How Fair Shares Compare: Experimental Evidence from Two Cultures*

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Abstract

Voluntary transfers between individuals and households are common in less developed countries. These behaviors may be partially explained by social preferences. Two leading models — altruism and reciprocity — make opposing predictions about the impact of other-regarding preferences on incentives for effort in a variety of situations common in poor communities. This paper examines the willingness to reward effort in rural Kenya using an ensemble of economic experiments. I introduce a novel measure of effort based on physical production. I compare other-regarding behavior in experimental economic environments which differ only in the extent to which income depends on individual labor inputs. Though Kenyan experimental subjects are significantly more generous than members of a comparison population drawn from a university in the United States, members of the former group do not appear to reward effort at their own expense. In contrast, subjects in the U.S. sample are more selfish, on average, but appear comparatively generous when dividing money earned by other participants. Within the Kenyan subject pool, educational attainment and formal sector employment are correlated with the willingness to reward effort at one's own expense.

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1 Introduction

People are sometimes willing to sacrifice their own payoffs to help strangers, reward helpful actions by others, and punish uncooperative or unusually selfish behavior; these *social preferences* have been formally documented in many cultures by experimental economists. In developing countries, other-regarding behavior is of particular importance because agents often engage in unstructured bargaining or implicit contracting over the division of resources — leading examples include intrahousehold allocations, sharecropping, and joint-liability borrowing. Voluntary transfers between households are common, prompting anthropologists to describe the rural village as a "moral economy" in which individuals are motivated by concern for their neighbors' welfare and aversion to inequality within the community.[1] Yet, in the bargaining contexts described above, two workhorse models of other-regarding behavior — reciprocity and generalized altruism — make divergent predictions about the impact of social preferences on incentives for effort. Aversion to inequality in outcomes may reduce the cost of low effort by providing an informal social safety net, and may also discourage productive activities which exacerbate inequality.[2] On the other hand, preferences for reciprocity — the desire to reward helpful actions and punish uncooperative ones — may help encourage effort and enforce implicit contracts.

In this paper, I explore altruism and the willingness to reward effort in rural Kenya and the United States using a suite of economic experiments. I measure preferences for sharing in benchmark contexts where luck alone governs income, and compare them to behavior in related settings in which income is generated by individual labor. The experimental setting allows me to vary the extent to which income depends on effort while holding other aspects of the economic environment constant. This allows for a clean cross-cultural comparison of the willingness to reward hard work, absent the confounding effects of both variation in levels of

[1]Scott (1976) emphasizes the primacy of the universal right to subsistence in the moral code of poor agricultural households. Platteau (2000) argues that rural communities in Africa distinguish between (desirable) economic progress which makes everyone better off and (undesirable) attempts by individuals to improve their own welfare without improving the welfare of their neighbors.

[2]In his study of economic enterprises in two Indonesian towns, Geertz (1963) argues that large firms in rural areas "turn into relief organizations rather than businesses." Foster and Rosenzweig (2001) highlight the possibility that altruism may restrict an individual's ability to credibly commit to excluding non-cooperating relatives from a mutual insurance network. Hoff and Sen (2005) and Bernard *et al* (2005) emphasize the constraints on market-oriented growth imposed by cultural norms of solidarity.

generalized altruism and dynamic considerations which arise in repeated interactions.

I present three models of other-regarding preferences which may explain behavior in the experiments: inequality-averse altruism, effort-rewarding altruism, and reciprocity. Individuals are altruistic if they care about other players' welfare. Effort-rewarding altruists have distributional preferences which depend on individual labor inputs; inequality-averse altruists care only about the distribution of final payouts. A player with a preference for reciprocity is willing to reward or punish others, even at her own expense in one-shot interactions. I propose a parsimonious framework for testing the restrictions on demand for giving implied by the three models.[3] The share of the budget that a player allocates to her partner is allowed to depend on individual characteristics, actions by either player which impact the size of the budget, and the experimental context. How demand for giving varies across the experimental treatments as a function of these variables allows me to distinguish between the models of altruism and reciprocity.

I test these theories using data from a set of economic experiments which I conducted in both field laboratories in Busia District, Kenya, and in the Experimental Social Science Lab (X-Lab) at the University of California, Berkeley. Subjects in the experiments participated in one of four variants of the dictator game in which they were asked to divide money between themselves and an anonymous partner. The experimental treatments differ along two dimensions: *how* the budget was generated, and *who* decided how to divide it. "Giving" treatments were conventional dictator games in which players decided how to divide money that had been allocated to them. In contrast, players in "Taking" treatments decided how to divide money that was either won or earned by their partners. In both Giving and Taking games, the dictator's budget was either determined by chance ("Luck") or earned by one of the two players ("Effort"). I conducted four distinct experimental treatments in total: Luck-Giving (LG), Effort-Giving (EG), Luck-Taking (LT), and Effort-Taking (ET). I introduce an experimental economic measure of effort based on physical production rather than monetary contribution, and I employ this experimental tool in the Effort treatments.[4] Players in these games were paid a piece rate for completing a tedious

[3]This allows me to place existing theoretical work on other-regarding preferences (e.g. Fisman *et al* 2007), reciprocity (e.g. Charness and Rabin 2002; Cox *et al* 2007), and fairness (e.g. Konow 2000; Cappelin *et al* 2007) in a unified framework.

[4]Many previous experiments examining the willingness to reward effort use individual contributions of money as a proxy for individual effort (e.g. Fehr *et al* 1997; Cappelin *et al* 2007). Konow (2000) uses the production of

task — sorting dried beans out of a bucket on the ground. The task was chosen to minimize the importance of intelligence and ability, and to limit the extent to which work was inherently satisfying.

The experimental data allow me to distinguish between the models of social preferences described above. If individual choices in the experiments are consistent with inequality-averse altruism, distributional preferences are independent of labor inputs by the players, so choices in each Effort treatment should be indistinguishable from those in the analogous Luck game. Individual behavior is consistent with effort-rewarding altruism if dictators always allocate a player earning the budget a larger share than they would a subject in a similar context who wins an equal amount of money. Models of reciprocity, on the other hand, do not predict disparities in behavior between the two Giving games, but suggest that dictators may reward high output — or punish laziness — in the ET treatment.

My sample includes 546 experimental subjects in Kenya and 196 in the United States. I surveyed all participants before or after the game, generating a rich data set on individual characteristics and self-reported values. I report four main results. First, I find that subjects in the field experimental lab in Kenya display extremely high levels of generalized altruism — they are significantly more generous than participants in companion experiments in the United States. In both the LT and ET treatments, dictators allocate their partners more than forty percent of the total budget, on average. Yet, they do not reward the effort of other players: dictators are no more generous with partners who have earned a budget (in the ET treatment) than they are in similar Luck games. My second result is that more educated subjects and those in households connected to the formal sector are willing to sacrifice a larger budget share to compensate those who have exerted effort: completing primary school and having a household member with a formal job are significantly associated with higher levels of generosity, but only in situations where dictators divide income *earned* by their partners. Third, subjects in comparison sessions in the Berkeley X-Lab were more selfish, on average, but were relatively less so in treatments where their partners earned the experimental budget. Thus, the choices of educated and employed Kenyans are more consistent with patterns of behavior observed in the U.S. Finally, I find that

administrative letters as a measure of individual effort.

subjects do not exert less effort in response to the property rights insecurity induced in the ET treatment.

This paper contributes to the emerging literature on behavioral and experimental development economics, and complements previous attempts to incorporate insights from psychology into the study of decision-making in poor communities.[5] Models of social preferences may help to explain stylized facts about economic activites in the developing world. For example, one longstanding puzzle is the prevalence of sharecropping tenancy contracts which call for an even division of output between the tenant and the landlord.[6] Other-regarding preferences characterized by aversion to inequality over outcomes may partially explain these institutions, and such inequality-aversion among tenants may also mitigate the productive inefficiency of sharecropping.[7] Alternatively, reciprocity may encourage optimal labor supply, if landlords voluntarily reward evidence of high effort or punish shirking beyond the terms of the contract.[8]

More broadly, behavioral development economics may help illuminate the opaque relationship between culture and development. An extensive literature in economics and sociology suggests that industrialization is often preceded by changes in values and beliefs which facilitate the emergence of capitalist enterprises.[9] In rural communities in the developing world, egalitarian norms are often seen as anathema to the emergence of successful businesses. For example, of his study of firms in rural Indonesia, Geertz (1963) writes "Traditional values supporting collective benefits as against individual enrichment induce a strong resistance to the rationalization of [enterprises] once they are formed... This essentially conservative kind of approach to change can be very inhibiting to long-run development." Experimental data collection methods, especially those documenting revealed preferences for giving and for fairness, highlight the variation in val-

[5]Duflo (2003) and Mullainathan (2004) discuss unresolved issues in development amenable to analysis in a behavioral context. Foster and Rosenzweig (2001) incorporate altruism into a formal model of mutual insurance.

[6]Bowles (2004) discusses this pattern in the context of distributional preferences and perceptions of fairness.

[7]However, Shaban (1987) evidence of this Marshallian inefficiency in his study of sharecropping in Indian villages.

[8]Fehr *et al* (1997) demonstrate that expectations of punishments and rewards from principals increase the willingness of agents to exert effort in accordance with the terms of contracts which are not otherwise credible.

[9]The most well-known proponent of this position is Max Weber, who partially attributes European exceptionalism to the emergence of values consistent with capitalist enterprise (Weber 1930). He highlights two related elements of the Protestant moral code which encouraged entrepreneurship and individual labor: the belief among the religious that hard work was favored by God, and the characterization of charity as detrimental to the souls of the poor, which affected the incentives for effort in all religious groups by undermining the social safety net.

ues and other-regarding behavior across cultures at differing levels of development.[10] Behavioral models of other-regarding preferences, in conjunction with experimental methods for testing and refining theory, can help determine whether social norms stem from optimal behavior in differing economic environments or from disparities in underlying preferences. These models may eventually help pinpoint psychological obstacles to development and identify potential causal channels of cultural change.

The rest of this paper is organized as follows. In Section 2, I discuss the experimental design in the context of the three social preference models described above. Section 3 describes my lab experimental procedures in Kenya. Section 4 details my empirical strategies and discusses results. Section 5 compares the results of the experiments in Kenya to the outcomes of the companion experiments in the U.S. Section 6 concludes.

2 Theory and Experimental Design

I explore the nature of social preferences by conducting four variants of the dictator game. These allow me to disentangle generalized altruism from the willingness to reward effort. As in the original dictator game,[11] players were randomly assigned to one of two rooms and matched with an anonymous partner; one member of each pair, the *dictator*, was asked to divide a budget between herself and her partner.[12] The treatments differed along two dimensions: *how* the budget was generated and *who* decided how to divide it. The four treatments are represented in Figure 1 below.

The amount of money to be divided was either determined by luck or by the actions of one player. In the **Luck Treatments**, players won money by rolling a twenty-sided die, so the amount a player received was entirely random. Luck games serve as a benchmark which allow me to evaluate the extent to which dictators reward effort — either their own or by their partner — in other treatments where players had to earn the money that was subsequently divided. In

[10] Roth *et al* (1991) compare behavior in ultimatum bargaining games in four industrialized countries. Henrich *et al* use economic experiments to compare social preferences in small-scale societies.

[11] The dictator game was first used in Forsythe *et al* (1994). Camerer (2003) provides an overview of its use. Ensminger (2004) and Marlowe (2004) conduct dictator games in rural areas in East Africa.

[12] Players did not learn their partners identities during or after the experiment.

the **Effort Treatments**, players were paid for completing a simple piece-rate task: each player was given a bucket containing three different varieties of dried beans and paid a fixed amount per gram of a designated variety of beans that she collected from the bucket during a ten minute period.

I also varied which player was assigned the dictator role — i.e. whether the player making the allocation decision was the same person who had won or earned the budget being divided. In **Giving Treatments**, players decided how to split money that they had either won or earned themselves; in **Taking Treatments**, players divided money that was won or earned by their partner.[13] For example, in the Effort-Giving (EG) treatment, Player i earns money by sorting beans and decides how to divide that money between herself and her partner, Player j. In the Luck-Taking (LT) game, on the other hand, Player j wins money by rolling a die, and Player i decides how to divide Player j's winnings between the two of them.

Figure 1: Experimental Treatments

	Luck	Effort
Giving	Luck-Giving (LG)	Effort-Giving (EG)
Taking	Luck-Taking (LT)	Effort-Taking (ET)

2.1 Luck Treatments

The Luck-Giving (LG) and Luck-Taking (LT) treatments provide benchmark measures of generalized altruism in the absence of reciprocity considerations, since individual choices did not influence the roll of the die or the resulting budget size. The set of feasible budgets in the Luck games was chosen to include the range of observed outcomes in the Effort treatments. Each player who rolled the die in the Luck treatments won 100 Kenyan shillings plus the number

[13]Dictator games which allow for both giving and taking have been employed by List (2007). Greig (2006) and Jakiela (2006) use taking games similar to the one employed here.

that she rolled times ten shillings.[14] Players in the Luck games won an average of 203 Kenyan shillings (3.06 U.S. dollars), which dictators then divided between themselves and their partners.

Comparing the LG and LT treatments allows me to quantify the impact of contextual cues — specifically, assigning the budget to a player other than the dictator — on preferences for sharing: since the budget was independent of player choices in the Luck games, the distinction between "giving" and "taking" is largely a matter of framing.[15] The Luck games allow me to measure reciprocity and the willingness to reward effort in comparison to behavior in identical choice settings where the budget is independent of the labor inputs of the players.

In the Luck treatments, Player i, the dictator, decides how to divide the budget between herself and her partner, Player j. Player i chooses to allocate her partner a share of the budget that maximizes her own (potentially other-regarding) utility. Let $s^*_{i,t}(m)$ be the budget share that Player i allocates her partner in "context" t when the budget size is m. The context refers to framing and other characteristics of the situation which may influence Player i's desire to share but are independent of budget size. I estimate relative demand for giving — the share of the total budget spent on one's partner — as a function of the budget size and the experimental treatment.[16] Different theories of social preferences imply different restrictions on relative demand, which I test explicitly using the experimental data.

