IFPRI Discussion Paper 01625

March 2017

Cooperation in Polygynous Households

Abigail Barr

Marleen Dekker

Wendy Janssens

Bereket Kebede

Berber Kramer

Markets, Trade and Institutions Division

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

The International Food Policy Research Institute (IFPRI), established in 1975, provides evidence-based policy solutions to sustainably end hunger and malnutrition and reduce poverty. The Institute conducts research, communicates results, optimizes partnerships, and builds capacity to ensure sustainable food production, promote healthy food systems, improve markets and trade, transform agriculture, build resilience, and strengthen institutions and governance. Gender is considered in all of the Institute's work. IFPRI collaborates with partners around the world, including development implementers, public institutions, the private sector, and farmers' organizations, to ensure that local, national, regional, and global food policies are based on evidence.

AUTHORS

Abigail Barr (abigail.barr@nottingham.ac.uk) is a professor in the School of Economics, University of Nottingham, UK.

Marleen Dekker (m.dekker@ascleiden.nl) is a senior researcher in the African Studies Centre, Leiden, the Netherlands.

Wendy Janssens (w.janssens@vu.nl) is an associate professor in the Department of Economics, VU Amsterdam, the Netherlands.

Bereket Kebede (b.kebede@uea.ac.uk) is a senior lecturer at the School of International Development and Centre for Behavioural and Experimental Social Science (CBESS) at the University of East Anglia, Norwich, UK.

Berber Kramer (b.kramer@cgiar.org) is a research fellow in the Markets, Trade an Institutions Division of the International Food Policy Research Institute, Washington, DC.

Contents

Tables

Figures

ABSTRACT

Evidence that monogamous spouses often compromise household gains to maintain individual control over resources has informed the design of cash transfer schemes and other poverty alleviation programs. In polygynous households, decision making may be even less cooperative as co-wife conflict is common and welfare outcomes are often worse than in monogamous households, despite polygyny being associated with better ex ante prospects. Using a carefully designed series of two-person public goods games, we conduct a quantitative, *ceteris paribus* comparison of willingness to cooperate to maximize household gains across the two household types. We find that polygynous spouses and co-wives are less cooperative, one with another, than monogamous spouses. Co-wives are least cooperative toward each other and polygynous husbands are less cooperative with each of their wives than monogamous husbands are with their one wife. Finally, there are differences across the household types in the way husbands and wives condition their cooperativeness on how much they believe their spouses and co-wives will cooperate. Specifically, behavior in polygynous households is more reciprocal and apparently less altruistic than in monogamous households. This has implications for the design of poverty alleviation programs that transfer resources either in cash or in-kind.

Keywords: resource allocation; cooperative decision making; polygyny

ACKNOWLEDGMENTS

This research project received financial support from the Amsterdam Institute for International Development (AIID), the Economic and Social Research Council via the Network for Integrated Behavioural Sciences (award no. ES/K002201/1), the Netherlands Organisation for Scientific Research NWO (grant no. 451-10-002), the African Study Centre Leiden, the Tinbergen Institute, and the University of East Anglia. We are grateful to the AIID and PharmAccess Foundation for sharing their survey data and supporting the research. We very much appreciate the comments from Simon Gächter, John Gathergood, and Markus Goldstein. We are very thankful for the excellent assistance in the field by Tanimola Akande, Ameen Hafsat, Marijn van der List, and the interviewer team.

1. INTRODUCTION

Many programs aimed at reducing poverty involve transfers of either cash or in-kind resources (Banerjee et al. 2015; Baird et al. 2014; Banerjee, Karlan, and Zinman 2015; Morduch 2011). Motivated by evidence of gender differences in resource allocations in *monogamous* households (Manser and Brown 1980; McElroy and Horney 1981; Browning et al. 1994; Udry 1996; Iversen et al. 2011; Bezu and Holden 2015), these programs often target women. Variants of such programs, most notably conditional cash transfer programs, are now being introduced in African countries (Garcia and Moore 2012), where 20 to 50 percent of women are in *polygynous* marriages (Elbedour et al. 2002; Dalton and Leung 2014).

This raises new challenges for policy makers interested in optimizing program impacts regarding whom to target within households, what form resources should take, and what conditions recipients should be required to meet (World Bank 2010). This, in turn, highlights gaps in our understanding of how decision making differs between polygynous and monogamous households. We test whether members of polygynous households are equally, more, or less cooperative and, if so, why.

We hypothesize that cooperation is lower in polygynous compared with monogamous households. In evolutionary models polygyny is associated with higher male premarital socioeconomic status and hence better ex ante prospects (Zeitzen 2008). However, co-wife conflict is widespread (Jankowiak, Sudakov, and Wilreker 2005) and welfare outcomes are often worse in polygynous households than in monogamous households, especially for junior wives and their children (Amey 2002; Shepard 2013; Bove and Valeggia 2009; Tertilt 2005; Hadley 2005; Gyimah 2009). Analyses of cooperation in polygynous households are nevertheless rare (Akresh, Chen, and Moore 2012, 2016) and do not include both *ceteris paribus* comparisons with monogamous households and intrahousehold comparisons of cooperation in husband–wife versus co-wife interactions.

By inviting spouses to make decisions with real monetary consequences under controlled conditions, we generated directly comparable measures of the extent to which husbands cooperate with their wives, wives with their husbands, and co-wives with each other. We then compared cooperation across monogamous and polygynous households and established who within polygynous households were least willing to cooperate with whom. Finally, using data on participants' beliefs about others' cooperativeness, we investigated whether the difference in cooperation between monogamous and polygynous households could be explained by differences in how husbands and wives condition their own cooperativeness on their beliefs about the cooperativeness of their spouses and co-wives.

We generated our data on cooperation by engaging participants in a series of two-person public goods games. At the start of a game each participant was given a sum of money, referred to below as his or her initial endowment. Each had to decide, in private, how much of that initial endowment to contribute to a shared fund and how much to keep. Once both had made their contributions, the shared fund was multiplied by 1.5 and then divided equally between the two. Initial endowments varied and were known only to the recipients. Participants maximized their joint earnings from the game by contributing their entire initial endowment to the shared fund. However, a participant maximized his or her individual earnings, given the playing partner's contribution, by contributing nothing and going home with his or her own initial endowment plus three-quarters of the partner's contribution.

