the SMP (Cossa 2024).

In this context, we conduct two conditional cooperation games where respondents report their willingness to contribute (WTC), in money and time, to the SMP conditional on the behavior of the seven other households surveyed in the community. First, we provided a gift of 100 meticais (equivalent to $1.55 USD) and then asked households how much (if any) they would like to donate to the SMP. Second, we explained that the program needs community volunteers to operate the SMP and then asked respondents how many shifts they were willing to volunteer for (out of a possible 10) knowing that we would share the respondent's name and number of shifts with the implementer. In both games, we asked for respondents' WTC if they knew that $k \in \{0, 1, 2, \ldots, 7\}$ other households were contributing (conditional contributions) and if they did not know how many other households were contributing (unconditional contributions). To ensure incentive compatibility, we explained that an end-of-survey coin flip would determine whether payouts were based on unconditional or conditional responses, with identical payment timing.[5] Despite poverty, respondents made sizable unconditional contributions: 96.2% donated a sample average of 48 meticais, and 97.2% volunteered a sample average of 4.9 shifts. Appendix B includes the full script of the survey module.

We adapted the conditional contributions game for computer-assisted personal interviews (CAPI) by trained enu-

4. The SMP is implemented by World Vision and funded by the United States Department of Agriculture.
5. We provided payments within two months in 90% of cases; the remainder will be paid in future survey rounds.

merators, commonly used for surveys in low-literacy contexts. First, enumerators asked respondents for their contributions conditional on the *number* of other households contributing in their community between 0 and 7 (rather then the amount donated). Second, enumerators asked about contributions one condition at a time (if one household donates, if two donate...etc.), randomly in ascending or descending order (unlike labs, where participants view the full table on screen). These adaptions were necessary to implement the games in a low-literacy interview setting.

### 2.2 Analysis

We classify conditional contribution responses following the typology developed by Fischbacher, Gächter, and Fehr (2001), using the definitions developed by Thöni and Volk (2018) to allow for comparison between our sample and the 17 studies in their analysis:

- Free rider (FR): never contributes.
- Unconditional cooperator (UC): always contributes the same amount regardless of others' contributions.
- Conditional cooperator (CC): contributes more as others contribute.
- Triangle cooperator (TC): contributes more to a point, and then less, as others contribute.

Additionally, we invert Thöni and Volk (2018)'s definitions of CC and TC to define two types not included in their classification:[6]

- Counter conditional cooperator (CCC): contributes less as others contribute.
- V-shaped cooperator (VC): contributes less to a point, and then more, as others contribute.

The exact mathematical definitions and relevant tie-breaker rules adapted from Thöni and Volk (2018) are presented in Appendix C.

## 3 Results

First, to visualize this study's revised classification types, Figure 1 depicts the average conditional contribution profiles by type for monetary donations (Panel A) and volunteering (Panel B) following Fischbacher, Gächter, and Fehr (2001). Both existing and new types are shaped consistently with their descriptions. The dashed line shows the sample average contribution profile: a downward slope with a late uptick, classifying as VC for donations and CCC for volunteering. This suggests that the average respondent has *lower* WTC as others contribute, contrasting with previous studies.

Second, we find that the existing literature's typology for conditionally cooperative behavior does not sufficiently characterize our Mozambican sample. Figure 2 illustrates the mapping from the existing classification to our revised

6. To keep our classification consistent and comparable to past work, we choose to make new definitions by inverting Thöni and Volk (2018) rather than use the definitions suggested by the recent papers that termed these new types: Bergantino, Gil-Gallen, and Morone (2023) and Schäffer, Král, and Kun (2025), respectively. We quote their definitions in Appendix C to show they are the same conceptually even if mathematically different.

classification for monetary donations (Panel A) and volunteering (Panel B). Under the existing classification (left), over half of the sample is unclassified (NA) in both games (57% and 58%, respectively), and other types that were prevalent in previous studies are much less common: CCs are no longer at least half of the sample, and FRs are now the smallest category. Under this study's revised classification (right), most previously unclassified households become new types: CCC or VC.[7] Indeed, CCC becomes the largest category in both games (30% and 35%), VC becomes the second largest (19% and 17%), and fewer remain unclassified (12% and 13%).[8] Indeed, conditional contributions meaningfully differ in our context and require these new classifications.