In Luck games, I describe the share that Player i allocates to her partner as

$$s^*_{i,t}(m) = \alpha_i + \phi_{it} + f_i(m) \tag{1}$$

where α_i describes Player i's intrinsic or average preference for sharing, ϕ_{it} is the impact of the specific experimental context on Player i's desire to allocate funds to her partner, and the

[14]In companion sessions in the Berkeley Experimental Social Science Lab, participants in the Luck games won identical payouts denominated in experimental currency tokens — i.e. subjects won 100 currency tokens plus the number rolled times ten currency tokens. Each currency token was equivalent to one-sixth of a U.S. dollar

[15]Subjects did not receive any money until the end of the experimental session, so a player would only receive the share of her winnings or earnings that the dictator allocated to her. Thus, dictators in the LT treatments did not physically "take" money from their partners. Recent studies suggest that the willingness to share is sensitive to both framing and changes in the choice set facing the dictator (cf. List 2007).

[16]The relative demand for giving is the amount allocated to Player j, π_j, divided by the total quantity demanded, $\pi_i + \pi_j$, which is equal to the budget size, m, since the price of consumption is equal to one and subjects were not allowed to choose bundles on the interior of their budget set.

function $f(m)$ captures any non-homothetic element in Player i's preferences.[17] Both α_i and ϕ_{it} are implicitly functions of the structural parameters of Player i's other-regarding utility function, and specifying a functional form for $f(m)$ would implicitly define an indirect utility function for Player i. If Player i is purely self-interested, $s^*_{i,t}(m) = 0$; if Player i has homothetic preferences, $f_i(m) = 0$. In Section 4, I estimate $s^*_{i,t}(m)$ as a flexible function of the budget size using non-parametric techniques. This allows me to characterize the appropriate parametric form for $f_i(m)$.

Framing the allocation decision as a division of another player's winnings may increase the willingness to share. In other words, the Luck-Taking context may increase $s^*_{i,t}(m)$. I estimate the "impact" of the LT framing relative to the benchmark LG treatment. I only observe each subject in one experimental treatment, but individual characteristics are orthogonal to treatment assignment because of the experimental design. Consequently, differences in average behaviors across treatments can be interpreted in terms of individual relative demand for giving. Let $\bar{s}^*_{i,t}(m)$ denote the average budget share allocated by dictators to their partners in treatment t at budget size m. I test the Kenyan and U.S. data for consistency with Hypothesis 1 in Sections 4 and 5, respectively.

Hypothesis 1 ***The (Luck) Taking Effect.*** *Players allocate their partners a larger share of the budget in the LT Treatment than in the LG treatment:* $\forall\, m > 0$, $\bar{s}^*_{i,LG}(m) < \bar{s}^*_{i,LT}(m)$.

In Panel A of Figure 2, I provide an illustrative example of the behavior of a hypothetical player in the Luck Games whose preferences for sharing depend on the experimental context. The graph depicts $s^*_{i,LG}(m)$ and $s^*_{i,LT}(m)$ for a player with preferences that can be represented by a non-homothetic, other-regarding utility function. I derive the relative demand function depicted from a specific parametric example in the Appendix.

[17]Leading models of other-regarding behavior (cf. Charness and Rabin 2002; Fisman *et al* 2007; Cox *et al* 2007) assume that preferences for sharing in such contexts are homothetic: the wealth expansion path is a ray passing through the origin. When this assumption is valid, the optimal $s^*_{i,t}(m)$ is a constant independent of budget size. Since I am able to test it using my experimental decision data, I do not assume that preferences are homothetic *a priori*.

2.2 Effort Treatments

Players had to work to generate the dictator's budget in the Effort treatments, and the budget size was increasing in effort exerted by the player sorting beans. Subjects were asked to collect dried, green-colored beans from a mix of three different kinds. At the start of each effort game, about twenty percent of the beans in each player's bucket were the green variety; the total quantity of beans was calibrated such that a hard-working player could remove most, but not all, of the green beans within a ten-minute period.[18] I assume that Player k chooses an effort level, $a_k \in A_k$. Player k's effort is unobservable, but the amount of beans she chooses to collect is a reasonable proxy.[19] Since players could calculate their expected earnings throughout the game by counting the beans that they sorted out, I treat income as a deterministic function of individual labor.[20]

The specific task was chosen for several reasons. First, it does not require intelligence or specialized skills beyond basic motor coordination, and all players could increase their output by working harder. This is particularly important since most of the sample had little formal schooling, so other effort tasks such as solving math problems or puzzles would be very difficult for many of them. Moreover, because of the task's simplicity, it is not something that players are apt to "mess up" if they get nervous.[21] Second, it is a task that is not novel to the Kenyan subjects: though they do not often separate different varieties of beans *per se*, everyone in western Kenya is familiar with the process of removing small rocks from dried beans before cooking them. Finally, because the green beans become harder to locate as their prevalence in the bucket decreases, the task imposes a degree of convexity in effort costs without sacrificing the tangible sense that players are working for their earnings.[22]

[18]No player ever exhausted their supply of green beans during the experiment.

[19]The task was chosen to minimize the importance of ability relative to effort. I assume that output does not provide a signal about individual ability.

[20]An alternative interpretation is that "effort" consisted of participating in the task. In that case, players in the EG and ET treatments should be rewarded relative to their analogs in the Luck games. Thus, the predictions of the model do not depend on the assumption that (high) output is a signal of (high) effort.

[21]Ariely *et al* (2005) find that large rewards can lead agents to make mistakes which decrease output and compensation. Subjects in my experiment make very few mistakes — i.e. they rarely include beans of the wrong type in the sample they bring up to be weighed.

[22]Collecting beans was not costless. Both the buckets and the plates that beans were sorted into remained on the ground throughout the experiment, so players had to bend over in their seats to work at the task. Players were free to stop at any time, though no subject chose to do so. The instructions indicated that subjects who

The Effort-Giving (EG) and Effort-Taking (ET) treatments allow me to test whether players treat earned income differently from lottery winnings. I discuss two models of other-regarding preferences which predict that dictators will allocate money to those laboring to generate income differently than to those who come into money without working for it.[23] If effort costs enter into Player i's other-regarding utility function, they may directly affect the marginal utility of consumption by the player earning the budget, and consequently the optimal division of resources. Alternatively, theories of reciprocity suggest that the dictator might be motivated by a desire to reward high effort and punish laziness by her partner in the ET treatment.[24]

2.2.1 Altruism

Without imposing any restrictions on preferences, it is impossible to characterize behavior in situations where the desirability of sharing depends on the effort exerted by either the dictator or her partner. When effort is costly, the disutility of working to produce the budget may enter into an other-regarding utility function in a variety of ways. In the simplest case, effort costs are additively separable from consumption utility, and consequently do not affect the marginal utility of sharing or the dictator's optimal division of the budget. I refer to this model as "inequality-averse altruism" because distributional preferences depend only on final payouts.

Definition 1 *Player i's choices are consistent with* ***inequality-averse altruism*** *if for all* $m > 0$, $s^*_{i,LG}(m) = s^*_{i,EG}(m) > 0$ *and* $s^*_{i,LT}(m) = s^*_{i,ET}(m) > 0$.

Individual behavior is consistent with inequality-averse altruism if, for example, effort costs do not enter into the utility function or if effort costs are additively separable from consumption utility. In either case, relative demand for giving in each Effort Treatment will be identical to that in the analogous Luck game.

stopped early would be allowed to spend that portion of the experiment outside drinking juice and eating cookies. Thus, it is reasonable to assume that the opportunity cost of working was non-zero.

[23] Fong (2001) and Alesina and Angeletos (2005) explore the correlation between support for redistributive policies in industrialized countries and the belief that luck, rather than effort, determines individual economic outcomes. Platteau (2000) argues that, in tribal communities in Sub-Saharan Africa, egalitarianism is motivated by the belief that high incomes are driven by luck and supernatural forces, not by hard work or entrepreneurship.

[24] Charness and Rabin (2002) and Cox *et al* (2007) model reciprocity by making the weight that Player i places on Player j's welfare depend on the latter's actions.

If effort and consumption are not additively separable, effort may affect the optimal allocation. I examine the conditions under which dictators will "reward" effort, which I define relative to behavior in the Luck treatments: a player is effort-rewarding if she is both more selfish when she has exerted effort and more generous when her partner has done so.

Definition 2 *Player i's choices are consistent with **effort-rewarding altruism** if* $\forall\ m > 0$, $s^*_{i,EG}(m) < s^*_{i,LG}(m)$ *and* $s^*_{i,ET}(m) > s^*_{i,LT}(m)$.

Proposition 1 in the Appendix demonstrates that a set of plausible assumptions on the utility representation of preferences guarantee that a dictator rewards costly effort. Given the assumptions of the proposition, the amount allocated to the player earning the budget in an Effort Treatment increases strictly faster, as a function of budget size, than the amount allocated to that player in the analogous Luck game. In Panel B of Figure 2, I provide an illustrative example of the choices of an effort-rewarding altruist in all four experimental treatments.

A dictator whose behavior is consistent with effort-rewarding altruism gives herself more in the EG setting than in the LG setting, and allocates more to her partner in the ET setting than in the LT setting. If Player i is effort-rewarding, her relative demand for giving in the Effort games is

$$s^*_{i,t}(m) = \begin{cases} \alpha_i + \phi_{i,LG} + f_i(m) + g_{EG}(m) & \text{if } t = EG \\ \alpha_i + \phi_{i,LT} + f_i(m) + g_{ET}(m) & \text{if } t = ET \end{cases} \qquad (2)$$

where $g_{EG}(m) < 0$ and $g_{ET}(m) > 0$ for all $m > 0$. [25]

If non-selfish players reward effort, then the average budget share allocated to one's partner will be strictly lower in the EG treatment than in the LG treatment for all budget sizes, and the reverse will be true in the Taking games.

Hypothesis 2 ***Effort-Rewarding Utility.*** *For all* $m > 0$, $\bar{s}^*_{i,EG}(m) < \bar{s}^*_{i,LG}(m)$ *and* $\bar{s}^*_{i,ET}(m) > \bar{s}^*_{i,LT}(m)$.

The key prediction of the model is that dictators reward both themselves and their partners for costly effort. This is what distinguishes effort-rewarding altruism from reciprocity, which I discuss in the next section.

[25] $f_i(m)$ is defined in Equation (1).

2.2.2 Reciprocity

Reciprocity provides an alternative explanation of differences in behavior across the two Taking games: a dictator may be motivated by feelings of reciprocity because her budget is an increasing function of her partner's bean-sorting effort. In broad terms, a player with reciprocal preferences is willing to reward or punish others, even at her own expense in one-shot interactions. A player displays **positive reciprocity** if she is willing to reduce her own consumption to increase consumption by a player who has been helpful or trusting, and displays **negative reciprocity** if she is willing to reduce her own consumption to decrease consumption by a player who has been uncooperative or unusually selfish. As is evident from the definitions, reciprocity may only factor into the dictator's allocation decision when both of the following are true. First, Player j chooses an action from a strategy space which includes at least two elements that translate into different choice sets or probability distributions over choice sets for Player i. In other words, Player j's action must actually affect Player i's outcome. Second, it must be possible to partition Player j's strategy space into equivalence classes which can be ranked in terms of Player i's preferences. This requirement motivates the following definition.

Definition 3 *In the ET treatment, Player j chooses an effort level, a_j, from the strategy space A_j, and this determines Player i's budget: $m = a_j$. The action $a_j^{'}$ is **more helpful than** $a_j^{''}$ only if $a_j^{'} > a_j^{''}$.*

All non-zero effort levels in the ET game may be perceived as more helpful than any action available to Player j in the LT treatment, since players in the ET game actively choose whether or not to generate money for their partner to divide. In addition, harder work on the part of Player j — and the larger budget that it generates — is more helpful still, and dictators may interpret output as a signal of effort. Player i has reciprocal preferences if she always allocates a partner choosing a helpful action a larger share of the budget than she would in a neutral setting like the LT game. To make this concept precise, it is necessary to consider the optimal budget share allocated by the dictator to Player j in relation to the optimal share in the benchmark Luck-Taking treatment.

Definition 4 *Player i displays **reciprocity** if the budget share that she allocates to her partner in an ET game is given by*

$$s^*_{i,t}(m) = \alpha_i + \phi_{i,ET} + f(m) + g(m) \tag{3}$$

where $\phi_{i,ET}$ is a constant and $g(\cdot)$ is a function which is weakly increasing everywhere and strictly increasing over some range. Choices are consistent with negative reciprocity if there exists $\underline{m} > 0$ such that for $m' \leq \underline{m}$, $s^*_{i,ET}(m') < s^*_{i,LT}(m')$. Behavior is consistent with positive reciprocity if there exists $\overline{m} > 0$ such that for $m' \geq \overline{m}$, $s^*_{i,ET}(m') > s^*_{i,LT}(m')$.

Thus, a player with reciprocal preferences punishes behavior that is worse than neutral — i.e. output levels below $\underline{m}$ — and rewards actions that are more helpful than neutral. In the Appendix, I derive relative demand for giving for two hypothetical players with reciprocal preferences; the behavior of these hypothetical subjects is depicted in Figure 2.[26]

2.3 Summary

I have outlined three models of other-regarding behavior which make differing predictions about optimal choices in the experiment. Behavior is consistent with inequality-averse altruism if allocations in the Luck treatments do not differ from allocations in the Effort games. The model of effort-rewarding altruism, on the other hand, predicts that dictators allocate *themselves* more in the EG setting than they do in the LG setting, and allocate their *partners* more in the ET setting than in the LT setting. Finally, the models of reciprocity do not predict differences in behavior between the two Giving games. However, reciprocal dictators will allocate their partners more in the ET setting than in the LT setting when the partners choose actions that are more helpful than some neutral action, and will allocate them less in the ET setting than in the LT setting when they choose actions that are less helpful than the neutral action.