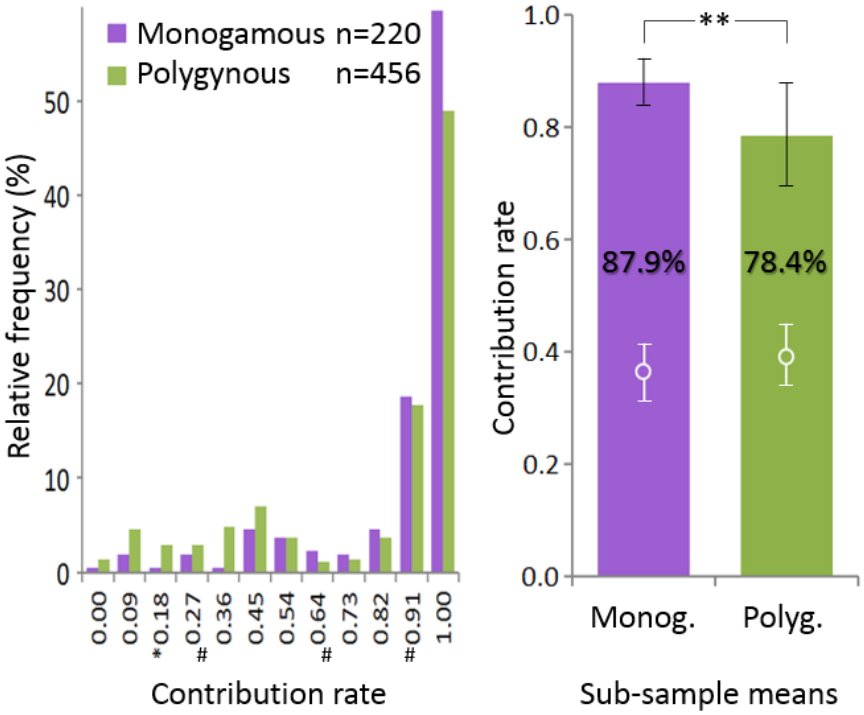
Each participant played this game three times. All husband–wife pairs played one game together. All co-wife pairs played one game together. All other games were played by pairs of adults drawn from different households residing in the same community. The order in which participants played with their various partner types was randomized across participants.

In total, 596 Nigerian adults participated in the games. More details about the experimental games and protocols, the subject sample, and the data analysis are provided in the section "Materials and Methods" (see also the Appendix with "Supporting Information").

2. RESULTS

The results pertain to the decisions made by the 448 participants who were in either monogamous marriages (110 men and 110 women) or polygynous marriages involving two wives (76 men and 152 women). The right-hand panel of Figure 2.1 compares the mean contribution rates of monogamous and polygynous household members when playing with their spouses or co-wives. Polygynous household members were significantly less cooperative, one with another, than monogamous household members (Appendix, Section 1, Table A.2). On average, monogamous spouses contributed 88 percent of their initial endowment to the shared fund, while polygynous spouses contributed only 78 percent. The difference notwithstanding, the left-hand panel reveals that within both household types, most participants contributed the entire initial endowment. Finally, the whiskered white circles in the right-hand panel indicate that when playing with members of other households, contributions by both monogamous and polygynous spouses were significantly lower at 36 and 39 percent, respectively (Appendix, Section 1, Table A.2, column 4). These findings are robust to the inclusion of the experimental and demographic control variables listed in "Materials and Methods" below (Appendix, Section 1, Tables A.2 and A.3).

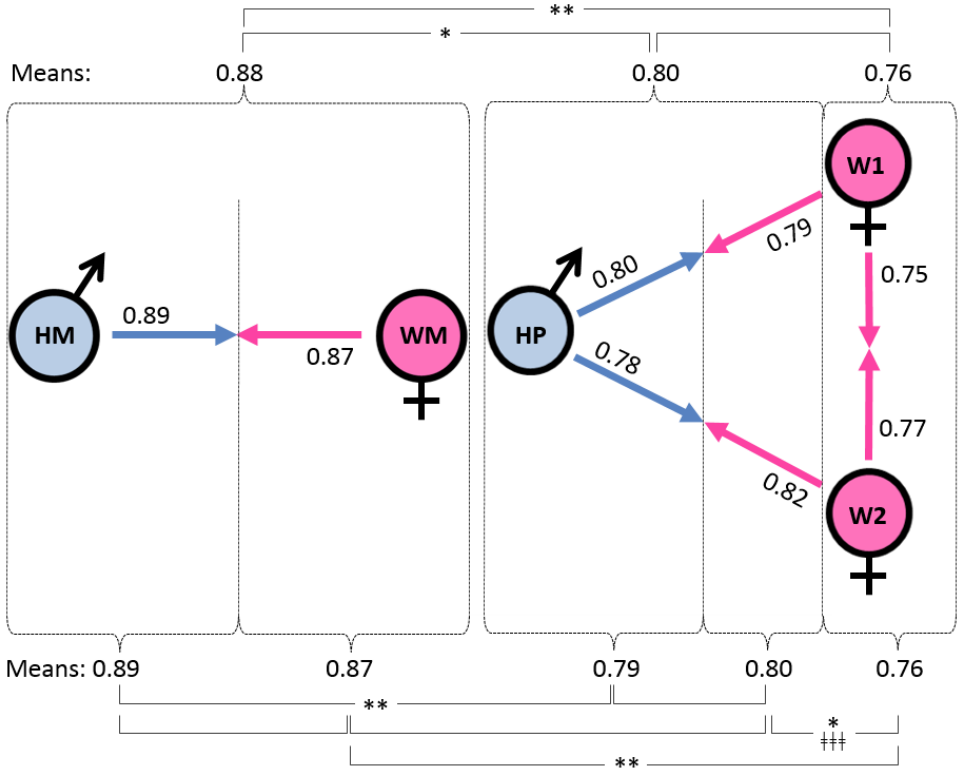
Figure 2.1 Contributions to the shared fund by monogamous and polygynous spouses



Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: Contribution rate is the amount contributed to the shared fund as a proportion of initial endowment. Each observation is a contributing decision. The left-hand panel presents the distributions of contribution rates for monogamous spouses when playing together (purple) and polygynous husbands and their wives when playing in pairs (husbands with wives or co-wives together) (green). The right-hand panel presents the mean contribution rates. The vertical whiskers are 95% confidence intervals generated using a linear regression in which dependence within workshops is accounted for using a wild bootstrap. The test result indicated by the horizontal bracket at the top of the panel is derived from the same regression: ** = difference significant at the 5% level. * = difference significant at 10% level. The circle and whiskers in white within each bar indicates the mean and 95% confidence interval of the contribution rate for the same participant subsample, but when playing with members of other households. # = bin expanded to accommodate slightly higher and lower contribution rates owing to initial endowments not always equaling 220 naira.

Next, we investigate whether cooperation within each household type varies systematically depending on who is interacting with whom. Figure 2.2 presents the mean contribution rates for each type of husband and wife when interacting with their spouses and, in the case of wives of polygynous husbands, their co-wives. The figure also presents the results of a series of comparison-of-means tests focusing on various pairs of defined subsamples. While monogamous husbands' and wives' contribution rates were statistically indistinguishable, there was systematic heterogeneity in contribution rates within polygynous households depending on who was interacting with whom (Appendix, Section 2, Table A.4). Specifically, when co-wives played together, their contribution rates were significantly lower than when they played with their husbands: 76 percent, on average, compared to 80 percent. This difference is *within* wife—that is, it derives from a comparison of what the *same* women do when interacting with their husbands and when interacting with their co-wives. This being the case, it cannot be owing to selection of less cooperative women into polygyny (Appendix, Table A.5). As within monogamous households, the contribution rates of polygynous husbands when interacting with their wives did not differ significantly from those of polygynous wives when interacting with their husbands.