Third, we explore whether contributions vary by perceptions of community social cohesion. Social cohesion refers to the strength of relationships and sense of solidarity among members of a community, reflected in trust, mutual support, and shared norms (Chan, To, and Chan 2006; OECD 2011; Berger-Schmitt 2000). In Mozambique and other African settings, norms of mutual support and reciprocity are strong (Foster and Rosenzweig 2001; Coate and Ravallion 1993; Ligon and Schechter 2012). Using an index of social cohesion constructed from questions asked in the household survey (listed in Appendix D), we compare households' perceptions of community social cohesion based on whether their index is below or above the sample median. Among households with an above-median perception of community social cohesion, we find fewer free-riders and counter conditional cooperators and more unconditional and conditional cooperators,suggesting that social cohesion may be one possible avenue warranting future research.

# 4 Concluding Discussion

We document the prevalence of two types of conditional contributors infrequently observed in the literature in a field-adapted contributions game in rural Mozambique. We hypothesize this is because our Mozambican sample's behavioral preferences and community public goods' payoff function differ from those previously studied, all of which, to our knowledge, were conducted as lab or online experiments in high-income countries with anonymous participants. For example, observed differences depending on community social cohesion suggest that community-based social norms may play a role in this setting. While we cannot rule out that some differences might be due to implementation by enumerator-led interviews and corresponding protocol changes that were necessary for our context, these effects would have to be dramatic to solely explain our distinct findings. Our novel results motivate future research on the determinants of this socially relevant behavior.

7. Other changes are due to new tie-breaker rules, adapted from Thöni and Volk (2018) and detailed in Appendix C.

8. By comparison, Bergantino, Gil-Gallen, and Morone (2023) observes CCCs in 17% of their non-treated sample, while Schäffer, Král, and Kun (2025) checks for both types but identifies zero CCCs and only one VC representing 0.4% of their sample.

# References


Bergantino, Angela Stefania, Sara Gil-Gallen, and Andrea Morone. 2023. "Do risk and competition trigger conditional cooperation? Evidence from public good experiments." *Annals of Public and Cooperative Economics* 94 (1): 39–73.

Berger-Schmitt, Regina. 2000. *Social cohesion as an aspect of the quality of societies: Concept and measurement.* Technical report EU Reporting Working Paper No. 14. Mannheim, Germany: Centre for Survey Research and Methodology (ZUMA), Social Indicators Department. https://www.gesis.org/fileadmin/upload/dienstleistung/daten/soz_indikatoren/eusi/paper14.pdf.

Chan, Joseph, Ho-Pong To, and Elaine Chan. 2006. "Reconsidering social cohesion: Developing a definition and analytical framework for empirical research." *Social Indicators Research* 75 (2): 273–302. https://doi.org/10.1007/s11205-005-2118-1.

Coate, Stephen, and Martin Ravallion. 1993. "Reciprocity without commitment: Characterization and performance of informal insurance arrangements." *Journal of development Economics* 40 (1): 1–24.

Cossa, Edgar. 2024. *Qualitative Data Collection Report, Nampula (Meconta and Monapo Districts) and Zambézia (Milange District), August 2024.* Technical report. Field report prepared in August 2024.

Fischbacher, Urs, Simon Gächter, and Ernst Fehr. 2001. "Are people conditionally cooperative? Evidence from a public goods experiment." *Economics letters* 71 (3): 397–404.

Foster, Andrew D, and Mark R Rosenzweig. 2001. "Imperfect commitment, altruism, and the family: Evidence from transfer behavior in low-income rural areas." *Review of Economics and Statistics* 83 (3): 389–407.

Greig, Fiona, and Iris Bohnet. 2009. "Exploring gendered behavior in the field with experiments: Why public goods are provided by women in a Nairobi slum." *Journal of Economic Behavior  Organization* 70 (1): 1–9. ISSN: 0167-2681. https://doi.org/https://doi.org/10.1016/j.jebo.2008.12.006. https://www.sciencedirect.com/science/article/pii/S016726810900002X.

Kerr, John, Mamta Vardhan, and Rohit Jindal. 2012. "Prosocial behavior and incentives: Evidence from field experiments in rural Mexico and Tanzania." *Ecological Economics* 73:220–227. ISSN: 0921-8009. https://doi.org/https://doi.org/10.1016/j.ecolecon.2011.10.031. https://www.sciencedirect.com/science/article/pii/S0921800911004605.