[26]The model is similar in spirit to those of Charness and Rabin (2002) and Cox *et al* (2007), which include a structural parameter, the weight that Player i places on consumption by Player j, which is an increasing function of the perceived helpfulness of Player j's actions.

3 Experimental Procedures and Data

In Section 3.1, I describe the experimental protocol used to administer the lab sessions. The protocol is common to all four treatments, and was followed in both the field experimental lab sessions in Kenya and the companion sessions in the Berkeley X-Lab. Section 3.2 describes the experimental lab that I set up in Busia, and how participants were recruited for the sessions. In Section 3.3, I describe the characteristics of the Kenyan experimental subjects.

3.1 Experimental Protocol

Experimental sessions were structured as follows. In each of the four experimental treatments, subjects were randomly assigned to either Room A or Room B.[27] After a brief introduction, participants were divided into two groups, each assigned to a separate classroom. Each subject was matched with a partner in the other room, though their partners' identities were never revealed to them during or after the experiment. Subjects in both rooms faced identical decision problems (i.e. all subjects played the dictator role); after the session ended, the decisions of one room were randomly chosen to determine final payouts. Subjects in Rooms A and B were read identical sets of instructions.[28] They learned the entire structure of the game before making any decisions.[29] The instructions included a trial period in which subjects were allowed to practice rolling the die (in the Luck Treatments) or sorting out the correct type of beans (in the Effort Treatments).

After the instructions and the trial period, subjects were called outside one at a time to make their allocation decisions. Each participant sat down at a desk with a research assistant. Before recording any decisions, the research assistant quizzed the subject on the structure of the game to verify comprehension.[30] I then used the strategy method to record decisions: each participant was asked a series of questions about how she would like to divide every feasible budget that

[27]The randomization was stratified by arrival time at the game session.

[28]Copies of the instructions — in English or Swahili — are available from my website at https://webfiles.berkeley.edu/~jakiela/research.html.

[29]As a result, labor choices in the ET treatment should be best responses to beliefs about the allocation decisions that their partners would make later in the game.

[30]In the few cases where participants did not understand the instructions, research assistants reviewed the protocol with them before proceeding.

could be generated in the game between herself and her partner in the other room.

After all of the decisions had been recorded, subjects returned to their respective classrooms and the income-generation portion of the experiment began. In Luck Treatments, subjects were called up to the front of the room one at a time. Each person was given one opportunity to roll a twenty-sided die. Participants learned how much they won immediately.[31] In Effort Treatments, subjects were given ten minutes in which to collect beans from their buckets. They were informed that, if they wished to stop collecting beans at any time, their earnings would be calculated immediately based on their work up to that point and they would be allowed to spend the rest of the game sitting outside drinking juice and eating cookies.[32] At the end of the ten minutes, they were called up one at a time and their beans were weighed using a digital scale. After a brief break, subjects returned to a single classroom. At that point, the room whose decisions would determine final payouts was selected. Two colored disks labeled "A" and "B" were placed into a large plastic cup, and one of the disks was chosen at random. Subjects received their payments in cash at the close of the experimental session.

3.2 Field Lab Settings

I conducted fourteen experimental sessions in field experimental labs which I set up in Busia District in rural western Kenya. Busia District is a poor, predominantly rural area on the Ugandan border, just north of Lake Victoria. Each session in the sample took place in a different rural community located less than one hour away from Busia Town, the main urban center in the district. In each location, I recruited participants from the catchment area of a single primary school. I used the schools to define the boundaries of a community for recruitment purposes and to provide a location in which to set up the field lab. Six of the fourteen schools are located on or within ten minutes of a paved road, and three of those are in Nambale, a market center 22 kilometers from Busia Town. It was not possible to hold equal proportions of each experimental treatment in schools near paved roads because of divisibility issues: I conducted three sessions

[31] However, since either Room A or Room B was randomly chosen to determine final payouts, subjects did not learn whether their winnings would be used to calculate payouts until the end of the experiment.

[32] No subjects in either Kenya or the U.S. chose to stop early.

of each Luck treatment and four sessions of each Effort treatment.

The experimental subjects were Kenyan adults drawn from the primary school catchment areas. Before each session, members of the research team worked with the local head teacher and village leaders to compile a list of adults between the ages of 18 and 35.[33] Letters explaining the presence of the researchers within the community were given to these target participants — they were either sent home with children in the school or hand delivered by a village elder. The day before each session, research assistants made home visits to each individual on the target roster. Potential subjects completed a short survey and were invited to attend a session of economic games. 548 individuals were surveyed prior to the experiment, of whom 78.1 percent chose to attend the game session the next day. In addition, the sample includes 118 individuals who had either received introductory letters, but were not at home when the survey team visited their household, or heard about the economic games from their neighbors. A total of 546 people participated in the experimental sessions in Busia.

All experimental sessions were held in empty primary school classrooms. Sessions were held in the afternoon, by which time lower grades had left school for the day. The experiment was approximately three hours long. All sessions were conducted in Swahili, the local lingua franca.[34] Participants who had not been surveyed before the session met with a research assistant after the experiment was over to complete the questionnaire.

Table 1 presents summary statistics on the experimental sessions. The average number of subjects per session was 39. I report the participation rate — the fraction of individuals interviewed the day before the experiment who chose to attend — as a measure of the willingness to households to forgo the opportunity cost of spending three hours at the field lab session. In addition, I include within-session ethnolinguistic fractionalization and average community group participation to provide suggestive evidence on the cohesiveness of the sample neighborhoods.[35]

[33] Because it was not possible to conduct sessions in multiple tribal languages at the same time, and because variation in the linguistic requirements of subjects across neighborhoods could bias my results, I chose to target younger adults to minimize the extent to which Swahili-speakers would represent a selected sample. Almost all Kenyans under 35 are proficient in Swahili. My survey teams only encountered target participants who were not conversant in Swahili in a handful of households.

[34] 97.6 percent of subjects were drawn from the three main ethnic groups in Busia District: Luhyas, Tesos, and Luos, each with its own language. Sessions were conducted in Swahili to avoid selection along ethnic lines.

[35] Ethnolinguistic fractionalization (ELF) is a scalar measure of the level of diversity in a population, calculated by summing (over ethnic groups) the squared proportion of the total population in each group and subtracting

Though there is variation in these figures, none of the differences are statistically significant.

3.3 Participant Characteristics

The survey data document both the subjects' socioeconomic position and their values and beliefs; summary statistics are included in Table 2. The survey data indicate that most of the subjects are poor subsistence farmers: 96.1 percent farm their own plot of land, and only 16.9 percent live in a household with a member employed in the formal sector. 19.5 percent of subjects completed secondary school, and an additional 35.2 percent completed primary. There is considerable ethnic diversity: though most are Luhya, the dominant tribe in Western Province, 24.4 percent are ethnically Teso and 4.7 percent are Luo.[36] There is, however, almost no religious diversity in the sample: 97.4 percent are Christian. Subjects were asked to describe their participation in a variety of community groups. On average, subjects are active members of two such groups, the most common being church groups, rotating savings and credit associations (ROSCAs), and women's groups.[37] Only 111 subjects do not actively participate in any community groups.

I also collected data on values, trust, and self-reliance.[38] These data provide insight into the culture and beliefs of the Kenyan subjects, and how these differ between Busia and the United States. In Section 4, I explore the importance of values — as opposed to differences in economic opportunities or educational attainment — in explaining disparities between the two samples. 52.4 percent indicated that people were generally fair, and 77.3 percent indicated that they trust their neighbors either completely or somewhat.[39] 41.6 percent of subjects believe that poverty in Kenya results from laziness and lack of willpower among the poor, and not from

this sum from one. Easterly and Levine (1997) attribute slow development in Sub-Saharan Africa to high levels of ELF. At the local level, Miguel (2004) finds that ELF is correlated with poor provision of public goods in Busia District. Putnam (1993) argues that community group participation is a proxy for social capital.

[36]Four participants were drawn from other minority ethnic groups. In addition, I do not have ethnic group information for nine subjects.

[37]A ROSCA is an informal group-lending mechanism funded by individual contributions from members.

[38]Several of these questions were taken from the World Values Survey (http://www.worldvaluessurvey.org) and adapted to the Kenyan context. Copies of my survey instrument, in English and Swahili, are available at https://webfiles.berkeley.edu/~jakiela/research.htm.

[39]Respondents were asked the World Values Survey question "Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?" They were also asked to indicate whether they trusted their family, their neighbors, and "people that they were meeting for the first time" completely, somewhat, not very much, or not at all.

unfair treatment by society as a whole. 67.6 percent indicated that it would be acceptable for two primary school teachers to earn different salaries if one was a more reliable worker whose students performed better on standardized tests. Respondents were also asked how they would attempt to get 1,000 Kenyan shillings (15.04 U.S. dollars) in an emergency.[40] They were allowed to volunteer unstructured responses, and their answers were classified as either self-reliant — selling possessions, working more, etc. — or reliant on others. 60.3 percent of respondents reported at least one self-reliant action, while 87.8 percent indicated that they would either take a loan or ask for a gift from another individual.

4 Analysis

This section describes individual allocation decisions and effort choices. Section 4.1 tests allocation decisions for consistency with the social preference theories described in Section 2. Comparing the Luck treatments allows me to characterize preferences for sharing in the absence of effort considerations, since the budget outcome in those games did not depend on the choices of either player. There is strong evidence that individual preferences for sharing depend on the context of the dictator game: players allocate themselves a larger share of their own (unearned) winnings than their partners' winnings, in spite of the fact that the distinction is largely semantic. I compare Effort-Giving to Luck-Giving games in Section 4.1.2. I find evidence that players reward their own hard work: simply being in the "earner" role increases the share of the budget that players allocate to themselves. Analyzing the differences between Effort and Luck Taking treatments in Section 4.1.3, I find no evidence of a parallel pattern of effort-rewarding behavior. In Section 4.2, I predict individual behavior in the experiment using the survey data. While values and beliefs are not associated with differential behavior across treatments, educational attainment and formal sector employment predict the willingness to reward another subject's effort. I examine individual effort choices in Section 4.3. There is no evidence that subjects curtail their labor in response to insecure "property rights" in the ET game.

[40] 1,000 Kenyan shillings is more than a week's wages for an agricultural laborer in Busia District.

4.1 Comparing Allocation Decisions Across Treatments

I begin by characterizing relative demand for giving in the four experimental treatments. I focus on the outcome variable Partner Share which represents the fraction of the total budget that a player allocates to her partner. Thus, in the Giving treatments, Partner Share represents the portion of a player's winnings or earnings that she allocates to her partner; in the Taking treatments, Partner Share is the fraction of a player's partner's winnings or earnings that the player does not transfer to her own account. Pooling data across subjects and budget sizes, dictators in the LG game allocate their partners an average of 26.3 percent of the budget (Table 1). This finding is broadly consistent with previous work on dictator games.[41] I am able to reject the hypothesis that any two treatments have equal average values of Partner Share.

My results draw on two types of empirical analysis. First, I explore the experimental decision data graphically. I present histograms of Partner Share, pooling the data for all players and budget sizes (Figure 3). I also graph the results of non-parametric, locally-weighted Fan regressions of Partner Share as a function of the total budget (Figure 4).[42]

Since all four graphs in Figure 4 are approximately linear, I adopt a linear estimation strategy in my regression analysis. I present the results of regressions in which I pool the data from all of the individual allocation decisions made in the experimental sessions (Table 3) and estimate the regression equation

$$s_{itm} = \alpha + \mathbf{T}_{it}\phi + m \times \mathbf{T}_{it}\gamma + \epsilon_{itm} \quad (4)$$

in which s_{itm} represents the budget share that individual i allocates to her partner in treatment t when the budget size is m, $\mathbf{T}_{it}$ is a vector of indicators for the experimental treatments, m is the budget size, and ϵ_{itm} is a conditionally mean-zero error term.[43] Because subjects made their

[41] Camerer (2003) provides an overview of demand for giving in dictator games. In her study of dictator game giving among the Orma people of northern Kenya, Ensminger (2004) finds that subjects allocate their partners 31 percent of the budget, on average. Marlowe (2004) finds that Hadza dictators in Tanzania offer their partners an average of 20 percent of the budget.

[42] A scatter plot of the average values of Partner Share, disaggregated by treatment and budget size, is available at https://webfiles.berkeley.edu/~jakiela/research.html. The results are similar to the Fan regressions: the graphs are less smooth, but there is no evidence that higher order polynomials would be an improvement over a simple linear specification.

[43] Budgets in the experiment ranged from 100 to 300 Kenyan shillings (1.50–4.51 U.S. dollars), but I divide the budget by 100 in all specifications to ease interpretation of the coefficient estimates.

decisions in sequence — for example, they indicated how they would like to divide 200 Kenyan shillings immediately after dividing 190 shillings and immediately before dividing 210 shillings — I expect serial correlation in the error terms. To control for this, I report OLS estimates with robust standard errors clustered at the player level (Table 3, Column 1). I also estimate a Tobit regression specification which adjusts for censoring of the PARTNER SHARE variable at zero and one (Table 3, Column 2).[44] The results of both specifications are similar.

4.1.1 Luck-Giving vs. Luck-Taking

There is strong evidence that the difference in framing between the LG and LT treatments has a significant impact on allocation decisions. On average, players allocate their partners 26.3 percent of their budgets in the LG games and 42.9 percent in the LT games (Table 1). The distribution of amounts given in the LG treatment is bimodal: players award their partners nothing 15.0 percent of the time and half of the budget 15.9 percent of the time (Figure 3). In the LT game, there is a single peak in the distribution: 27.7 percent of observations are even splits of the budget (Figure 3). In addition, in more than a quarter of the observations, players allocate their partners *more* than half of the total budget. In contrast, fewer than five percent of PARTNER SHARE observations in the LG game are above 0.5.