Figure 2.2 Contributions to the shared fund by marriage, spouse, and playing partner type



Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: The Mars symbols (blue) indicate husbands. The Venus symbols (pink) indicate wives. HM = monogamous husband; WM = monogamous wife; HP = polygynous husband; W1 = first wife of a polygynous husband; W2 = second wife of a polygynous husband. An arrow emanating from one symbol in the direction of another indicates the contributions made by spouses of former symbol type when playing with spouses of latter symbol type. The proportion inscribed on each arrow is the mean contribution rate. The means listed above and below the diagram are for pooled subsamples defined by the vertical dotted lines and corresponding braces. The test results on the horizontal square brackets above and below these means are derived from a series of linear regressions in which the dependence within workshops is accounted for using a wild bootstrap. Within each pooled subsample (defined by vertical dotted lines and braces), the same linear regressions indicate that the contribution rates can be pooled. ** = significantly different at the 5% level according to the pooled regression analysis; * = significantly different at the 10% level according to the pooled regression analysis; ††† = significantly different at the 1% level according to a within-wife analysis. n = 676.

The relatively low cooperation between co-wives was one, but not the only, driver of the difference in cooperativeness between household types. Figure 2.2 also reveals that when playing with their wives, polygynous husbands contributed significantly less than monogamous husbands (Appendix, Section 2, Table A.4). This difference is between husbands—that is, it derives from a comparison of polygynous and monogamous husbands' contribution rates when they are each playing with their wives. This being the case, it might be owing to selection of less cooperative men into polygyny. However, when comparing monogamous and polygynous husbands' contributions when playing with women from other households, we found that they were statistically indistinguishable. This provides evidence that the difference in husbands' cooperativeness when playing with their wives is not due to selection of less cooperative men into polygyny (Appendix, Section 3, Table A.6). This, combined with the result reported above, is consistent with polygyny causing husbands to be less cooperative with each of their wives.

As with the simple comparison across household types in Figure 2.1, these findings are robust to the inclusion of the experimental and demographic control variables listed in "Materials and Methods" (Appendix, Section 2, Table A.4).

One possible explanation for the findings presented above is that the behavioral foundations of cooperation vary across the two types of household. For example, cooperation can be motivated by altruism, in which case husbands and wives will not deviate from full cooperation even when they believe that their spouse is likely to do so. A strong cooperative norm would have a similar effect. Alternatively, cooperation may be based on reciprocity and, hence, conditional on the cooperation of others. In this case, husbands and wives will deviate from full cooperation when they believe that their spouse or co-wife will do likewise. In summary, differences in cooperation between household types may be related to differences in the behavioral responses of husbands and wives to their spouses' or co-wives' expected cooperativeness.

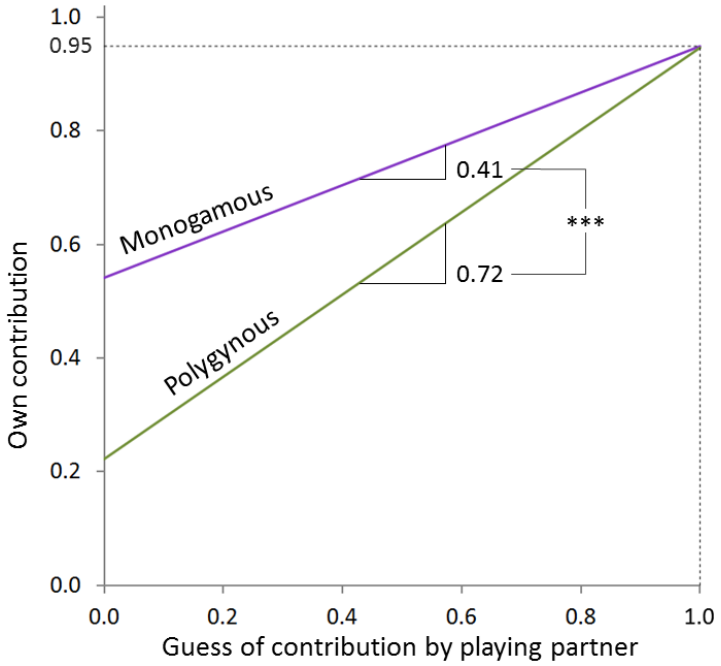
To investigate this, first, we checked that the beliefs about others' contributions that we elicited were neither biased on average nor differentially biased depending on whose belief it was about whom (Appendix, Section 5, Table A.10). Then, we regressed participants' own contribution rates on their beliefs about their playing partners' contribution rates, while allowing the relationship to differ between monogamous and polygynous spouses (Appendix, Section 5, Table A.11). Figure 2.3 presents the estimated relationships. The upper (purple) line pertains to monogamous husbands and wives when playing with each other. The lower (green) line pertains to polygynous husbands and their wives when playing with each other or wives with their co-wives.

Spouses who believed that their playing partners would contribute 100 percent of their initial endowments chose to contribute 95 percent of their own initial endowment on average, regardless of whether their household was monogamous or polygynous. However, spouses who believed that their playing partners would contribute less than 100 percent conditioned their own contributions differently depending on whether their household was monogamous or polygynous. Within monogamous households, a 10 percentage point reduction in expected playing partner's contribution is associated with a 4 percentage point reduction in own contribution. Within polygynous households, a 10 percentage point reduction in expected playing partner's contribution is associated with a significantly larger 7 percentage point reduction (Appendix, Section 5, Table A.11).

This analysis, combined with the histogram in the left-hand panel of Figure 2.1, indicates that full cooperation is a common reference point for members of both monogamous and polygynous households, but that they respond differently when they anticipate that their spouses or co-wives are going to deviate from this reference point. A closer look at the data reveals that the difference between these relationships is primarily owing to differences in the relative frequencies of unconditional versus conditional cooperation (Appendix, Section 5, Table A.12). When monogamous spouses deviate from full cooperation, their playing partners appear more likely to make unconditionally cooperative decisions, that is, to contribute all or almost all of their initial endowment irrespective of how much they expect their spouse to contribute. When polygynous household members expect their spouses or co-wives to deviate from full cooperation, they appear more likely to make conditionally cooperative decisions, that is, to contribute approximately the same amount as they expect their spouse or co-wife to contribute. Thus, cooperation appears motivated

more by altruism or a strict cooperative norm in monogamous households and more by reciprocity in polygynous households.

Figure 2.3 The conditioning of own cooperation on beliefs about playing partners' cooperation among monogamous and polygynous spouses



Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: The two plotted lines are derived from a single linear regression in which the potential dependence within workshops is accounted for using a wild bootstrap: *** = slopes significantly different from zero at the 1% level. $n = 676$.