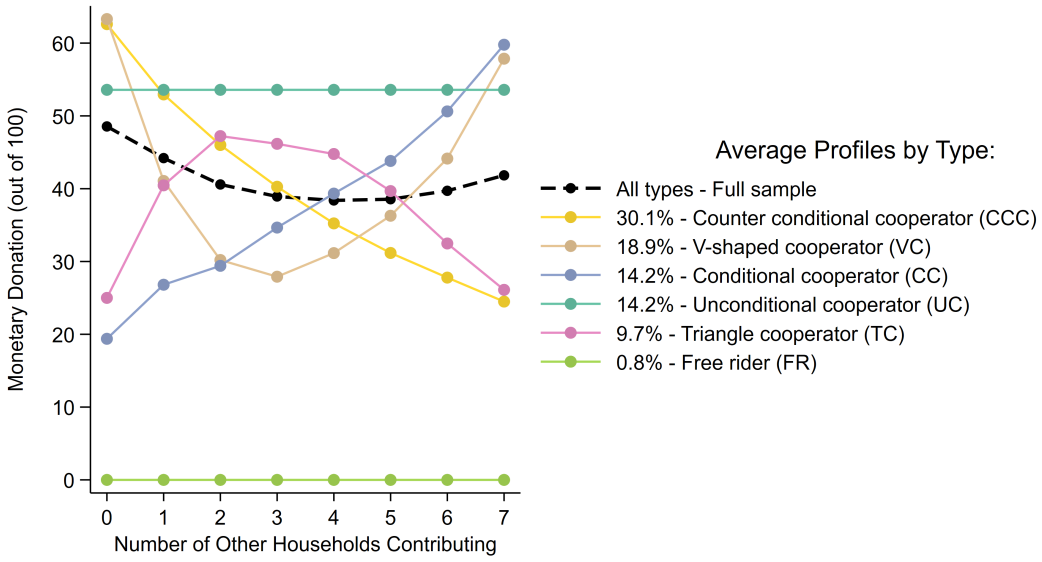
Ligon, Ethan, and Laura Schechter. 2012. "Motives for sharing in social networks." *Journal of Development Economics* 99 (1): 13–26.

OECD. 2011. *Perspectives on Global Development 2012: Social Cohesion in a Shifting World.* Paris: OECD Publishing. https://doi.org/10.1787/persp_glob_dev-2012-en. https://doi.org/10.1787/persp_glob_dev-2012-en.

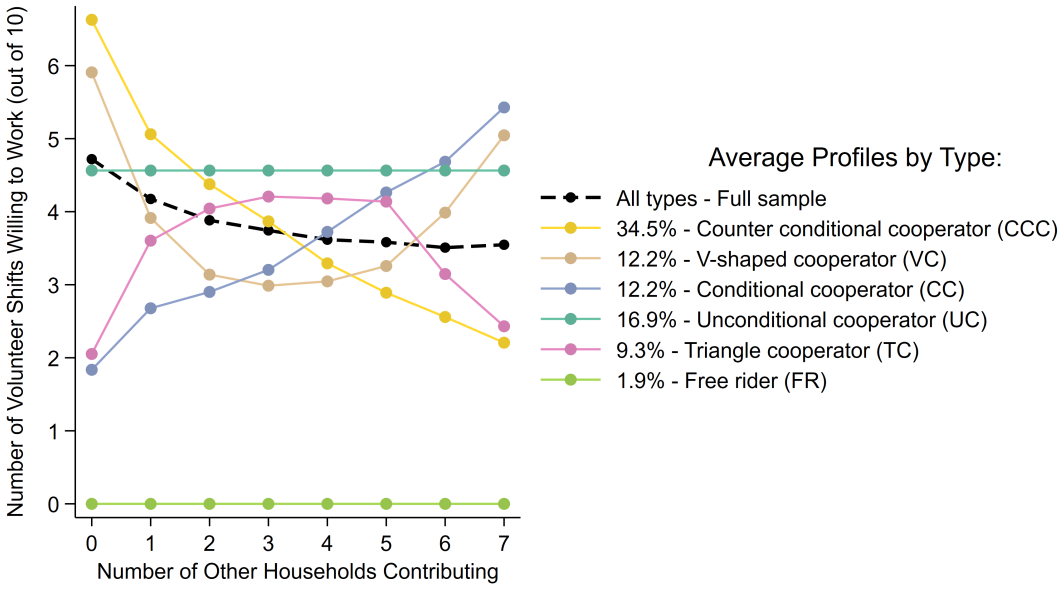
Schäffer, Klaudia, Adrienn Král, and Ádám Kun. 2025. "New Categories of Conditional Contribution Strategies in the Public Goods Game." *Games* 16 (3): 22.