These differences are statistically significant. The indicator for the LT game is positive and significant in both specifications. The OLS specification suggests that dictators dividing their partners' winnings allocate the other player 15.5 percent more than they would if they had won the money themselves (Table 3, Column 1). PARTNER SHARE decreases as the budget size increases in both treatments. The Fan regression graphs appear to drop by more than five percent of the total budget over the range of possible outcomes (Figure 4). The estimated coefficients on BUDGET in these two experimental treatments are both negative and significant. The coefficient estimate for LG $\times$ BUDGET is slightly smaller than the analogous figure for LT $\times$ BUDGET: -0.034 versus -0.029.[45] The estimates suggest that moving from the lowest feasible budget to the highest would decrease the share that a player allocates to her partner by

[44] Several of the models discussed in Section 2 lead to corner solutions for certain parameter values.

[45] A coefficient estimate of 0.010 indicates that a player would allocate her partner an additional two percent of the budget at the largest budget size — 300 shillings — than she does when the budget is only 100 shillings.

6.8 and 5.8 percentage points, respectively, in the LG and LT treatments. Though the estimated slope coefficients are not identical, a Wald test fails to reject their equality (p-value 0.546).

Thus, I am able to reject the hypotheses that (a) players are purely self-interested and (b) that other-regarding preferences are homothetic. Though giving to one's partner is a normal good, Partner Share is not independent of the budget size. The finding highlights the importance of using the Luck treatments as a control when assessing the willingness to reward effort. In addition, I find clear evidence in support of Hypothesis 1: framing the dictator's choice as taking (rather than giving) has a positive and significant impact on the relative demand for giving, and this effect does not appear to vary across budget sizes.

4.1.2 Do Subjects Reward Their Own Effort?

Next, I compare allocation decisions in the LG and EG treatments. On average, players allocate their partners less in the EG treatment: 22.5 percent of the budget as opposed to 26.3 percent (Table 1). The histogram of Partner Share in the EG game is broadly similar to the LG histogram described above: both are bimodal with peaks at zero and fifty percent of the budget (Figure 3). However, allocations consistent with purely selfish preferences occur with greater frequency in the EG game. This evidence suggests that players reward their own effort.

The Fan regression graphs demonstrate that, as in the LG treatment, Partner Share is decreasing in budget size in the EG game (Figure 4). This result is confirmed in the regression analyses. Though the coefficient on the interaction between the EG treatment and the budget size is negative and significant in both specifications, at -0.018, it is smaller than the estimated slope in the LG treatment (Table 3). Thus, dictators in the EG treatment allocate their partners a smaller share, on average, than dictators in the LG game, but the gap shrinks as the budget size increases. The coefficient suggests that moving from the smallest possible budget to the largest would decrease the share that a player in the EG treatment allocates to her partner by 2.51 percentage points, as opposed to 6.8 percentage points in the LG treatment — the estimated decrease is only half as large. A Wald test on the equality of the two coefficients rejects the hypothesis that the slope coefficients are equal (p-value 0.016). This result is surprising: when players increase the size of the pie through their own effort, they increase the budget share that they allocate to themselves, but they do so less rapidly, as the budget increases, than they would in a neutral setting where the budget was not generated by their labor.

4.1.3 Negative Reciprocity?

Next, I examine the hypothesis that players reward helpful effort by their partners. On average, Partner Share is *lower* in the ET game than in the LT game: players allocate their partners 42.9 percent of the total budget in the latter treatment, but only 40.6 percent in the former (Table 1). The estimated regression coefficients on the indicator for the ET game are smaller in magnitude than those of the LT indicator, and I can reject the hypothesis that they are equal with 99 percent confidence (Table 3, Column 1).[46] In the ET game, 33.6 percent of observations are even splits of the budget (vs. 27.7 percent in the LT treatment), and the non-dictating earner receives more than half the budget in an additional 21.2 percent of the observed allocations (vs. 25.6 percent in the LT game). Thus, there is evidence of considerable levels of other-regarding behavior in the ET games, but not as much as in the LT treatments. Thus, the data are not consistent with positive reciprocity or effort-rewarding utility.

The results indicate that the share a dictator allocates to her partner in the ET game is constant — it *doesn't* depend on budget size in a manner consistent with the other three treatments. The ET Fan regression graph is essentially flat, while the other three graphs are downward-sloping (Figure 4). In addition, the estimated slope coefficient for the ET games is not significantly different from zero (Table 3, Column 1), and I can reject the hypothesis that the slopes are equal in the two Taking treatments with 99 percent statistical confidence (p-value 0.009).

It is possible that subjects are punishing low effort: the estimated value of Partner Share is decreasing in the LT treatment but not in the ET game, so the magnitude of the disparity between the two is decreasing in output. However, the OLS coefficient estimates suggest that

[46]However, the LT coefficient is almost identical in magnitude to the difference between the ET and EG parameter estimates, suggesting that differences in the intercept across treatments are driven by the impact of placing the dictator in a "taking" role, relative to the analogous Giving treatment. It is clear from the Partner Share histograms that much of this difference comes from the increased likelihood of choosing the even split of the budget in the Taking treatments (Figure 3).

dictators define 300 grams as the neutral action — non-dictating partners in the ET and LT games have predicted allocations that are equal when $m = 300$ — above the maximum observed output level in the Effort treatments.[47] Thus, it is a stretch to argue that behavior is motivated by negative reciprocity, since dictators appear to punish effort rather than rewarding it, though the size of the punishment is decreasing in the level of output.

Thus, in aggregate, the choices of the Kenyan subjects are not consistent with any of the models discussed in Section 2. As discussed above, their choices in the Taking games are not consistent with reciprocity. Because they reward themselves for any amount of effort in the EG treatment, relative to the LG treatment, their behavior is not consistent with the models of inequality-averse altruism or reciprocity. However, because they do not reward their partners' labor, they are also not consistent with the model of effort-rewarding altruism. One possible interpretation is that players value effort, but only when it works in their favor. In his discussion of dictator games among the Hadza people in Tanzania, Marlowe (2006) writes "Those who gave 0.5 usually said it was the only fair offer. Those who gave less were quick to pull any old rationalization out of thin air." It may be that dictators in my sample are similar, employing different fairness norms in different contexts in a manner which increases their payouts.

4.2 Predicting Individual Behavior

Next, I test whether, within the Kenyan sample, the willingness to reward effort is correlated with variables which may be linked to development — income, education, and cultural values. I use the survey data to predict individual behavior within the experiment. I estimate the regression equation

$$s_{itm} = \mathbf{X}_i\delta + m * \mathbf{X}_i\lambda + \varepsilon_{itm} \tag{5}$$

where s_{itm} is the budget share that Player i in treatment t allocates to her partner at budget size m, $\mathbf{X}_i$ is a vector of individual characteristics drawn from the survey, and ε_{itm} is an error term with conditional expectation equal to zero. I estimate both OLS specifications with robust

[47] Participants were informed before they made their allocation decisions that it was not possible for a player to collect more than 300 grams of beans. Thus, it is not possible that they intended to punish low output and reward high output, but mis-estimated average production.

standard errors clustered at the player level and Tobit regressions which allow for censoring of Partner Share (Table 4). The results of the two specifications are similar. I then replicate the main OLS regression separately for each of the four experimental treatments, to explore the correlates of effort-rewarding behavior (Table 5).

When the data from all four treatments are pooled, education and formal sector employment predict altruism: the dummy variables for completing primary school and having a household member employed in the formal sector are both positive and significantly different from zero with at least 95 percent statistical confidence in all specifications (Table 4). When the data are disaggregated by treatment, the two variables are not independently significant at conventional levels. However, they are correlated, and a test of their joint significance in the ET treatment indicates that the 16.7 percentage point increase in Partner Share that they predict is statistically significant (p-value 0.039). However, the variables are not jointly related to significant increases in Partner Share in any of the other three treatments. Though the results are not decisive, they suggest that education and employment — both clear hallmarks of participation in the modern sector — are associated with the willingness to reward others' effort.

In addition, I find that subjects who report relying on others for financial support during crises are less generous than other players. The coefficient estimate on the dummy variable Relies on others to get Ksh 1000 is negative and significant in both the OLS and Tobit specifications, suggesting that depending on others is associated with between a 3.9 and a 4.7 percentage point decrease in demand for giving. Disaggregating the data by treatment does not reveal any clear patterns: the coefficient estimate is negative in three of the four games, though only significant in the LT and EG settings.

The estimated coefficient on Budget is negative, as expected, though it is only significant in the OLS specifications. The interactions between budget size and individual characteristics, however, are both small in magnitude and statistically insignificant. In addition, the variable measuring willingness to accept inequality is near zero and insignificant, as is the measure of financial self-reliance (Table 4). The indicator for trusting one's neighbors is also not significant, though the point estimate is slightly larger. Thus, most of the variables characterizing values and beliefs do not appear to predict either generalized altruism or effort-rewarding behavior, but variables related to participation in the modern sector are associated with the latter.

4.3 Effort Choices

I next compare the level of effort exerted sorting beans in the EG and ET treatments. "Standard" theory predicts that self-interested players facing convex effort costs will equate the marginal utility of consumption and the marginal cost of effort in the giving treatments, but exert minimal effort in the taking games if they expect self-interested behavior by their partners. My data are entirely inconsistent with the latter prediction. Unlike "standard" theory, the social preference models described in Section 2 do not predict zero effort in the ET treatment.[48]

I report means and standard errors for two measures of individual effort: the number of grams of beans collected (Grams) and the total amount earned (Earnings), which is equal to the number of grams minus the amount of points deducted for incorrectly sorted beans (Table 1).[49] Both outcomes are nearly identical in the two Effort games, and t-tests on the equality of the means across treatments do not reject the null hypotheses (p-values 0.84 and 0.79, respectively). On average, subjects collect 212.2 grams of beans in the EG treatments and 212.9 grams in the ET treatments. The similarity between Grams and Earnings demonstrates that error rates were low in both games. This evidence is consistent with the hypothesis that sorting beans was not a difficult task — players did not make mistakes in their haste.

Histograms of effort choices in the two treatments suggest that the distributions are similar (Figure 6). The minimum and maximum numbers of beans collected are comparable: 116 grams and 296 grams in the EG games and 114 grams and 283 grams in the ET games. The two distributions are not identical — there are a few more players in the left tail of the ET treatment distribution. The first through fifth percentiles of the ET distribution are about fifteen grams below the analogous statistics for the EG treatments. However, a Kolmogorov-Smirnov test does

[48] Though explicit predictions depend on functional form assumptions, most studies of other-regarding behavior suggest that players put more weight on their own consumption than on consumption by others. Models of such behavior might predict lower effort in the ET treatment than in the EG treatment. However, effort levels may not differ if either (a) players put equal weight on themselves and other players or (b) they expect reciprocal dictators to allocate them a share of the budget that is increasing in output.

[49] Ten Kenyan shillings were deducted from a player's earnings for each bean in her plate that was not green.

not reject the equality of the distribution functions (p-value 0.577).

Though the data are not consistent with the behavior of rational, self-interested agents maximizing their utility in the face of strictly convex effort costs, several models might account for the observed patterns. First, other-regarding individuals could, in principle, value consumption by others as much as they value their own. Alternatively, if agents believe that, because their partners have a preference for rewarding effort, the share that an earner will be allocated is an increasing function of output, then even purely self-interested players facing strictly convex effort costs may work harder in the ET treatment — whether this is true depends on both players' preferences. Finally, subjects might have been hesitant to stop working in the presence of their peers, in spite of the fact that the instructions clearly indicated that they were allowed to do so.

I predict bean-sorting effort using the survey data. I estimate the linear regression equation

$$g_i = \mathbf{X}_i \beta + \varepsilon_i \tag{6}$$

where g_i is the number of grams of beans collected by Player i, $\mathbf{X}_i$ is a vector of individual characteristics drawn from the survey, and ε_i is an error term with conditional expectation equal to zero. First, I pool the data from the EG and ET games (Table 6, Column 1). I also estimate Equation (6) separately for the EG and ET samples (Table 6, Columns 2 and 3).

It is apparent that women do better at bean-sorting than men: the female dummy is associated with a 33.3 gram increase in output, and the difference is significant with at least 99 percent statistical confidence in all specifications. Age, educational attainment, and formal sector employment do not predict bean-sorting output. There is, however, suggestive evidence that effort is motivated, in part, by beliefs about one's partner. When the sample is restricted to participants in the EG treatment, the dummy variable Most People Fair is associated with a increase in output by 10.2 grams. Surprisingly, the variable is also associated with lower production in the ET game, though the result is only significant at the ten percent level.

Taken together, these results suggest that, though effort may be motivated by beliefs, there is little reason to fear that the absence of effort-rewarding preferences discourages individual labor. However, the finding may be driven by the public nature of production, or the relatively low cost of exerting effort for ten minutes in an experimental setting.

5 Companion Experiments in Berkeley

In this section, I discuss companion experiments which I conducted in the Experimental Social Science Lab (X-Lab) at U.C. Berkeley. These sessions allow me to compare demand for giving in Busia to behavior in a conventional experimental economic lab in the United States. Procedures in the Berkeley sessions were identical to those used in Kenya, except that U.S. participants were recruited using standard procedures for the X-Lab.[50] 196 students participated in the U.S. sessions, all of whom completed an abbreviated survey after the experiment, which allows me to make cross-cultural comparisons of the correlates of behavior in the lab.