3. DISCUSSION

The effectiveness of policy interventions that inject resources into poor households with the aim of alleviating poverty depends on cooperation between household members. If differences in intrahousehold cooperation between monogamous and polygynous households are not taken into consideration at the design stage, such interventions could lead to worse relative outcomes for members of polygynous households. We use a carefully designed experiment to measure cooperation between all possible interacting pairs within the two types of households. Focusing on pairwise interactions even in households where there are three spouses allows *ceteris paribus* comparisons to be made. In addition, to investigate whether the observed differences in cooperativeness are due to selective sorting into household type, we use the same methods to measure and analyze the cooperativeness of the husbands and wives when interacting with individuals from other households.

The results presented above indicate that cooperation is lower within polygynous compared with monogamous households, that cooperation is particularly low between co-wives, and that polygynous husbands are less inclined to cooperate with each of their wives compared with monogamous husbands. The last of these findings (and, hence, the first) could be owing to selection of less cooperative men into polygynous marriage. However, we do not find behavioral differences between monogamous and polygynous husbands when playing with individuals from other households, suggesting that selection bias is not driving the differences.

These findings have important implications for the design of programs that inject resources into households with the aim of improving (especially children's) welfare outcomes. The findings indicate that when given the opportunity to hide resources, members of polygynous households are more inclined to compromise household efficiency in order to maintain their individual control over those resources than their monogamous counterparts. This suggests that careful consideration needs to be given to who within the households should receive the resources. In particular, if senior (junior) wives are the sole recipients, our findings suggest that junior (senior) wives and their children may be disadvantaged. Further, if husbands are the recipients, impacts on the wives and children in polygynous households may be lower than in monogamous households.

Injecting in-kind resources such as food vouchers instead of cash or imposing strict conditions with which households need to comply in order to receive resources, such as child-specific school attendance, may go some way toward addressing these issues. These solutions reduce the individual benefits of hiding the transfers, and may preclude hiding altogether. Moreover, cooperation may be higher when all members of the receiving households are aware of the resource transfers. A simple extension of our experimental design would support a test of this conjecture.

Finally, our findings suggest that members of polygynous households contribute less than their monogamous counterparts only when they believe that their spouses or co-wives deviate from full cooperation. Put another way, the lower level of cooperation in polygynous households is owing to greater reciprocity and not pure selfishness. This implies that cooperation can be increased by increasing the level of trust between spouses and co-wives. Resource transfer programs often include engagement in training or counseling, for example, on nutrition and hygiene, as a condition for transfer receipt. Expanding such conditions to include engagement in trust-building activities would be relatively straightforward and potentially highly beneficial. Tasks developed for gender sensitization training for couples within female entrepreneurship programs (Vu et al. 2015) and programs aimed at reducing domestic violence (Iyengar and Ferrari 2016; Stephen et al. 2011) could be adapted for this purpose.

4. MATERIALS AND METHODS

The experimental games were conducted in June and July 2013 as a complement to a panel survey. The survey covered all adults from a sample of 240 households in Edu, a local government area in the north of Kwara State, Nigeria. This sample was representative for three towns (Bacita, Shonga, and Lafiagi) and four or, in the case of Lafiagi, five randomly selected rural communities within 15 kilometers of each town. The three towns plus the three sets of nearby rural communities resulted in six strata. The research team conducted a household listing and then randomly sampled 40 households for each stratum. All the adults from those 240 (40×6) households were invited to participate in the experimental games. In total, $n = 613$ adults were invited (including five spouses residing outside the survey household). Of those, 492 were married.

All but 13 of the unmarried and four of the married invitees showed up and participated in the workshops. The six spouses (two monogamous and four polygynous) of the four married invitees who did not show up were also excluded from the analysis. In addition, the analysis omits one household with two co-wives but no husband, and eight polygynous households with three wives. The final analysis sample consisted of 448 married individuals (220 monogamous and 228 polygynous spouses) (see Appendix, Section 7 and Table A.1 for a description of the samples).

A single team conducted the workshops in all 16 communities. The team consisted of a local researcher acting as supervisor, an instructor, an instructor's aid, and five assistants. All team members were fluent in English, the main Yoruba language, and, except for the supervisor, the local Nupe language. Instructions and games were conducted entirely in Nupe. At the start of a workshop, the supervisor gave an introduction. Then the instructor read out the group training script (Appendix, Section 9), while his aid presented the corresponding large visual aids (Appendix, Section 10). Afterward, participants received, one by one and in private, their individual interview, which included individual training, a quiz to test understanding, and each of their three games. A detailed protocol was followed at each stage of a workshop (Appendix, Section 8).

The workshops took place in community buildings, such as schools or health or community centers, with at least two separate rooms. The group training was given to all the participants in a workshop in one room—henceforth referred to as the group training room. The second room was used as a waiting room for participants who had completed their individual interview.

In most communities, two workshops were conducted. The exceptions were two small villages where a single workshop was planned due to small sample size, four villages in Shonga district for which the two planned workshops were amalgamated into one for logistical reasons, and one town (Lafiagi town) in which three workshops were held due to large sample size. On average, a workshop involved 28 participants, with a minimum of eight and a maximum of 50.

Substantial care was taken to avoid communication within workshops and spillovers within and between communities. Preplanned seating arrangements in the training room ensured that marriage groups (spouses as well as co-wives) were separated. Participants were not allowed to talk to each other until they had finished their individual interview and reached the waiting room, where they received a drink and a snack. Participants in the first of two workshops within a community were held in the waiting room until all participants for the second workshop had been registered and seated in the group training room. Participants arriving for the second workshop were asked to wait outside the premises until all first-workshop participants had been called out of the group training room. Workshops within a single district were planned such that they would start the day *after* the weekly market day in that district. Spillovers between communities on days other than market days were expected to be very limited. In Lafiagi, the three workshops were held across two consecutive days. A mapping of participants in Lafiagi town revealed that their residences were dispersed across neighborhoods, limiting potential communication between participants assigned to workshops on the first and second days.

In the experimental games, initial endowments varied and were known only to the recipients. With a 95 percent probability, a participant's initial endowment was 220 naira (₦220) in each game (approximately US$1.50, one-third of median daily cash income). However, each participant faced a 5 percent chance of receiving an initial endowment of between ₦180 and ₦20. The range of possible initial endowments was common knowledge, but participants did not know the probabilities associated with each.

Each participant played the linear two-person public goods game three times, each time with a different playing partner. Every monogamous husband (wife) played one game with his (her) wife (husband). Every polygynous husband with two wives played one game with each of his wives. Every wife of a polygynous husband with two wives played one game with her husband and one with her co-wife. Monogamous (polygynous) spouses played their remaining two (one) games with an adult from another household.