Thöni, Christian, and Stefan Volk. 2018. "Conditional cooperation: Review and refinement." *Economics Letters* 171:37–40.

Figure 1: **Average contribution if other households contribute by classification type**



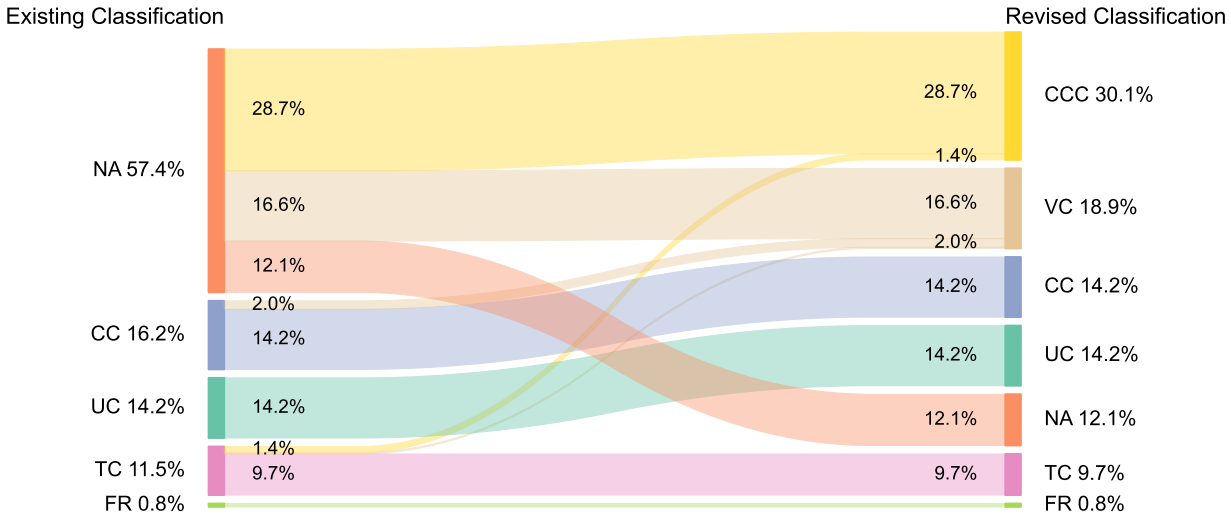

(a) Monetary Donations



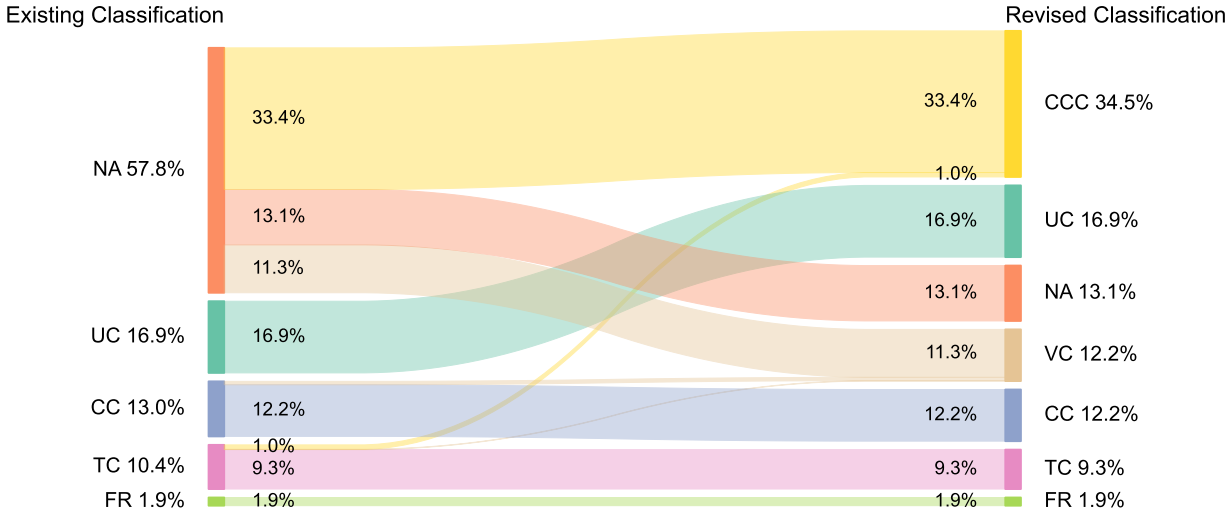

(b) Volunteering

*Notes:* Following Fischbacher, Gächter, and Fehr (2001), figure displays the average conditional contribution for donations out of a 100 meticais endowment (on the vertical axis) based on the number of other households they are told are donating (on the horizontal axis) for the full sample and each of the six contributor types. N=1,248.