Berkeley subjects are younger and more likely to be female than their Kenyan counterparts: the average age was 20.2 (vs. 27.5 in Kenya), and 61.7 percent (vs. 41.2 percent) of participants were female (Table 8). The U.S. sample is also, by construction, more educated, since subjects are recruited from the student population of the University of California. Surprisingly, I find comparable levels of ethnolinguistic fractionalization in the two samples, because only 49.0 percent of the participants in the X-Lab sessions are native English speakers. U.S. subjects are less likely to believe that "most people would try to be fair" to them (34.4 vs. 52.4 percent), yet also less likely to believe that poverty results from laziness or lack of willpower among the poor (36.9 vs. 41.6 percent). Subjects in Berkeley are also less likely to ask for a gift or a loan in the event of a financial crisis (65.5 vs 87.8 percent). This might reflect more self-reliance on the part of subjects in the U.S., or greater access to the formal credit market.

Data from the dictators' allocation decisions indicates that experimental subjects in the X-Lab are significantly less generous toward other participants than their Kenyan counterparts (Table 7). In all four treatments, subjects in Berkeley allocate less to their partners than dictators in Kenya. Histograms of Partner Share in the four treatments indicate that all four distributions are bimodal, with significant mass at both zero and one half (Figure 6). In

[50] The instructions used in the U.S. sessions were exact translations of the Swahili instructions employed in Kenya. Copies of the instructions are available at https://webfiles.berkeley.edu/~jakiela/research.html.

both of the Giving treatments, subjects in Berkeley allocate their partners 6.8 percentage points less, on average, than dictators in Kenya. More strikingly, U.S. subjects leave their partners 29.0 and 17.3 percentage points less in the LT and ET games, respectively (Table 7).

Non-parametric Fan regression plots of the allocation decisions of subjects in the Berkeley sample highlight their comparative selfishness (Figure 7). However, it is apparent from the graph that U.S. subjects allocate those who earn the budget more than those who win it. In contrast to the Kenyan data, this pattern is significant in both the Giving and Taking treatments. OLS and Tobit regression estimates confirm the graphical patterns: only the coefficient on the ET dummy is significantly different from zero (Table 9). The intercept estimates for the other three treatments are statistically indistinguishable, though the estimated coefficient on the EG dummy is less than zero.[51] The slope estimates in the Berkeley data are consistent with the hypothesis that subjects allocate earners a share of the budget that is increasing in output, at least relative to the Luck benchmarks. At −0.029, the EG × Budget coefficient is more negative than the Luck analog, and only the former is significantly different from zero. Thus, dictators in the EG treatment allocate themselves a budget share that is increasing in budget size. In contrast, dictators in the ET treatment allocate their partners a budget share that is decreasing in budget size, but significantly less steeply than in the LT game. The coefficient estimates are −0.018 and −0.042, respectively. Thus, in marked contrast to subjects in Busia, participants in the U.S. behave in a manner consistent with effort-rewarding altruism.

Examining the correlation between survey data and behavior in the experiment, I find several variables that predict overall generosity (Table 10). Women, those who trust strangers, and self-reliant players all allocate their partners a larger fraction of the budget; the beliefs that poverty results from "laziness or a lack of willpower" and that income inequality is acceptable are both significantly associated with lower demand for giving. However, the survey data does not appear to predict differences in behavior across treatments in the U.S. sample.[52]

In contrast to the Kenyan participants, subjects in the U.S. exert slightly less effort in the ET treatment than in the EG sessions (Table 7). On average, participants collected 173 grams

[51] Though the LT intercept estimate is not significantly different from zero, the *average* share that dictators in the LT game give to their partners is significantly lower than the average share given in the LT treatment.

[52] This and other results not shown here are available at https://webfiles.berkeley.edu/~jakiela/research.html.

of beans in the EG game, but only 168 grams in the ET game. However, the difference is not statistically significant (p-value 0.396). Figure 8 contains histograms of effort choices in the Berkeley sessions. As in the Kenya data, the left tail of the effort distribution is thicker in the ET game. The least productive player collected 80 grams in the Taking treatment, while the minimum observation in the EG game is 118 grams. However, the two distributions are similar above the 20th percentile, and a Kolmogorov-Smirnov test does not reject the hypothesis that they are equal (p-value 0.781). As in Kenya, regression estimates suggest that women generate more output than men, an effect which is statistically significant in all specifications (Table 12). In addition, self-reliance predicts significantly lower output in ET games, but not in EG games. Those who report reliance on others, however, collect fewer beans regardless of the treatment. Yet, though there are suggestive patterns in the data, the overarching result is that insecure property rights, in the experimental context examined here, do not lead to reductions in output in either the U.S. or Kenya.

6 Conclusion

In this paper, I examine altruism and reciprocity in western Kenya and the United States using a suite of dictator games. The experimental design allows me to vary the extent to which income depends on individual labor without affecting other aspects of the economic environment. I find that demand for giving is significantly higher in Kenya, but that subjects there do not appear to reward others' effort. Their behavior is not consistent with inequality-averse altruism, effort-rewarding altruism, or reciprocity. Dictators allocate themselves a larger share of the budget when they earn money than when they win it, but do not apply the same effort-rewarding rule to other subjects. In contrast, participants in companion experiments in the U.S. appear more selfish, on average, than Kenyan subjects, but behave in a manner consistent with effort-rewarding altruism. Subjects do not appear to reduce their effort in the ET treatment in either Kenya or the United States.

This paper contributes to the emerging literature in experimental development economics, and also complements recent work on the role of values and beliefs in development. I provide evidence that distributional preferences and values — in particular, the willingness to rein in selfishness in order to reward hard work — differ across cultures. This pattern suggests that disparities between communities in the extent of real-world sharing and public goods provision may be motivated by more than differences in the economic environment. Within the Kenyan subject pool, the willingness to reward effort is associated with education and formal sector employment. One interpretation of this finding is that economic progress, at the individual and community levels, may be related to changes in the willingness to accept inequality that results from individual enterprise, though my results do not justify a causal interpretation.

While there is a broad consensus that culture influences developmental outcomes, identifying the impact of values and beliefs on behavior is difficult, since they are not independent from the economic and social environment of those who hold them. Experimental economic methods allow us to collect data on values, such as the willingness to reward effort, or to share. Yet, as Ray (2006) argues, "Individual desires and standards of behavior are often defined by experience and observation." Recent work by Di Tella *et al* (2006) suggests that market-oriented beliefs may be caused by economic opportunities: individuals who had received land titles were more likely to hold pro-market beliefs, though the assignment of titles was orthogonal to individual characteristics. My data are consistent with this finding, since variables related to integration into the modern economy — education and formal sector employment — are associated with effort-rewarding behavior. Nonetheless, the connections between cultural values and economic progress, and the dynamic interplay between the two, are not yet well understood, and merit further study.

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Appendix

Player i is assumed to have complete preferences over the consumption space $\Pi_i \times A_i \times \Pi_j \times A_j$, where, for $k = i, j$, π_k is the amount of money allocated to Player k and a_k is Player k's effort, which completely determines income in the Effort treatments.[53] I assume that $m = a_i$ in the EG treatment and $m = a_j$ in the ET treatment.

Proposition 1 *Let $u(\pi_i, a_i, \pi_j, a_j)$ be a continuous, twice-differentiable utility function which represents Player i's preferences over $\Pi_i \times A_i \times \Pi_j \times A_j \subseteq \mathbb{R}^4_+$, and let the following assumptions hold:*

i. For $k = i, j$, $\dfrac{\partial u(\pi_i, a_i, \pi_j, a_j)}{\partial \pi_k} > 0$ and $\dfrac{\partial^2 u(\pi_i, a_i, \pi_j, a_j)}{\partial \pi_k^2} < 0$.

ii. For $k = i, j$, $\dfrac{\partial u(\pi_i, a_i, \pi_j, a_j)}{\partial a_k} < 0$ and $\dfrac{\partial^2 u(\pi_i, a_i, \pi_j, a_j)}{\partial a_k^2} < 0$.

iii. $\dfrac{\partial^2 u(\pi_i, a_i, \pi_j, a_j)}{\partial \pi_i \partial \pi_j} \geq 0$.

iv. For $k = i, j$, $\dfrac{\partial^2 u(\pi_i, a_i, \pi_j, a_j)}{\partial \pi_k \partial a_k} > 0$ and $\dfrac{\partial^2 u(\pi_i, a_i, \pi_j, a_j)}{\partial \pi_k \partial a_{-k}} = 0$.

v. As $m \to 0_+$, $\lim \pi^*_{i,EG}(m) \geq \lim \pi^*_{i,LG}(m)$ and $\lim \pi^*_{i,ET}(m) \leq \lim \pi^*_{i,LT}(m)$.

If the assumptions above are valid, then Player i is effort-rewarding.

Proof of Proposition 1

Player i chooses a division of the budget that maximizes her utility, which is defined over her own consumption, her partner's consumption, and both of their effort levels. The budget share that she allocates her partner is given by

$$s^*_{i,t}(m) = \frac{\pi^*_j(m)}{m}$$

where $\pi^*_j(m)$ is the amount of money awarded to her partner at the optimum.

In the Luck-Giving treatment, Player i chooses an allocation to maximize $u(\pi_i, a_i, \pi_j, a_j) = u(\pi_i, 0, \pi_j, 0)$ subject to the budget constraint $\pi_i + \pi_j \leq m$. Let $z(\pi_i, \pi_j; m) = 0$ be the first-order condition which implicitly defines Player i's optimal division of the budget. Then,

$$z(\pi_i, \pi_j; m) = \frac{\partial u(\pi_i, 0, \pi_j, 0)}{\partial \pi_i} - \frac{\partial u(\pi_i, 0, \pi_j, 0)}{\partial \pi_j} = 0$$

because Assumption i implies a binding budget constraint, so $\pi_j = m - \pi_i$. The following is true by the Implicit Function Theorem.

$$\begin{aligned}
\frac{d\pi_{i,LG}}{dm} &= -\frac{\dfrac{\partial z(\pi_i, \pi_j; m)}{\partial m}}{\dfrac{\partial z(\pi_i, \pi_j; m)}{\partial \pi_i}} \\
&= -\frac{\dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j} \cdot \dfrac{\partial \pi_j}{\partial m} - \dfrac{\partial^2 u}{\partial \pi_j^2} \cdot \dfrac{\partial \pi_j}{\partial m}}{\dfrac{\partial^2 u}{\partial \pi_i^2} + \dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j} \cdot \dfrac{\partial \pi_j}{\partial \pi_i} - \left(\dfrac{\partial^2 u}{\partial \pi_j \partial \pi_i} + \dfrac{\partial^2 u}{\partial \pi_j^2} \cdot \dfrac{\partial \pi_j}{\partial \pi_i}\right)} \\
&= -\frac{\dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j} - \dfrac{\partial^2 u}{\partial \pi_j^2}}{\dfrac{\partial^2 u}{\partial \pi_i^2} - \dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j} - \dfrac{\partial^2 u}{\partial \pi_j \partial \pi_i} + \dfrac{\partial^2 u}{\partial \pi_j^2}}
\end{aligned}$$

[53] Note that I assume (a) that effort is not costless and (b) output is not interpreted as a signal inversely related to individual effort costs.

Assumptions *i* and *iii* together imply that the denominator is negative and the numerator is positive, so the entire expression is greater than zero.

In the Effort-Giving game, $m = a_i$ and $a_j = 0$. Player i chooses an allocation to maximize $u(\pi_i, a_i, \pi_j, a_j) = u(\pi_i, a_i, \pi_j, 0)$ subject to the budget constraint $\pi_i + \pi_j \leq a_i$. Let $y(\pi_i, \pi_j; a_i) = 0$ be the first-order condition which implicitly defines Player i's optimal division of the budget. Then,

$$y(\pi_i, \pi_j; a_i) = \frac{\partial u(\pi_i, a_i, \pi_j, 0)}{\partial \pi_i} - \frac{\partial u(\pi_i, a_i, \pi_j, 0)}{\partial \pi_j} = 0.$$

The following is true by the Implicit Function Theorem.

$$\begin{aligned}
\frac{d\pi^*_{i,EG}}{da_i} &= -\frac{\dfrac{\partial y(\pi_i, \pi_j; a_i)}{\partial a_i}}{\dfrac{\partial y(\pi_i, \pi_j; a_i)}{\partial \pi_i}} \\
&= -\frac{\dfrac{\partial^2 u}{\partial \pi_i \partial a_i} + \dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j} \cdot \dfrac{\partial \pi_j}{\partial a_i} - \left(\dfrac{\partial^2 u}{\partial \pi_j \partial a_i} + \dfrac{\partial^2 u}{\partial \pi_j^2} \cdot \dfrac{\partial \pi_j}{\partial a_i}\right)}{\dfrac{\partial^2 u}{\partial \pi_i^2} + \dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j} \cdot \dfrac{\partial \pi_j}{\partial \pi_i} - \left(\dfrac{\partial^2 u}{\partial \pi_j \partial \pi_i} + \dfrac{\partial^2 u}{\partial \pi_j^2} \cdot \dfrac{\partial \pi_j}{\partial \pi_i}\right)} \\
&= -\frac{\dfrac{\partial^2 u}{\partial \pi_i \partial a_i} + \dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j} - \dfrac{\partial^2 u}{\partial \pi_j^2}}{\dfrac{\partial^2 u}{\partial \pi_i^2} - \dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j} - \dfrac{\partial^2 u}{\partial \pi_j \partial \pi_i} + \dfrac{\partial^2 u}{\partial \pi_j^2}} \\
&= \frac{d\pi^*_{i,LG}}{dm} + \frac{\dfrac{\partial^2 u}{\partial \pi_i \partial a_i}}{-\left[\dfrac{\partial^2 u}{\partial \pi_i^2} - 2\left(\dfrac{\partial^2 u}{\partial \pi_i \partial \pi_j}\right) + \dfrac{\partial^2 u}{\partial \pi_j^2}\right]}
\end{aligned}$$

Assumption *iv* guarantees that the second term in the expression above is positive. Thus,

$$\frac{d\pi^*_{i,EG}}{dm} > \frac{d\pi^*_{i,LG}}{dm}$$

at all $m > 0$. Given Assumption *v*, this proves the proposition.