At the start of each intrahousehold game, participants were told the precise identity of their playing partner. At the start of each interhousehold game they were told that they were playing with "a (wo)man" in the same workshop. The order of the games was randomized and participants received no indication that husbands, wives, and co-wives would play together until the start of their first intrahousehold game. These details allowed us to investigate and rule out the possibility that behavioral differences across monogamous and polygynous households were owing to the former playing one intrahousehold game, while the latter played two (Appendix, Section 4).

After playing all three games, participants were reminded of their partner in each game and asked to guess how much each contributed, assuming an initial endowment of ₦220.

Finally, the participants received their earnings from each of the three shared funds to which they could have contributed. These earnings were received as a single payment with no breakdown. Because of this and the fact that participants' initial endowments were known only to themselves, participants could contribute significantly less than their initial endowments in any given game while claiming to have contributed all.

Most of the data analysis involves comparisons of means. We conduct these comparisons using statistical regressions with standard errors wild bootstrapped to account for possible dependence across decisions within workshops. This approach also allows us to investigate the robustness of our findings to the inclusion of an extensive set of control variables. Our standard set of experiment-related controls includes the following: the participant's initial endowment; the number of people present in the workshop attended by the participant; where the participant came in the order in which participants were called to their one-on-one interviews; whether the workshop was delayed; two dummy variables identifying whether the workshop was the second or third in a community; and a set of dummy variables identifying the enumerator who conducted the one-on-one interview.

In addition, when investigating the possibility that behavioral differences across monogamous and polygynous households were owing to the former playing one intrahousehold game while the latter played two, we introduce three dummy variables relating to the order in which each participant interacted with his or her various playing partners. These dummy variables identify the second interhousehold game played by the participant; the second intrahousehold game played by the participant; and interhousehold games played after at least one intrahousehold game had been played (Appendix, Section 4, Tables A.7–A.9). Our standard set of demographic controls included age; education; an indicator of belonging to the locally dominant ethnic group (Nupe); an indicator of being a Muslim; an indicator of earning a monetary income; a household wealth index variable; and an indicator of dwelling in a town rather than a village. All of the regressions are tabulated in the Appendix.

APPENDIX: SUPPORTING INFORMATION

Appendix Contents

Supplementary Text

1. Comparison of cooperation in monogamous and polygynous households

This section presents the regressions used to derive Figure 2.1 in the paper and some related robustness checks.

Table A.2 presents regression analyses of contribution decisions in the public goods games. The regressions in columns 1, 2, and 3 focus on contribution decisions made by participants when playing with a spouse or a co-wife. The dependent variable is the amount contributed to the public good as a proportion of the initial endowment. The explanatory variable *Polygynous* equals 1 if the decision was made by a participant in a polygynous marriage. The basis for comparison is monogamous participants playing with their spouses.

Column 1 presents the regression that was used to generate Figure 2.1 in the paper. The models in columns 2 and 3 control for a comprehensive set of 15 variables relating to the experiment (see table note for variable definitions). The model in column 3 also controls for seven standard demographic variables (see table note for variable definitions). Adding the controls has very little impact on the size or significance of the coefficient on *Polygynous;* when playing with household members, participants in polygynous marriages are estimated to contribute 9.5 percentage points less than monogamous participants in column 1, 9.9 percentage points less in column 2, and 9.8 percentage points less in column 3.

The regression in column 4 of Table A.2 focuses on contribution decisions made by the same married participants, but in their interhousehold games. The interhousehold games differed from the intrahousehold games in two ways: participants in the interhousehold games played with adults from other households *and* they did not know their playing partners' identities, only their gender. The dependent variable is again the amount contributed to the public good as a proportion of the initial endowment. In this regression, participants from polygynous households contribute 2.6 percentage points *more,* on average, than monogamous participants, and we cannot reject the null hypothesis that this difference is equal to zero. Members of monogamous and polygynous marriage groups are hence indistinguishably cooperative when playing with members of other households. This suggests that the difference in contribution rates we observe between monogamous and polygynous households is not driven by selection bias (that is, less cooperative individuals selecting into polygynous marriages) and that our main result can be given a causal interpretation.

Participants' initial endowments varied. Whereas most endowments were ₦220, the endowment was less than ₦220 with a probability of 0.05. In columns 2 and 3 of Table A.2, we controlled for initial endowment size. Table A.3 investigates the sensitivity of our results to the variation in initial endowment using a different approach. The regressions in columns 1, 2, and 3 of Table A.3 are the same as those in the corresponding columns of Table A.2 except that we have replaced initial endowment size with a dummy variable, *LowerAmount*, which equals 1 if the initial endowment was less than ₦220. In all three models, the coefficient on *LowerAmount* is insignificantly different from zero and the coefficient on *Polygynous* does not change in size and significance.

2. Who within polygynous households is most (least) willing to cooperate and with whom?

This section presents the regressions used to derive Figure 2.2 in the paper and some related robustness checks.

The regressions in Table A.4 are set up to investigate differences in contributions in the intrahousehold public goods games across player-pair types. Figure 2.2 in the main text was derived from the regressions in columns 1, 3, 5, and 6 of this table. The regressions focus on participants' contribution decisions when playing with a spouse or a co-wife. The dependent variable is the amount contributed to the public good as a proportion of the initial endowment. The key explanatory variables in columns 1 and 2 are as follows:

- *Monogamous wife with husband*, which equals 1 if the decision was made by a monogamous wife when playing with her husband
- *Polygynous husband with wife 1*, which equals 1 if the decision was made by a polygynous husband when playing with his first (senior) wife
- *Polygynous husband with wife 2*, which equals 1 if the decision was made by a polygynous husband when playing with his second (junior) wife
- *Polygynous wife 1 with husband*, which equals 1 if the decision was made by a first wife of a polygynous husband when playing with her husband
- *Polygynous wife 2 with husband*, which equals 1 if the decision was made by a second wife of a polygynous husband when playing with her husband
- *Wife 1 with wife 2*, which equals 1 if the decision was made by a first wife of a polygynous husband when playing with her co-wife

- *Wife 2 with wife 1*, which equals 1 if the decision was made by a second wife of a polygynous husband when playing with her co-wife

The basis for comparison is contributions by monogamous husbands playing with their wife.

Columns 3 and 4 focus on the same contribution decisions and dependent variable, but impose the following restrictions on the explanatory variables:

- *Pair includes polygynous husband (PPH): Polygynous husband with wife 1 = Polygynous husband with wife 2 = Polygynous wife 1 with husband = Polygynous wife 2 with husband.*
- *Pair are co-wives (PCW): Wife 1 with wife 2 = Wife 2 with wife 1 (W1W2 = W2W1).*

The basis for comparison is now contributions by monogamous husbands and wives when playing with each other.

F-tests indicate that the restrictions imposed as we move from column 1 to column 3 (and column 2 to column 4) cannot be rejected. The *p*-value associated with the null hypothesis that contribution rates are the same across all types of individuals and individual pairings in which one of the individuals is a polygynous husband is $p = 0.701$ if the focus is column 1 versus 3 ($p = 0.764$ if the focus is column 2 versus 4). The probability that the two co-wives have equal contribution rates when playing with each other is $p = 0.355$ if the focus is column 1 versus 3 ($p = 0.705$ if the focus is column 2 versus 4), respectively.