Figure 2: **Mapping types from the existing literature to revised classification**



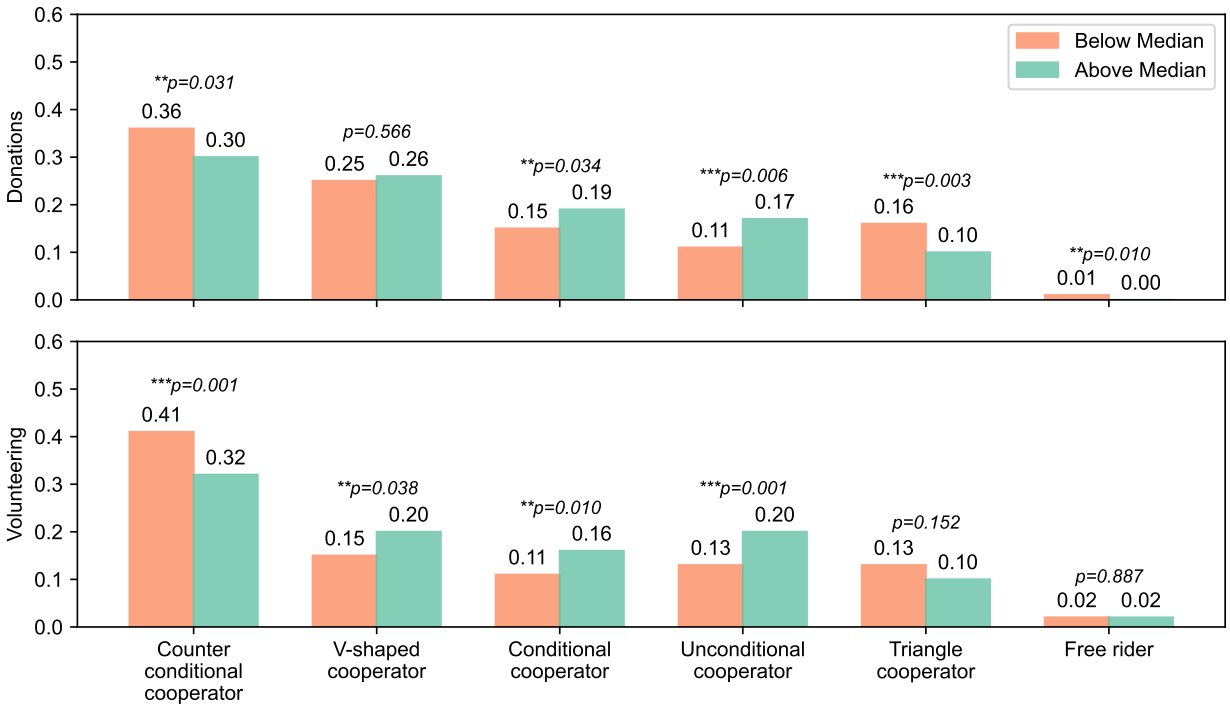

(a) Monetary Donations




(b) Volunteering

*Notes:* Sankey graphs compare conditional contributing behavior between the existing literature's classification (on the left) to our revised classification with new types (on the right). Type labels: CCC=Counter conditional cooperator, VC=V-shaped cooperator, CC=Conditional cooperator, UC=Unconditional cooperator, NA=Not classified, TC=Triangle-shaped cooperator, FR=Free rider. N=1,248.

Figure 3: **Type Prevalence by Perception of Community's Social Cohesion**




*Notes:* This Figure shows the proportion of each conditional contributor type based on whether the respondent household has an above or below median perception of community social cohesion. *p*-values indicate a statistical test of differences between groups. N=1,248 (606 below-median social cohesion, 642 at-or-above-median social cohesion).