■

A Parametric Example

In this section, I characterize the behavior of four hypothetical players whose preferences can be represented by non-homothetic, other-regarding utility functions. The utility functions are broadly similar variants of the Stone-Geary specification. The first is consistent with inequality-averse altruism, the second with effort-rewarding altruism, the third with positive reciprocity, and the fourth with negative and positive reciprocity. The behavior of these four hypothetical players is represented in Figure 2.

Inequality-Averse Altruism

Suppose Player i's preferences can be represented by the utility function

$$u(\pi_i, a_i, \pi_j, a_j) = \ln(\pi_i + z) + \alpha_t \ln(\pi_z + 2z) - \gamma a_i^\lambda - \alpha_t\left(\gamma a_j^\lambda\right)$$

where π_i and a_i are consumption and effort by Player i, π_j and a_j are consumption and effort by Player j, $z > 1$, $\gamma \leq 1$, and $\lambda > 1$. α_t is the weight that Player i places on her partner's welfare in experimental treatment t. In this and the proceeding examples, I assume that $\alpha_{LG} = \alpha_{EG}$ and $\alpha_{LT} = \alpha_{ET}$. Player i maximizes her utility subject to the budget constraint $\pi_i + \pi_j \leq m$. In the Luck treatments, $a_i = a_j = 0$. Output is determined by

Player i in the EG treatment. Hence, $m = a_i$ and $a_j = 0$. In the ET game, the opposite is true: $m = a_j$ and $a_i = 0$.

Since effort costs are additively separable from consumption utility, the first-order condition which characterizes the optimal division of Player i's budget in a Luck game is identical to the first-order condition defining utility-maximizing behavior in the analogous Effort treatment. Solving Player i's utility maximization problem yields the following characterization of her relative demand for giving in treatment t.

$$s_{i,t}^{*} = \frac{\alpha_t}{1+\alpha_t} - \left(\frac{2-\alpha_t}{1+\alpha_t}\right)\frac{z}{m}$$

Panel A of Figure 2 characterizes the behavior of such an inequality-averse altruist for the parameter values $z = 20$, $\alpha_{LG} = 1/2$, and $\alpha_{LT} = 2/3$.

Effort-Rewarding Altruism

Next, consider an effort-rewarding altruist whose preferences can be represented by the utility function

$$u(\pi_i, a_i, \pi_j, a_j) = \ln\left(\pi_i - \gamma a_i^{\lambda} + z\right) + \alpha_t \ln\left(\pi_z - \gamma a_j^{\lambda} + 2z\right)$$

where all parameters are consistent with the Inequality-Averse model described above. The Effort-Rewarding Altruist differs from the Inequality-Averse Altruist because effort costs affect the marginal utility of consumption by both players. Optimal choices in the Luck treatments are identical to those made by the Inequality-Averse Altruist. In the EG game, Player i maximizes her utility subject to the constraint $\pi_i + \pi_j \leq a_i$. Her optimal interior solution is defined as follows.

$$s_{i,EG}^{*} = \frac{\alpha_t}{1+\alpha_t} - \left(\frac{2-\alpha_t}{1+\alpha_t}\right)\frac{z}{m} - \left(\frac{\alpha}{1+\alpha}\right)\gamma m$$

In the ET game, Player i faces the budget constraint $\pi_i + \pi_j \leq a_j$. Relative demand for giving is defined by the following solution to Player i's optimization problem.

$$s_{i,ET}^{*} = \frac{\alpha_t}{1+\alpha_t} - \left(\frac{2-\alpha_t}{1+\alpha_t}\right)\frac{z}{m} + \left(\frac{\gamma m}{1+\alpha}\right)$$

The choices of a hypothetical Effort-Rewarding Altruist are depicted in Panel B of Figure 2 (for $z = 20$).

Reciprocity

I consider two examples of reciprocity: strictly positive reciprocity and both positive and negative reciprocity. I assume that effort costs are additively separable from consumption utility, and for simplicity I omit them from the utility representation. I model positive reciprocity following Charness and Rabin (2002), who make the weight that Player i places on her partner a step function which increases when Player j moves from "neutral" actions to more helpful behaviors. Let the utility function

$$u(\pi_i, a_i, \pi_j, a_j) = \ln(\pi_i + z) + \beta(a_j)\left[\ln(\pi_z + 2z)\right]$$

represent the Player i's preferences. The weight that Player i places on Player j depends on the latter's effort, and is defined as follows.

$$\beta(a_j) = \begin{cases} \frac{2}{3} & \text{if } a_j \leq 200 \\ \\ \frac{3}{4} & \text{if } a_j > 200 \end{cases}$$

The above formulation leads to a discrete jump in the budget share that Player i allocates to her partner, occurring when Player j crosses the threshold, at $a_j = 200$, from neutral actions to better-than-neutral behaviors. Panel C of Figure 2 depicts the choices of this hypothetical player (for $z = 20$).

Finally, I consider the model of reciprocity employed in Cox *et al* (2007). Let Player i's utility function be defined as above, and let

$$\beta(a_j) = \frac{a_j}{300}$$

so that the weight that Player i places on her partner is proportional to Player j's effort. The behavior of this player is illustrated in Panel D of Figure 2 (for $z = 20$).

Figure 2: Illustrative Examples of Social Preference Models

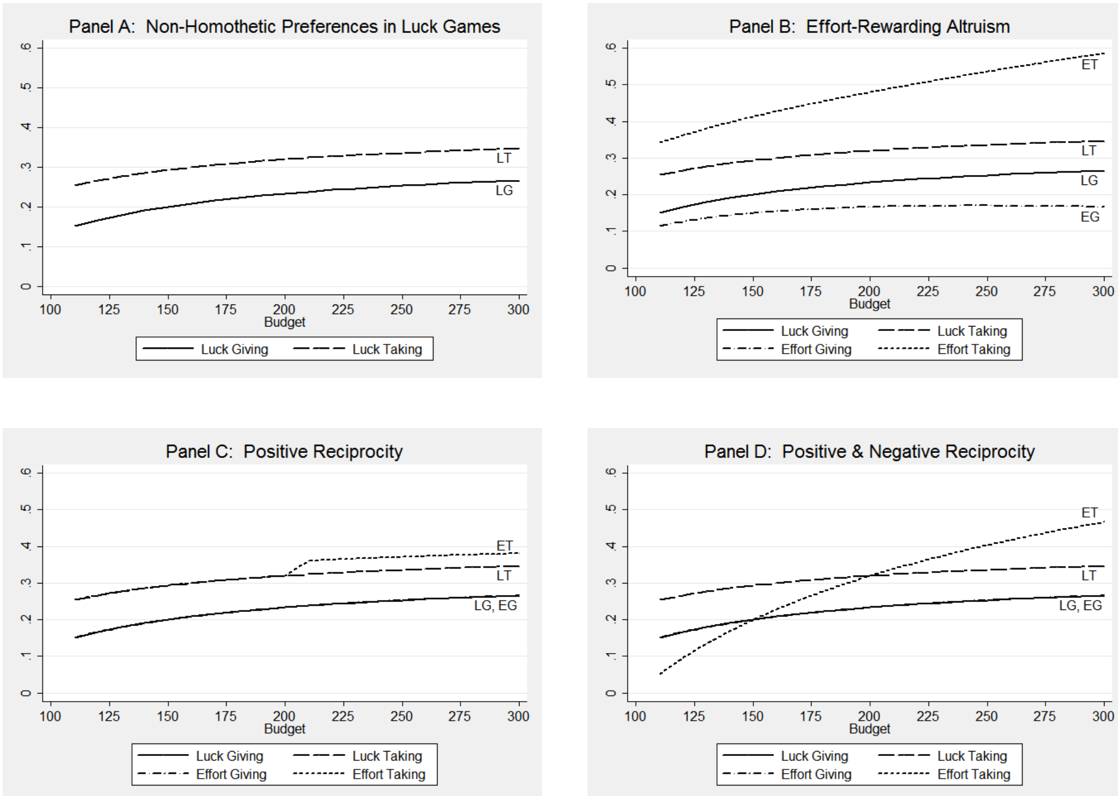


Table 1: Summary Statistics — Experimental Sessions in Kenya

Treatment	LG	LT	EG	ET	All Sessions
Panel A: Session Characteristics					
Games Played	3	3	4	4	14
Participants	108	126	168	144	546
Minimum Players	28	38	40	26	26
Maximum Players	40	46	46	44	46
Participation Rate	0.758	0.819	0.810	0.725	0.776
Near Paved Road	0.333	0.333	0.500	0.500	0.429
Proportion Female	0.443	0.382	0.377	0.447	0.412
Ethnolinguistic Fractionalization	0.743	0.619	0.624	0.617	0.647
Average Community Groups	2.276	1.953	1.789	2.019	1.994
Panel B: Experimental Outcomes of Interest					
Grams	–	–	212.186	212.875	–
			(2.530)	(2.731)	
Earnings	–	–	211.2874	212.250	–
			(2.508)	(2.759)	
Partner Share	0.263	0.429	0.225	0.406	0.327
	(0.004)	(0.005)	(0.003)	(0.004)	(0.002)
Partner Share = Zero	0.150	0.062	0.171	0.082	0.118
	(0.008)	(0.005)	(0.006)	(0.005)	(0.003)
Partner Share = Half	0.159	0.277	0.113	0.336	0.219
	(0.008)	(0.009)	(0.005)	(0.009)	(0.004)

In Panel A, Participation Rate is the proportion of those surveyed the day prior to the experiment who chose to attend. Ethnolinguistic Fractionalization is one minus the sum over ethnic groups of the squared proportions of each session belonging to that group. Average Community Groups is the average number of groups in which an experimental subject actively participates. In Panel B, Grams is the average number of grams of beans collected in the experiment, and Earnings is the number of grams minus ten times the number of incorrectly sorted beans (i.e. the number of beans of the wrong type). Partner Share is the budget share that a dictator allocates to her to partner in a given experimental treatment, averaged over subjects and budget sizes. Partner Share = Zero is a dummy variable equal to one if a dictator allocated herself the entire budget at a given budget size. Partner Share = Half is a dummy variable equal to one if a dictator divided the budget evenly. Standard errors are reported in parentheses for all variables in Panel B.

Table 2: Summary Statistics — Kenyan Subjects

Variable	Mean	Std. Dev.	N
Female	0.412	0.493	544
Age	27.471	5.417	535
No Formal Education	0.026	0.160	534
Completed Primary School	0.355	0.498	534
Completed Secondary School	0.195	0.396	534
Household Size	5.959	2.452	534
HH Has Tin Roof	0.387	0.487	525
HH Has Latrine	0.888	0.315	537
HH Farms Own Plot	0.961	0.194	535
No HH Member Works[1]	0.193	0.395	545
HH Member Works in Formal Sector	0.168	0.374	546
Christian	0.974	0.159	537
Luhya[2]	0.701	0.458	536
Luo[2]	0.047	0.211	536
Teso[2]	0.244	0.430	536
Community Groups[3]	1.989	1.619	546
Inequality OK[4]	0.673	0.468	534
Most People Fair[5]	0.524	0.500	531
Poor Are Lazy[6]	0.416	0.493	536
Trusts Neighbors[7] (Completely or Somewhat)	0.773	0.419	537
Trusts Strangers[7] (Completely or Somewhat)	0.378	0.485	537
Relies on Self to Get Ksh 1000[8]	0.505	0.500	531
Relies on Others to Get Ksh 1000[8]	0.791	0.406	531

1. Equals one if no household member received income for any activity in the past month. 2. Luhyas, Luos, and Tesos are Kenyan ethnic groups. Luhyas are the dominant group in Busia District. 3. Subjects were asked about involvement in different types of voluntary organizations. Prayer groups and ROSCAs were the most common. Community Groups indicates the number of groups in which an individual actively participates. 4. Respondents were asked to consider two primary school teachers "both of the same age, teaching in similar schools." Inequality OK equals one if the respondent indicated that it was "OK" for one teacher to be paid more than the other if that teacher was more reliable and her students performed better on exams. 5. Equals one if respondent chose the latter response to the WVS question "Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?" 6. Equals one if the respondent expressed a belief that there were poor people in Kenya because of "laziness or a lack of willpower" and not because poor individuals were treated unfairly by society. 7. Respondents were asked if they trusted members of different groups completely, somewhat, not very much, or not at all. 8. Respondents were asked to indicate how they would obtain one thousand Kenyan shillings in an emergency. Asking for a gift or a loan from someone else was coded as "relying on others" while working more and selling off assets were coded as "relying on self." Many subjects reported answers, and were consequently coded as both self-reliant and reliant on others.