Columns 5 and 6 present estimates of the same model as column 3, but for husbands and wives separately. Thus, the basis for comparison is contributions by monogamous husbands when playing with their wives in column 5, and contributions by monogamous wives when playing with their husbands in column 6. This should be born in mind when comparing estimated coefficients with column 3.

Focusing on the estimations in columns 3 and 4, we cannot reject the null hypothesis that individuals in pairs involving a polygynous husband contribute at the same rate as co-wives when playing together ($p = 0.193$). However, when focusing on wives' decisions only, column 6, we *can* reject the null hypothesis that the contribution rates of co-wives are the same when playing with their husbands and when playing together at the 10 percent significance level ($p = 0.063$).

Figure 2.2 was generated on the basis of columns 1, 3, 5, and 6. Thus, the estimates in the figure do not account for the possible effects of experimental and demographic variables. The regressions in columns 2 and 4 indicate that accounting for these possible effects would lead to only marginal changes to the figure.

The regressions in Table A.5 include decision-maker fixed effects. The regressions focus on contributions made by members of polygynous households when paired with spouses and co-wives. (A similar approach cannot be applied to monogamous spouses because they played only one intrahousehold game.) In column 1 the sample is restricted to contributions made by wives of polygynous husbands. In column 2 the sample is restricted to contributions made by the polygynous husbands themselves.

The regression in column 1 indicates that wives of polygynous husbands contribute 4.3 percentage points less when paired with their co-wife than when paired with their husband and that this difference is significant at the 1 percent level. The regression in column 2 indicates that polygynous husbands' contribution rates when paired with their first and second wives are statistically indistinguishable.

3. Do members of polygynous and monogamous households behave differently in interhousehold interactions?

This section presents a regression used to derive an element of Figure 2.1 and other regressions supporting statements in the paper about whether the main results are owing to selection or the effect of the state of being in a polygynous marriage.

In the intrahousehold games, differences in contribution rates between members of polygynous and monogamous households may arise owing to either the state of polygyny or selection into polygyny. If cooperation is lower in polygynous households because less cooperative people select into polygyny, we would expect members of polygynous households to be less cooperative when playing with members of other households as well. Column 4 of Table A.2 indicated that this is not the case. In Table A.6 we investigate further. The estimation in column 1 of Table A.6 is similar to that presented in column 4 of Table A.2, except that experimental and demographic controls have been added. In columns 2 and 3, the sample is divided into husbands and wives. In all three estimations, the coefficient on *Polygynous* is small and insignificant, offering no evidence of selection into marriage type based on cooperativeness. Finally, in columns 4 and 5, we further divide the sample of contributions by husbands according to whether they were playing with a woman or a man from another household. We do this because one of the two drivers of the observed difference in intrahousehold contributions between monogamous and polygynous households is a difference in the extent to which husbands contributed when playing with their wives (no such difference was observed for wives playing with their husbands). That being the case, it is interesting to compare what the two types of husband do when playing with women to whom they are not married. Here, once again, we find no evidence that is consistent with selection into polygyny based on cooperativeness.

4. Investigating and controlling for portfolio play decision making

This section presents regressions supporting statements in the paper about the main result not being driven by portfolio decision making and the structure of the decision portfolio differing between monogamous and polygynous spouses.

Monogamous participants played one intrahousehold game and the remaining *two* games with adults from other households. Polygynous participants played two intrahousehold games and only *one* game with an adult from another household. If participants were playing their games as a portfolio rather than a set of three independent games, the difference in the three-game portfolio structure for members of monogamous versus polygynous households could be driving our result.

Several aspects of the experimental design served to minimize the possibility of portfolio decision making. Specifically, (a) participants were told the "type" of their partner for a game (for example, "your husband," "your wife," "a (wo)man who is also here today," and "your co-wife") just prior to that game, so they did not know with whom they would play in future games; (b) no indication was given to participants that the games would be played between spouses and co-wives until the first time each participant played such a game; (c) the order in which a participant met each of his or her playing partners was randomized; and (d) there was no feedback about the behavior of playing partners or payoffs between games.

In addition to minimizing the possibility of portfolio decision making, these features allow us to investigate whether such decision making is driving our results. Design features a, b, and c created random variation in participants' perceptions of their three-game portfolio structure as they moved from one game to the next. So if the participants were trying to play all three games as a portfolio, they would play the same game, in terms of type of participant, differently depending on which other partner types they had already played with. In Tables A.7, A.8, and A.9, we exploit these features to the full and, thereby, exclude the possibility that portfolio decision making is driving our results.

The regressions in Table A.7 investigate whether participants played their second intrahousehold game differently from their first. The regressions only include participants' contribution decisions when playing with a spouse or a co-wife. The dependent variable is the amount contributed to the public good as

a proportion of the initial endowment. The explanatory variable of interest here is *Second intrahousehold game*, which equals 1 if the contribution was made in the participant's second intrahousehold game. Note that this variable will never equal 1 for a member of a monogamous marriage but equals 1 for half of the contributions made by members of polygynous marriages. Because of this correlation with *Polygynous*, if *Second intrahousehold game* is a determinant of contributions in intrahousehold games, its omission from the regressions presented in Tables A.2 and A.4 will be causing bias in our main results.

Column 1 of Table A.7 presents the same model as column 2 of Table A.2; column 3 presents the same model as column 1 of Table A.4, but with experimental controls added; and column 5 presents the same model as column 3 of Table A.4, but with experimental controls added. Columns 2, 4, and 6 of Table A.7 present the same models as columns 1, 3, and 5, respectively, but with *Second intrahousehold game* included as an additional explanatory variable. The results reported in the next paragraph are insensitive to the inclusion or exclusion of the other experimental controls.[1]

In columns 2, 4, and 6, the coefficients on *Second intrahousehold game* are small and insignificant and the size and significance of the coefficients on the variables of principal interest are barely perturbed. From this, we conclude that the differences in contribution rates for monogamous versus polygynous participants cannot be explained by the second intrahousehold game that only polygynous participants played.