# Appendix

## A Past Literature

Table A.1: **Setting of Past Literature**

| STUDY | COUNTRY | SETTING | RECRUITS |
|---|---|---|---|
| ***Replicated in Thöni & Volk (2018):*** | | | |
| Abeler & Nosenzo (2015) | United Kingdom | Lab | Students |
| Aimone et al. (2013) | United States | Lab | Students |
| Cubitt et al. (2017) | United States | Lab | Online |
| Dariel & Nikiforakis (2014) | Netherlands & Switzerland | Lab | Students |
| Fischbacher & Gächter (2010) | Switzerland | Lab | Students |
| Fischbacher, Gächter & Fehr (2001) | Switzerland | Lab | Students |
| Fischbacher, Gächter & Quercia (2012) | Switzerland | Lab | Students |
| Fischbacher, Schudy, et al. (2014) | Germany | Lab | Students |
| Fosgaard et al. (2014) | Denmark | Online | Online |
| Gächter et al. (2017) | England | Lab | Students |
| Herrmann & Thöni (2009) | Russia | Lab | Students |
| Kamei (2012) | United States | Lab | Students |
| Kocher et al. (2008) | United States, Austria, Japan | Lab | Students |
| Makowsky et al. (2014) | United States | Lab | Students |
| Thöni et al. (2012) | Denmark | Virtual lab | Online |
| van Miltenburg et al. (2014) | Netherlands | Lab | Students |
| Volk et al. (2012) | In Europe | Lab | Likely students |
| Weber et al. (2018) | England | Lab | Students |
| | | | |
| ***Other Studies:*** | | | |
| Bergantino, Gil-Gallen & Morone (2021) | Italy | Lab | Students |
| Dariel (2018) | Switzerland | Lab | Students |
| Schäffer, Král, & Kun (2025) | Hungary | Virtual Lab | Online |
| Xu & Li (2024) | Canada | Lab | Students & non-student adults |

## B Survey Module Scripts

## Donation Game

Let me tell you some more information about the new school meal program. World Vision has implemented this program in other parts of Mozambique, including in Muecate, Nacaroa, and Meconta districts. A research team did a study and they found that the program helped students to eat more and better food and as a result, they felt less hungry during the school day and were able to concentrate on their studies. They also learned how to read better because they

were not hungry and could concentrate on their studies. There are also some necessary items for the school meal to be implemented, for example, some fruits and vegetables, spices and condiments, and cutlery and plates. The way World Vision works is that they provide the main food, which is a porridge. However, the schools need volunteers to help to cook the food, gather firewood, wash the dishes and clean up after the meal is served. The volunteers are members of the community rather than students so that students do not miss out on valuable time for lessons.

Today we are offering you 100 Meticais. We would like to ask you three things: 1) Whether your household would like to donate some of the 100 Meticais to the school meals program for the materials I described, and if so, how much 2) How many people in your community you think will contribute and 3) Whether your household would like to volunteer to help with the school meals, and if so, how many shifts per week.

We are interviewing your household and seven other households in your community. For the decision about whether and how much your household would like to contribute to the school meals program, we will think about two scenarios: one where we will tell you how many of the other 7 households in this community have contributed, and another where we will not tell you how many contributed. We will ask you how much your household would donate for each possible number of households that could donate. Whether we do or do not tell you how many other households donated will be determined by a coin flip. Next, we will ask you how much your household would donate if we do not tell you how many households donated. All donations are anonymous. Apart from the research team, no one else will know who donated or how much they donated.

Here's how it will work: After you answer both questions, I will flip a coin. If it is heads, we will tell you how many other households donated and your household will donate the amount from the first scenario. We will only know how many households donated after interviewing all 7 other households and their donations. If it is tails, we will not tell you how many households donated and your household will donate the amount from the second scenario.

Since your donation can come from either decision, it's best to answer both scenarios honestly. The remaining amount (100 Meticais minus your donation) will be sent to your household via M-Pesa or E-Mola within the next 10 days, after we know the total donations from other households. Out of fairness, we will send all payments to households in your community on the same day, no matter if the coin flip results in heads or tails. Again, please remember all donations are anonymous. Apart from the research team, no one else will know who donated or how much they donated.

**So remember these four things:**

1. I am going to ask you how much of the 100 Meticais you would like to donate to the school meals.
2. I will ask you in two ways: one where you would know the number of the other seven households donated and the other one where we would not tell you.
3. Whether or not we tell you will be decided by a coin flip after you answer both questions.
4. We will give you the 100 Meticais minus what you donate after we know how many households donated (even if it turns out that we do not tell you).

Would you like me to repeat these instructions, or should we proceed with the scenarios?