Figure 3: Histograms of Partner Share by Treatment

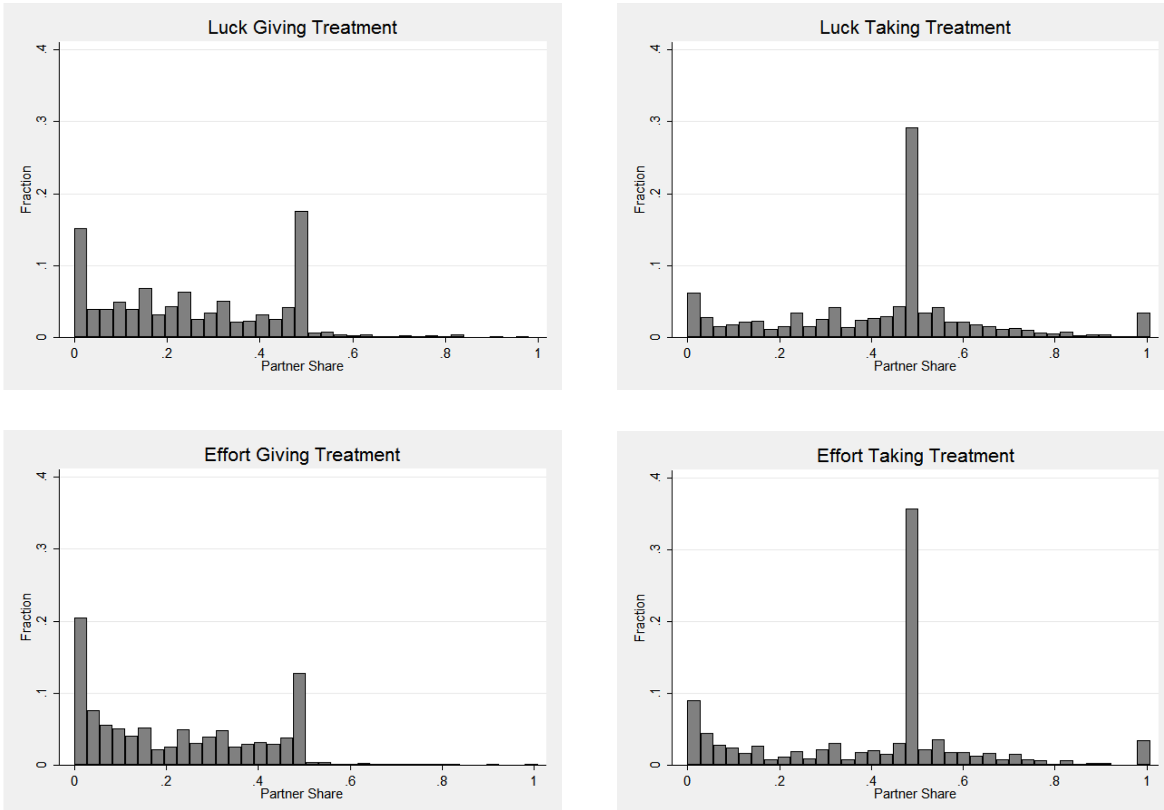


Figure 4: Fan Regressions of Partner Share by Treatment

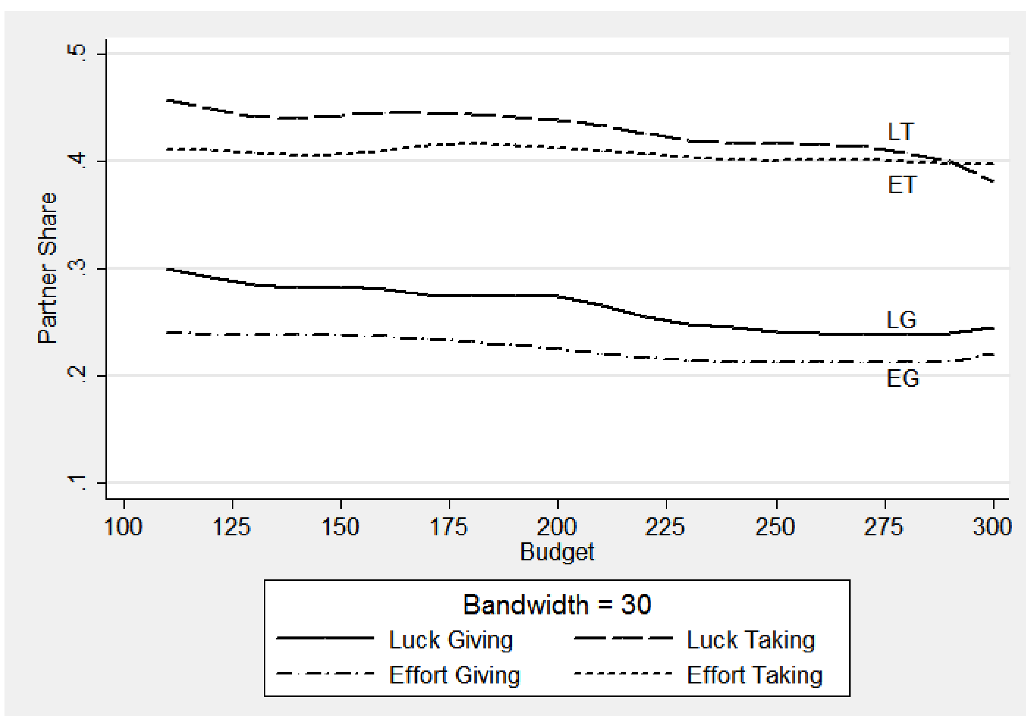


Table 3: Dependent Variable = Partner Share

	(1) OLS	(1) TOBIT
Effort × Giving	− 0.071***	− 0.079**
	(0.021)	(0.025)
Luck × Taking	0.155***	0.167***
	(0.022)	(0.026)
Effort × Taking	0.089***	0.096***
	(0.025)	(0.026)
Luck × Giving × Budget	−0.034***	−0.038***
	(0.005)	(0.009)
Effort × Giving × Budget	−0.018***	−0.020***
	(0.004)	(0.007)
Luck × Taking × Budget	−0.029***	−0.031***
	(0.006)	(0.008)
Effort × Taking × Budget	−0.007	0.009
	(0.005)	(0.008)
Constant	0.332***	0.323***
	(0.015)	(0.019)
Observations	10914	10914
R-squared	0.154	0.329

Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. Column (1) estimated by OLS, Column (2) by Tobit. Robust standard errors clustered at the player level in the OLS specification.

Table 4: Dependent Variable = Partner Share

	(1) OLS	(2) OLS	(3) TOBIT	(4) TOBIT
Female	– 0.021	– 0.015	– 0.024	– 0.021
	(0.019)	(0.021)	(0.02)	(0.020)
Age	0.001	0.003	0.002	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Completed Primary School	0.053***	0.060***	0.055***	0.060***
	(0.019)	(0.020)	(0.019)	(0.019)
HH Farms Own Plot	0.016	0.018	0.008	−0.006
	(0.051)	(0.056)	(0.05)	(0.051)
HH Member in Formal Sector	0.063**	0.081***	0.073***	0.077***
	(0.027)	(0.031)	(0.026)	(0.026)
Inequality OK	.	0.008	.	0.010
	.	(0.021)	.	(0.021)
Trusts Neighbors (Completely or Somewhat)	.	0.018	.	0.024
	.	(0.023)	.	(0.023)
Relies on Self to Get Ksh 1000	.	−0.002	.	−0.005
	.	(0.016)	.	(0.016)
Relies on Others to Get Ksh 1000	.	−0.039**	.	−0.047**
	.	(0.019)	.	(0.020)
Budget	−0.038*	−0.048**	−0.044	−0.054
	(0.019)	(0.021)	(0.032)	(0.035)
Budget × Female	−0.003	−0.002	−0.003	−0.002
	(0.005)	(0.005)	(0.009)	(0.01)
Budget × Age	0.001*	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Budget × Completed Primary School	−0.004	−0.004	−0.004	−0.005
	(0.005)	(0.005)	(0.009)	(0.009)
Budget × HH Farms Own Plot	−0.003	−0.004	0.0001	−0.0006
	(0.014)	(0.014)	(0.024)	(0.024)
Budget × Formal Sector	−0.007	−0.006	−0.007	−0.006
	(0.007)	(0.007)	(0.012)	(0.012)
Budget × Inequality OK	.	0.005	.	0.004
	.	(0.006)	.	(0.010)
Budget × Trusts Neighbors	.	0.011*	.	0.011
	.	(0.007)	.	(0.011)
Budget × Relies on Self	.	0.002	.	0.005
	.	(0.004)	.	(0.008)
Budget × Relies on Others	.	0.002	.	0.004
	.	(0.004)	.	(0.009)
Constant	0.287***	0.317***	0.276***	0.308***
	(0.067)	(0.076)	(0.067)	(0.074)
Observations	10614	10434	10614	10434
R-squared	0.026	0.038	0.052	0.075

Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. Columns (1) and (2) estimated by OLS, Columns (3) and (3) by Tobit. Robust standard errors clustered at the player level in OLS specifications.

Table 5: Dependent Variable = Partner Share

	(1) LG	(2) LT	(3) EG	(4) ET
Female	0.004	0.007	-0.053	-0.031
	(0.035)	(0.036)	(0.034)	(0.042)
Age	-0.001	-0.001	0.004	0.004
	(0.004)	(0.003)	(0.003)	(0.004)
Completed Primary School	0.007	0.013	0.020	0.083*
	(0.035)	(0.039)	(0.034)	(0.046)
HH farms Own Plot	-0.024	-0.016	0.092	-0.013
	(0.053)	(0.071)	(0.075)	(0.155)
HH Member Works in Formal Sector	-0.010	0.066	-0.027	0.109*
	(0.047)	(0.041)	(0.066)	(0.062)
Inequality OK	-0.033	-0.023	-0.001	0.069
	(0.041)	(0.041)	(0.036)	(0.047)
Trusts Neighbors (Completely or Somewhat)	-0.009	0.017	0.086**	-0.030
	(0.038)	(0.037)	(0.039)	(0.065)
Relies on Self to Get Ksh 1000	0.065*	-0.072*	-0.007	-0.009
	(0.036)	(0.043)	(0.036)	(0.045)
Relies on Others to Get Ksh 1000	0.020	-0.176***	-0.053	-0.034
	(0.056)	(0.048)	(0.038)	(0.062)
Budget	-0.049	-0.039	-0.010	-0.013
	(0.043)	(0.070)	(0.033)	(0.051)
Budget × Female	-0.006	0.008	0.008	-0.024**
	(0.013)	(0.015)	(0.009)	(0.011)
Budget × Age	0.001	0.002	-0.001	-0.0002
	(0.001)	(0.001)	(0.001)	(0.001)
Budget × Completed Primary School	0.001	-0.008	0.002	-0.019
	(0.013)	(0.016)	(0.009)	(0.014)
Budget × HH farms Own Plot	-0.013	-0.030	0.000	0.003
	(0.024)	(0.050)	(0.020)	(0.028)
Budget × Formal Sector	-0.002	-0.029*	0.023*	0.012
	(0.017)	(0.016)	(0.014)	(0.013)
Budget × Inequality OK	-0.006	0.021	-0.001	0.007
	(0.014)	(0.017)	(0.009)	(0.012)
Budget × Trusts Neighbors	0.009	0.017	-0.001	0.023
	(0.015)	(0.015)	(0.011)	(0.017)
Budget × Relies on Self	0.0120	-0.005	0.004	-0.023*
	(0.012)	(0.014)	(0.01)	(0.013)
Budget × Relies on Others	-0.021	-0.028**	0.011	0.019
	(0.017)	(0.014)	(0.011)	(0.015)
Constant	0.349***	0.667***	0.066	0.294
	(0.128)	(0.125)	(0.114)	(0.204)
Observations	1760	2140	2897	2239
R-squared	0.086	0.147	0.068	0.095

Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. All specifications estimated by OLS. Robust standard errors clustered at the player level.

Figure 5: Grams of Beans Collected by Treatment

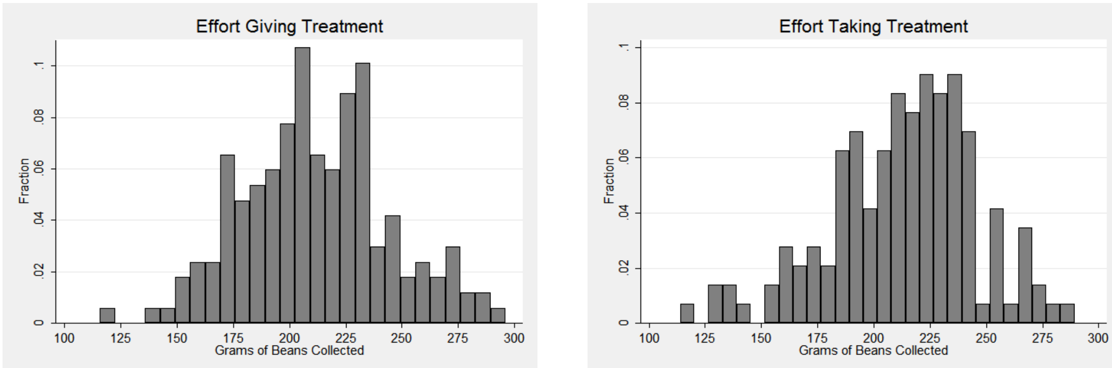


Table 6: Dependent Variable = Grams Collected

	(1) Effort Games	(2) EG	(3) ET
Female	33.386***	35.001***	31.683***
	(3.987)	(5.507)	(6.642)
Age	0.138	0.335	0.029
	(0.379)	(0.467)	(0.621)
Completed Primary School	1.954	-0.800	5.780
	(3.794)	(4.730)	(6.501)
HH Farms Own Plot	-1.468	-7.955	2.620
	(9.515)	(11.633)	(16.962)
HH Member Works in Formal Sector	-1.567	8.619	-9.517
	(6.540)	(10.376)	(9.275)
Inequality OK	-0.892	1.808	0.485
	(4.173)	(5.278)	(7.274)
Trusts Neighbors (Completely or Somewhat)	2.983	1.179	4.355
	(4.667)	(5.795)	(9.038)
Relies on Self to Get Ksh 1000	1.453	-0.344	7.209
	(4.127)	(5.258)	(6.652)
Relies on Others to Get Ksh 1000	-2.455	-6.385	3.323
	(4.884)	(6.135)	(7.615)
Observations	255	143	112
R-squared	0.234	0.301	0.233

Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. All specifications estimated by OLS. Robust standard errors clustered at the player level.