To further investigate this, Table A.8 analyzes whether participants play their second intrahousehold game differently from their first, this time focusing only on the decisions made by members of polygynous households. Once again, in every regression the coefficient on *Second intrahousehold game* is small and insignificant, and the estimated coefficient on *Playing pair are co-wives* is barely perturbed and remains significant when the analysis is focused on wives' contributions.[2]

Finally, Table A.9 tests whether we see any evidence of portfolio play when focusing only on the *interhousehold* games, that is, participants' contributions when playing with members of other households. In column 1, we investigate whether monogamous husbands and their wives play their second interhousehold game differently from their first. They do not; the coefficient on *Second interhousehold game* is small and insignificant. Columns 2 and 3 address the question of whether participants played interhousehold games differently depending on whether they had already played an intrahousehold game. The regressions in both columns include *Polygynous* and *Intrahousehold game already played (PostIntra)*, which is a dummy variable equal to 1 if the participant had already played at least one intrahousehold game; in addition, column 3 controls for an interaction between these two variables. We include this interaction term because perceptions of the three-game portfolio could have differed between monogamous and polygynous participants only among those who had already played their first intrahousehold game. In both estimations, the coefficients on *Polygynous* and *PostIntra* are small and insignificant and, in column 3, the coefficient on the interaction term is also small and insignificant. These results indicate the following: in interhousehold games polygynous participants contribute at the same rates as monogamous participants (as before); and prior play of intrahousehold games has no effect on contributions in interhousehold games irrespective of whether the contributor is in a monogamous or polygynous household.

5. Beliefs and conditional cooperation

This section presents the regressions used to derive Figure 2.3 in the paper and documents the "closer look at the data" referred to in the last paragraph of Section 2 of the paper.

We elicited participants' beliefs about their playing partners' contributions. These belief elicitations allow us to take a first look at whether participants' own contributions are conditioned on beliefs about others' contributions and whether this varies across monogamous and polygynous households.

[1] We exclude the demographic controls here because their inclusion has little effect on the results of principal interest (see Table A.2). We include the experimental controls because *Second intrahousehold game* is such a control and excluding the others would therefore seem inconsistent.

[2] Including decision-maker fixed effects in this analysis does not significantly change the results.

The usefulness of this analysis depends on the quality of the beliefs data. If the elicited beliefs are inaccurate or biased (or both) but the inaccuracy or bias is not correlated with participants' household types, this will only affect the power of the analysis. However, if any inaccuracy or bias differs between members of monogamous and polygynous households, this will undermine the validity of our comparative findings. We did not incentivize the beliefs elicitation, which could have increased bias or inaccuracy. It has been found that when beliefs elicitation within the context of student public goods games is not incentivized, the beliefs remain unbiased but become less accurate (Gächter and Renner 2010). This is reassuring. However, in intrahousehold games, there are additional reasons to be cautious about possible bias—for example, husbands and wives might inflate the reported beliefs out of politeness.

Table A.10 reports the mean bias and the mean inaccuracy of the stated beliefs of every possible intrahousehold directed pair and for interhousehold pairs made up of married (not to each other) participants. We measure bias by subtracting the playing partner's actual proportional contribution from the guesser's belief about that contribution. Therefore, a negative bias implies that the guess was too low and a positive bias implies that the guess was too high. The mean biases for the intrahousehold pair types vary from minus 6.2 to plus 4.4 percentage points of the initial endowment. For interhousehold pairings the mean bias is 6.9 percentage points. None of these biases is significantly different from zero. Importantly, there appears to be no systematic difference in biases between monogamous and polygynous household pairings.

We measure inaccuracy as the absolute distance between the playing partner's actual proportional contribution and the guesser's belief about that contribution. This measure is never negative. The mean inaccuracies for the intrahousehold pair types vary from 14.5 to 20.9 percentage points of the initial endowment. Reassuringly, the mean inaccuracy is higher at 32.3 percentage points for interhousehold pairings. Finally, there appears to be no systematic difference in inaccuracy between monogamous and polygynous household pairings.

Table A.11 analyzes the extent to which our main result can be explained by differences in elicited beliefs and differences in how monogamous versus polygynous participants condition their own contributions on their beliefs about what their playing partners will contribute. The analyses include all contribution decisions made by husbands and wives from polygynous and monogamous households when playing with their spouses or co-wives. The dependent variable is the amount contributed as a proportion of the initial endowment. For comparison, column 1 presents again the model first presented in column 1 of Table A.2, in which we do not control for beliefs.

Column 2 includes *Guessed contribution rate,* the proportion of the initial endowment that the participant believes his or her playing partner contributed. The large positive coefficient on this variable indicates that the proportion that a participant contributes him- or herself is positively associated with the proportion they believe their playing partner will contribute. Further, the coefficient on *Polygynous* reduces from -0.095 in column 1 to an estimated -0.061 in column 2; the guessed contribution rate explains one-third of the difference in contribution rates for members of monogamous versus polygynous households. Note that the coefficient on *Guess* in column 2 is not equal to 1. This implies that participants do not fully condition their own contribution rates on what they believe their playing partner will do.

Next, we investigate whether the extent to which participants condition their contribution rates on their beliefs differs for members of monogamous versus polygynous households. To investigate this, in columns 3 and 4 we also include an interaction between *Polygynous* and *Guess.* The only difference between columns 3 and 4 is that the latter includes the experimental and demographic controls. Column 3 was used to draw Figure 2.3 in the main text.

Focusing on the model in column 3 and summing the constant and the coefficient on *Guessed contribution rate* yields the predicted contribution rate for a member of a monogamous household who believes his or her spouse will contribute the full endowment. The sum of all four coefficients yields the predicted contribution rate for a member of a polygynous household member who believes his or her spouse will contribute the full endowment. On average, for both participant types, the contribution rate, conditional on believing that one's co-playing spouse or co-wife has contributed their entire initial endowment, is 95 percent. The coefficients on the two variables including *Guessed contribution rate* provide the slopes of the

regression lines plotted in Figure 2.3. Within monogamous households, a 10 percentage point reduction in the guessed playing partner's contribution rate is associated with a 4 percentage point reduction in own contribution rate. Within polygynous households, a 10 percentage point reduction in the guessed playing partner's contribution rate is associated with a significantly larger 7 percentage point reduction in own contribution rate.

Table A.12 presents the belief and own contribution data cross-tabulated. The upper panel is the cross-tabulation for monogamous spouses; the lower panel is the cross-tabulation for polygynous spouses and co-wives. Darker shading of a cell indicates that a higher proportion of the observations in that column fall in that cell. The cross-tabulations reveal that a large proportion of the observations pertaining to both household types are located either in the top two rows of the cross-tabulations or on or near the main diagonal. However, among monogamous spouses the top two rows are more prominent, and among polygynous spouses and co-wives the main diagonal is more prominent.

Table A.1 Participant sample characteristics

	Monogamous		Polygynous	
Variable	**Male**	**Female**	**Male**	**Female**
Age	48.38	37.89	48.42	36.81
Household size	5.57	5.57	8.93	8.93
Education (years)	6.77	2.78	6.17	1.55
Education (category):				
- No education	0.34	0.64	0.36	0.75
- (Some) primary completed	0.18	0.22	0.25	0.20
- (Some) secondary completed	0.25	0.09	0.17	0.03
- Higher education	0.23	0.05	0.21	0.00
Nupe	0.91	0.92	0.96	0.97
Muslim	0.87	0.84	0.96	0.95
Earning	0.95	0.90	0.97	0.93
Wealth	0.00	0.00	-0.08	-0.08
Urban	0.32	0.32	0.11	0.11
Comprehension of game	3.68	3.75	3.70	3.67
Observations	110	110	76	152

Source: Authors' data. Panel survey from which participants were sampled, and the public good games with monogamous and polygynous spouses.