### Scenario 1: Conditional donations

*[The CAPI will randomize whether the questions are asked in ascending or descending order]*

**If X other households in this community donated, how much would your household donate?**

| Households contributing | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Donation (Meticais) | don_0 | don_1 | don_2 | don_3 | don_4 | don_5 | don_6 | don_7 |

### Scenario 2: Unconditional donations

- How much would you donate if we do not tell you how many other households in your community donated? __ Meticais
- Out of the 7 other HHs we are surveying today in this community how many do you think will donate any of the 100 Meticais to the school meal program? __ households

Now we will do the coin flip and present the payment information. As a reminder, we will flip a coin to decide which scenario will determine your final response. If it is heads, your final response will be based on how many other households choose to donate. If it is tails, your final response will be based on the second decision.
**Heads:** Your household will donate X based on your answer in the first scenario.
**Tails:** Your household will donate Y based on your second decision.

## Volunteering Game

### Scenario 1: Conditional volunteering

*[The CAPI will randomize whether the questions are asked in ascending or descending order]*

**If X other households in this community volunteer, would your household volunteer?**

| Households volunteering | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Number of shifts per week (max of 10) | vol_0 | vol_1 | vol_2 | vol_3 | vol_4 | vol_5 | vol_6 | vol_7 |

### Scenario 2: Unconditional volunteering

- For how many shifts would you volunteer if we do not tell you how many other households in your community volunteer? __ shifts per week (max of 10)
- Out of the 7 other HHs we are surveying today in this community how many do you think will volunteer for at least one shift per week? __ households

Now we will do the coin flip and present the volunteer information. If it is heads, your final response will be based on how many other households choose to volunteer. If it is tails, your final response will be based on the second decision.
**Heads:** Your household will be added to the volunteer list based on your first decision.
**Tails:** Your household will be added to the volunteer list based on your second decision.

# C Type Definitions

We classify conditional contribution responses into types using the mathematical definitions presented in Thöni and Volk (2018). While others definitions exist (e.g., see Fischbacher, Gächter, and Quercia (2012)), we chose Thöni and Volk (2018)'s definitions as a starting point to enable comparison across the 17 studies in their analysis. Their definitions have also been used by more recent studies on conditional cooperation (e.g., Xu and Li (2024)).

In a conditional cooperation games, player $i$ must choose a contribution $g_{ik}$, given knowledge that $k$ other households have contributed, where $k = 0, 1, ..., 7$, resulting in a vector indicating the player's conditional contributions as $g_i = \{g_{i0}, g_{i1}, ..., g_{i7}\}$. We denote $\rho_{a,b}$ as the Pearson correlation coefficient between the vectors $g_i$ and $k$ for elements of $k \in [a, b]$ such that $a < b$ and $a = 0, 1, ..., 6$ and $b = 1, 2, ..., 7$.

First, the literature defines the following types:

- (Unconditional) free rider (FR)–does not contribute regardless of others' contributions: $g_k = 0 \; \forall \; k = 0, 1, ..., 7$
- Unconditional cooperator (UC)–always contributes the same amount regardless of others' contributions: $g_k = c$ with $0 < c \; \forall \; k = 0, 1, ..., 7$
- Conditional cooperator (CC)–contributes more as others contribute:

  **Either:** $\rho_{0,7} \geq 0.5$

  **Or:** $g_{k-1} \leq g_k \; \forall \; k = 1, 2, ..., 7$ and $g_0 < g_7$
- Triangle cooperator (TC)–contributes more to a point, and then less, as others contribute:

  **Either:** $\rho_{0,\kappa} \geq 0.5$ and $\rho_{\kappa,7} \leq -0.5$ for some $\kappa \in \{2, 3, 4, 5\}$

  **Or:** $g_0 < g_\kappa$ and $g_\kappa > g_7$ and $g_{k-1} \leq g_k \; \forall \; k \leq \kappa$ and $g_k \geq g_{k+1} \; \forall \; k \geq \kappa$ for some $\kappa \in \{1, 2, ..., 6\}$

Additionally, we invert Thöni and Volk (2018)'s definitions of CC and TC to give new definitions to two types that are still nascent in the literature:

- Counter conditional cooperator (CCC)–contributes less as others contribute:

  **Either:** $\rho_{0,7} \leq -0.5$

  **Or:** $g_{k-1} \geq g_k \; \forall \; k = 1, ..., 7$ and $g_0 > g_7$
- V-shaped cooperator (VC)–contributes less to a point, and then more, as others contribute:

  **Either:** $\rho_{0,\kappa} \leq -0.5$ and $\rho_{\kappa,7} \geq 0.5$ for some $\kappa \in \{2, 3, ..., 5\}$

  **Or:** $g_0 > g_\kappa$ and $g_\kappa < g_7$ and $g_{k-1} \geq g_k \; \forall \; k \leq \kappa$ and $g_k \leq g_{k+1} \; \forall \; k \geq \kappa$ for some $\kappa \in \{1, 2, ..., 6\}$

Thöni and Volk (2018) note that the definitions of CC and TC are not mutually exclusive. Thus we also follow their tiebreaker rule and adapt it for other scenarios involving CCC and VC, which compares either the rightmost conditional contribution (for TC) or the leftmost conditional contribution (for VC) to the average conditional contribution $\hat{g}_i$ to distinguish between strong versus weak changes in the profiles at the tail ends, as follows:

- If CC and TC: classify as CC if $g_7 > \hat{g}_i$, else as TC
- If CC and VC: classify as CC if $g_0 < \hat{g}_i$, else as VC
- If CCC and TC: classify as CCC if $g_0 \geq \hat{g}_i$, else as TC
- If CCC and VC: classify as CCC if $g_7 \leq \hat{g}_i$, else as VC

These definitions of CCC and VC are technically different, though conceptually similar, to those offered in the papers that introduced these terms into the typology:

- Bergantino, Gil-Gallen, and Morone (2023) defines counter conditional cooperators (CCC) as follows: "This is the inverse behavior of conditional cooperators. The higher is the average contribution of the other group members, the lower is the CCC's willingness to contribute. This category seems to replicate the shape generally found in the literature of repeated games, where subjects decrease their contributions over time. The players are defined as "counter" conditional cooperators when the Spearman rank coefficient is lower than or equal to 0.7, and statistically significant at the level of 1%."
- Schäffer, Král, and Kun (2025) defines V-shaped contributors (VC) as follows: "the contribution schedule starts and ends high, but decreases in the middle. The decreasing part (from the beginning to the minimum of the contributions) has a negative Spearman correlation, which is significant at the p  0.05 level. The increasing part has a positive Spearman correlation, which is significant at the p  0.05 level."

# D Social Cohesion Questions

Our social cohesion module is adapted from the mini-Social Cohesion Barometer (Catholic Relief Services 2019).

| **How much do you agree or disagree with the following statements?** | **1 Strongly disagree**<br>**2 Disagree**<br>**3 Neither agree nor disagree**<br>**4 Agree**<br>**5 Strongly agree** |
|---|---|
| It is your duty to take care of the people in your village, even when you have to sacrifice yourself. | |
| Members of my community trust each other regardless of identity differences like gender, religion, political affiliation, age, etc. | |
| My community has the capacity to peacefully manage social problems. | |
| People in my community help each other in times of need. | |
| Public resources are managed fairly for the benefit of all people. | |
| All people in my community are treated fairly by public officials. | |
| People in my community are listened to when they share their concerns and ideas. | |
| People in my community are generally trustworthy. | |
| Community leaders in this community are generally trustworthy. | |

# References for the Appendix


Bergantino, Angela Stefania, Sara Gil-Gallen, and Andrea Morone. 2023. "Do risk and competition trigger conditional cooperation? Evidence from public good experiments." *Annals of Public and Cooperative Economics* 94 (1): 39–73.

Catholic Relief Services. 2019. *The mini-Social Cohesion Barometer: A Tool to Assess and Strengthen Social Cohesion in Divided Communities.* Available from www.crs.org. Baltimore, MD: Catholic Relief Services.

Fischbacher, Urs, Simon Gächter, and Simone Quercia. 2012. "The behavioral validity of the strategy method in public good experiments." *Journal of Economic Psychology* 33 (4): 897–913.

Schäffer, Klaudia, Adrienn Král, and Ádám Kun. 2025. "New Categories of Conditional Contribution Strategies in the Public Goods Game." *Games* 16 (3): 22.

Thöni, Christian, and Stefan Volk. 2018. "Conditional cooperation: Review and refinement." *Economics Letters* 171:37–40.

Xu, Chenyang, and Tongzhe Li. 2024. "Are teams conditionally cooperative? Experimental evidence from a public goods game." *Economics Letters* 239:111763.

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