Table 7: Summary Statistics — Experimental Sessions in Berkeley

TREATMENT	LG	LT	EG	ET	ALL SESSIONS
Panel A: Session Characteristics					
Games Played	2	2	2	2	8
Participants	40	50	50	56	196
Minimum Players	14	18	18	26	14
Maximum Players	26	32	32	30	32
Proportion Female	0.593	0.680	0.543	0.634	0.610
Ethnolinguistic Fractionalization	0.694	0.667	0.695	0.634	0.672
Average Community Groups	1.728	1.472	1.927	1.550	1.669
Panel B: Experimental Outcomes of Interest					
Grams	–	–	173.360	168.321	–
			(3.996)	(4.300)	
Earnings	–	–	173.160	168.321	–
			(4.042)	(4.300)	
Partner Share	0.195	0.139	0.157	0.277	0.200
	(0.006)	(0.005)	(0.005)	(0.005)	(0.003)
Partner Share = Zero	0.281	0.426	0.421	0.251	0.342
	(0.016)	(0.016)	(0.013)	(0.011)	(0.007)
Partner Share = Half	0.111	0.096	0.156	0.282	0.178
	(0.011)	(0.009)	(0.010)	(0.011)	(0.005)

In Panel A, ETHNOLINGUISTIC FRACTIONALIZATION is one minus the sum over ethnic groups of the squared proportions of each session belonging to that group. Ethnic groups are characterized as those speaking the same mother tongue. AVERAGE COMMUNITY GROUPS is the average number of groups in which an experimental subject actively participates. In Panel B, GRAMS is the average number of grams of beans collected in the experiment, and EARNINGS is the number of grams minus ten times the number of incorrectly sorted beans (i.e.the number of beans of the wrong type). PARTNER SHARE is the average budget share that dictators allocates to her to their partners in a given experimental treatment. PARTNER SHARE = ZERO is a dummy variable equal to one if a dictator allocated herself the entire budget at a given budget size. PARTNER SHARE = HALF is a dummy variable equal to one if a dictator divided the budget evenly. Standard errors are reported in parentheses for all variables in Panel B.

Table 8: Summary Statistics — Kenyan Subjects

VARIABLE	MEAN	STD. DEV.	N
Female	0.617	0.487	196
Age	20.197	1.582	193
Native Language English	0.490	0.501	196
Community Groups[1]	1.658	1.245	196
Most People Fair[2]	0.344	0.476	192
Poor Lazy[3]	0.369	0.484	187
Inequality OK[4]	0.837	0.370	190
Trust Neighbors (Completely or Somewhat)[5]	0.589	0.493	192
Rely on Self for $1,000[6]	0.964	0.187	194
Rely on Others for $1,000[6]	0.655	0.477	194

1. COMMUNITY GROUPS indicates the number of groups in which an individual actively participates. 2. Equals one if respondent chose the latter response to the WVS question "Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?" 3. Equals one if the respondent said that there were poor people in the U.S. because of "laziness or a lack of willpower" and not because poor individuals were treated unfairly by society. 4. Equals one if the respondent indicated that it was "OK" for two elementary school teachers to receive different salaries if the higher paid teacher was "more reliable at work" and her students regularly performed better on standardized tests. 5. Respondents were asked if they trusted members of different groups completely, somewhat, not very much, or not at all. 6. Respondents were asked to indicate how they would obtain $1,000 in an emergency. Answers were coded as "relying on others" or "self-reliant."

Figure 6: Histograms of Partner Share by Treatment, Berkeley Sample

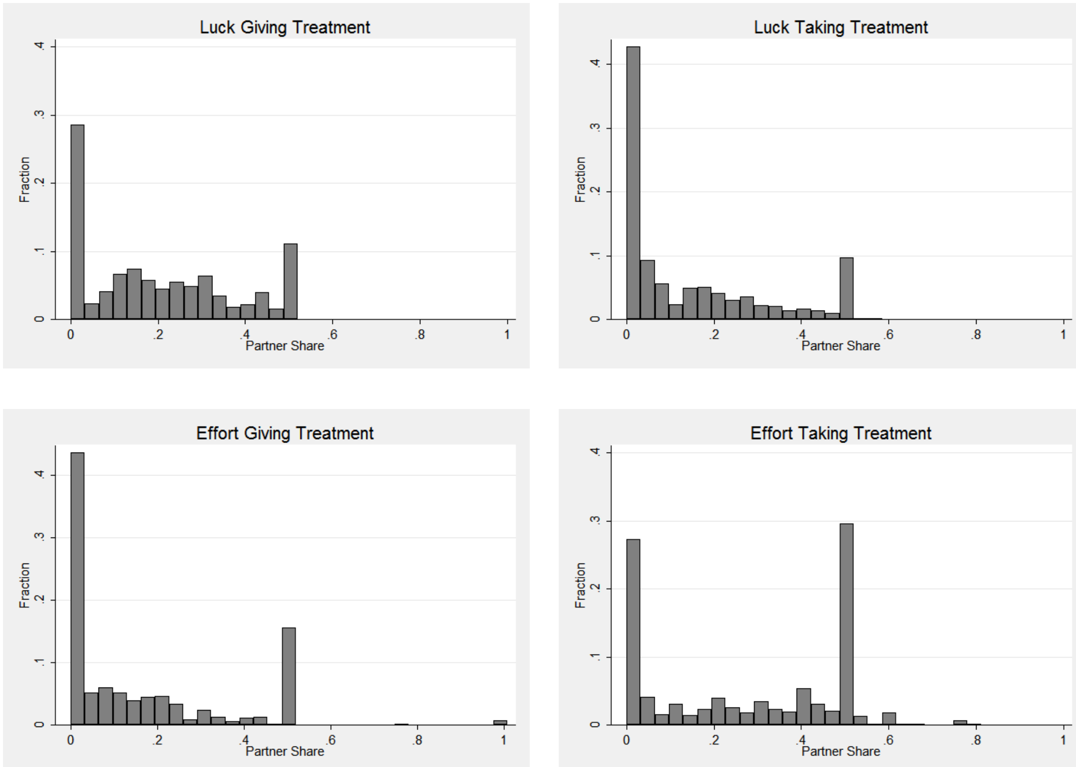


Figure 7: Fan Regressions of Partner Share by Treatment, Berkeley Sample

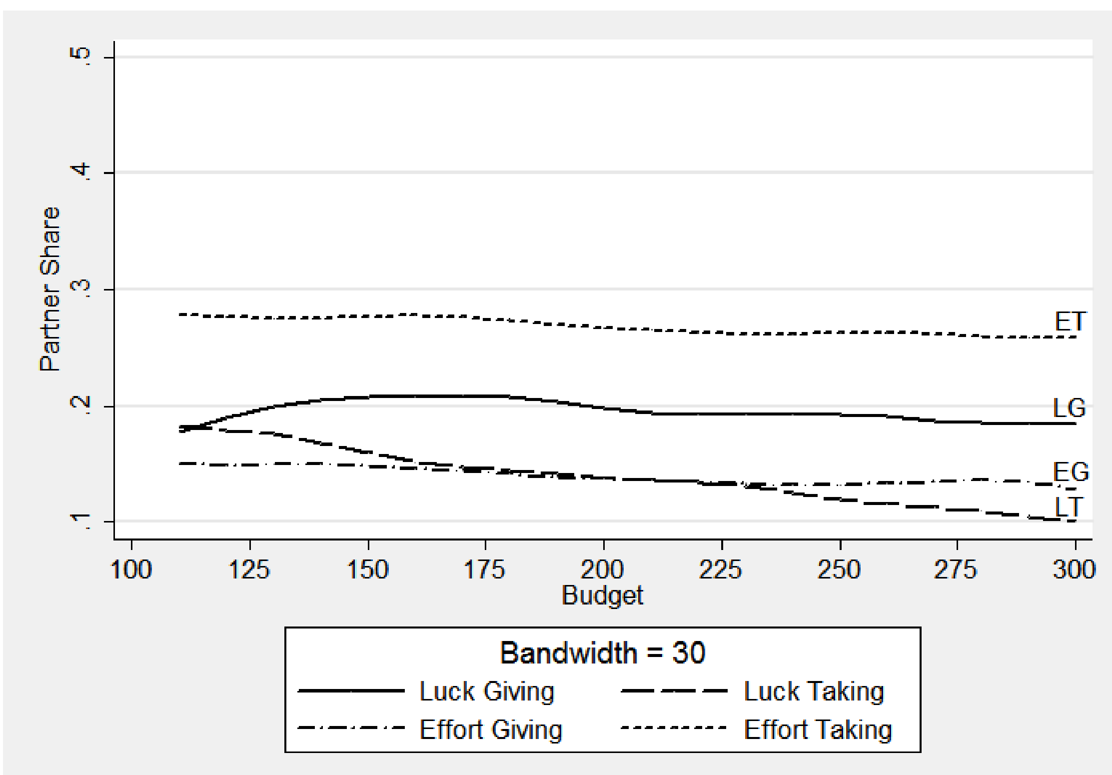


Table 9: Dependent Variable = Partner Share

	(1) OLS	(1) Tobit
Effort × Giving	−0.009	−0.032
	(0.046)	(0.041)
Luck × Taking	0.013	−0.009
	(0.049)	(0.051)
Effort × Taking	0.093**	0.114***
	(0.044)	(0.040)
Luck × Giving × Budget	−0.008	−0.006
	(0.011)	(0.018)
Effort × Giving × Budget	−0.029***	−0.032***
	(0.011)	(0.009)
Luck × Taking × Budget	−0.042***	−0.047***
	(0.011)	(0.016)
Effort × Taking × Budget	−0.018***	0.021***
	(0.005)	(0.008)
Constant	0.212***	0.158***
	(0.034)	(0.037)
Observations	4871	4871
R-squared	0.194	0.091

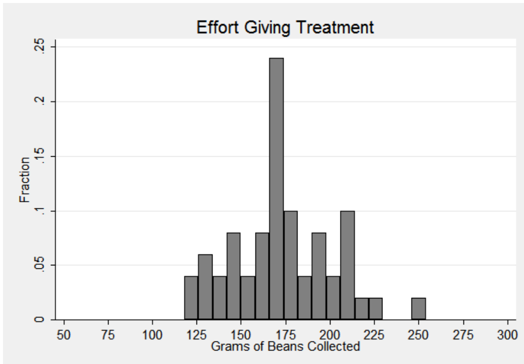
Sample restricted to Berkeley X-Lab subjects. Column (1) is estimated by OLS. Column (2) is estimated using the Tobit specification. Coefficients are significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. Standard errors in Column (1) are heteroskedasticity-robust and clustered at the player level.

Table 10: Dependent Variable = Partner Share

	(1) OLS	(2) OLS	(3) Tobit	(4) Tobit
Female	0.081*	0.050	0.127***	0.087***
	(0.042)	(0.043)	(0.021)	(0.022)
Age	−0.008	−0.012	− 0.010*	− 0.016**
	(0.014)	(0.016)	(0.006)	(0.007)
Poor Lazy	.	−0.079*	.	−0.120***
	.	(0.041)	.	(0.022)
Inequality OK	.	−0.097*	.	−0.113***
	.	(0.050)	.	(0.027)
Trusts Strangers (Completely or Somewhat)	.	0.048	.	0.075***
	.	(0.038)	.	(0.021)
Relies on Self to Get $1,000	.	0.105	.	0.166***
	.	(0.102)	.	(0.060)
Relies on Others to Get $1,000	.	−0.017	.	−0.007
	.	(0.040)	.	(0.021)
Budget	−0.012	−0.056	0.040	0.011
	(0.093)	(0.109)	(0.065)	(0.080)
Budget × Female	−0.001	0.002	0.005	0.008
	(0.015)	(0.015)	(0.011)	(0.011)
Budget × Age	−0.001	0.001	−0.004	−0.002
	(0.005)	(0.006)	(0.003)	(0.004)
Budget × Poor Lazy	.	0.008	.	0.013
	.	(0.014)	.	(0.011)
Budget × Inequality OK	.	0.006	.	0.006
	.	(0.014)	.	(0.014)
Budget × Trusts Strangers	.	0.004	.	0.007
	.	(0.013)	.	(0.011)
Budget × Relies on Self	.	−0.017	.	−0.038
	.	(0.030)	.	(0.031)
Budget × Relies on Others	.	0.009	.	0.008
	.	(0.013)	.	(0.011)
Constant	0.367	0.462	0.337***	0.419***
	(0.283)	(0.319)	(0.125)	(0.151)
Observations	4802	4497	4802	4497
R-squared	0.055	0.116	0.079	0.149

Sample restricted to Berkeley X-Lab subjects. Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. Columns (1) and (2) estimated by OLS, Columns (3) and (3) by Tobit. Robust standard errors clustered at the player level in OLS specifications.

Figure 8: Grams of Beans Collected by Treatment, Berkeley Sample



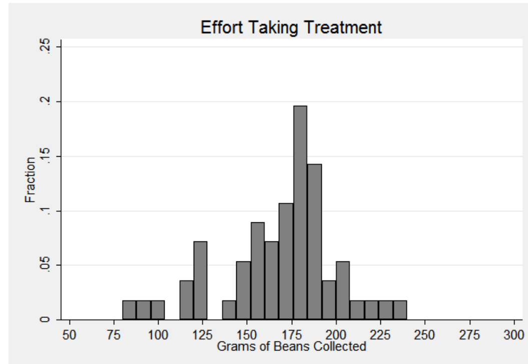


Table 11: Dependent Variable = Grams Collected

	(1) Effort Games	(2) EG	(3) ET
Female	17.549***	14.964**	22.134**
	(6.300)	(7.430)	(10.349)
Age	0.702	−5.187*	4.874*
	(2.150)	(2.943)	(2.750)
Poor Lazy	5.806	11.959	−4.980
	(6.177)	(7.906)	(8.650)
Inequality OK	0.357	−12.194	2.446
	(8.460)	(10.650)	(10.153)
Trusts Strangers (Completely or Somewhat)	−0.755	−11.235	11.369
	(5.797)	(8.796)	(8.482)
Relies on Self to Get $1,000	−19.208*	0.788	−29.749***
	(10.792)	(7.514)	(6.070)
Relies on Others to Get $1,000	−11.896**	−6.527	−10.522
	(6.056)	(7.599)	(9.929)
Constant	169.833***	282.689***	87.996*
	(42.189)	(60.849)	(51.556)
Observations	100	47	53
R-squared	0.155	0.291	0.269

Sample restricted to Berkeley X-Lab subjects. Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. All specifications estimated by OLS. Robust standard errors clustered at the player level.