Note: Age = age in years; household size = number of household members; education = years of formal education completed; Nupe = 1 if participant belongs to Nupe ethnic group; Muslim = 1 if participant Muslim; earning = 1 if participant brings monetary income into household; wealth = household-level asset index; urban = 1 if household in an urban area; comprehension of game = number (out of 4) of test questions about game correctly answered.

Table A.2 Contributions by monogamous and polygynous spouses: Regression analysis

Dependent variable = contribution rate = contribution ÷ initial endowment

	Intrahousehold			Intrahousehold			Intrahousehold			Interhousehold		
	(1)			(2)			(3)			(4)		
Constant	**0.879**	**(<1e^{-8})**	***	**0.815**	**(<1e^{-8})**	***	**0.736**	**(<1e^{-8})**	***	**0.361**	**(<1e^{-8})**	***
Polygynous	**-0.095**	**(0.040)**	**	**-0.099**	**(0.020)**	**	**-0.098**	**(0.018)**	**	**0.026**	**(0.366)**	
Experimental controls												
- Initial endow.				-3.5e^{-4}	(0.710)		-3.4e^{-4}	(0.705)				
- Session size				0.009	(0.006)	***	0.007	(0.022)	**			
- Order				-0.004	(0.016)	**	-0.003	(0.056)	*			
- Delay				-0.082	(0.018)	**	-0.064	(0.162)				
- Second session				0.040	(0.727)		0.025	(0.815)				
- Third session				0.150	(0.014)	**	0.084	(0.088)				
- Second game				-0.007	(0.707)		4.5e^{-4}	(0.981)				
- Third game				-0.001	(1.000)		0.001	(0.923)				
- Enumerator 1				0.008	(0.839)		0.005	(0.905)				
- Enumerator 2				0.068	(0.120)		0.092	(0.014)	**			
- Enumerator 3				0.028	(0.470)		0.052	(0.246)				
- Enumerator 4				-0.019	(0.863)		0.011	(0.833)				
- Enumerator 5				-0.073	(0.256)		-0.061	(0.314)				
- Enumerator 6				-0.003	(0.985)		0.010	(0.709)				
- Enumerator 7				0.101	(0.040)	**	0.115	(0.024)	**			
Demographic Controls												
- Age							-0.001	(0.511)				
- Educ.							0.005	(0.052)	*			
- Nupe (= 1)							-0.055	(0.214)				
- Muslim (= 1)							0.208	(0.040)	**			
- Earning (= 1)							-0.052	(0.396)				
- Wealth							0.033	(0.138)				
- Urban (= 1)							0.043	(0.132)				
Observ.	676			676			665			668		
R^2	0.025			0.140			0.199			0.002		

Source: Authors' data. Panel survey from which participants were sampled, and the public good games with monogamous and polygynous spouses.

Note: Coefficients and corresponding *p*-values (bootstrapped to account for clustering, null: coefficient equals 0, in parentheses) from linear regressions reported. Initial endowment = amount (in naira) less than 220 naira received in envelope; session size = number of participants in session (de-meaned); order = order of play (1 = 1st) in session (de-meaned); delay = 1 if session started later than prearranged time; second/third session = 1 if participant played in the second/third session held in the community; second/third game = 1 if decision made in second/third game played by participant; enumerator # = 1 if decision elicited in interview conducted by enumerator number #; age = age in years; education = years of formal education completed; Nupe = 1 if participant belongs to Nupe ethnic group; Muslim = 1 if participant Muslim; earning = 1 if participant brings monetary income into household; wealth = household-level asset index; urban = 1 if household in an urban area. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.3 Contributions in monogamous and polygynous marriages: Regression analysis controlling for lower amounts

Dependent variable = contribution rate = contribution ÷ initial endowment.

	Intrahousehold			Intrahousehold			Intrahousehold		
	(1)			(2)			(3)		
Constant	0.879	(<1e^{-8})	***	0.815	(<1e^{-8})	***	0.736	(<1e^{-8})	***
LowerAmount	0.023	(0.905)		-0.092	(0.693)		-0.072	(0.685)	
Polygynous	-0.095	(0.040)	**	-0.099	(0.022)	**	-0.098	(0.018)	**
Observations	676			676			665		
R^2	0.025			0.141			0.199		
Experimental controls	no			yes			yes		
Demographic controls	no			no			yes		

Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: Coefficients and corresponding p-values (bootstrapped to account for clustering, null: coefficient equals 0, in parentheses) from linear regressions reported. LowerAmount = 1 if initial endowments < 220 naira. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.4 Contributions within households by different playing partner matches

Dependent variable = contribution rate = contribution ÷ initial endowment.

	All spouses			All spouses			All spouses			All spouses			Husbands only			Wives only		
	(1)			(2)			(3)			(4)			(5)			(6)		
Constant	0.890	(<1e^{-8})	***	0.748	(<1e^{-8})	***	0.879	(<1e^{-8})	***	0.749	(<1e^{-8})	***	0.890	(<1e^{-8})	***	0.869	(<1e^{-8})	***
Monogamous wife with husband	-0.021	(0.480)		-0.018	(0.759)													
Polygynous husband with wife 1	-0.088	(0.086)	*	-0.093	(0.046)	*												
Polygynous husband with wife 2	-0.113	(0.026)	***	-0.120	(0.014)	**												
Polygynous wife 1 with husband	-0.104	(0.056)	*	-0.099	(0.094)	*												
Polygynous wife 2 with husband	-0.070	(0.172)		-0.075	(0.220)													
Wife 1 with wife 2	-0.141	(0.030)	**	-0.136	(0.044)	**												
Wife 2 with wife 1	-0.120	(0.060)	*	-0.125	(0.090)	*												
Pair includes polygynous husband (PPH)							-0.083	(0.052)	*	-0.087	(0.018)	**	-0.100	(0.034)	**	-0.066	(0.118)	
Pair are co-wives (PCW)							-0.120	(0.030)	**	-0.123	(0.022)	**				-0.109	(0.048)	**
Experimental controls	no			yes			no			yes			no			no		
Demographic controls	no			yes			no			yes			no			no		
Test null: coeff PPH = coeff PCW (*p*-value)							0.193			0.213						0.063		
Test null: coeff PHW1 = PHW2 = W1PH = W2PH (*p*-value)	0.701			0.764														
Test null: coeff W1W2 = W2W1 (*p*-value)	0.355			0.705														
Observations	676			665			676			665			262			414		
R^2	0.030			0.203			0.027			0.201			0.036			0.021		

Source: Authors' data. Public good games with monogamous and polygynous spouses.

Note: Coefficients and corresponding *p*-values (bootstrapped to account for clustering, null: coefficient equals 0, in parentheses) from linear regressions reported. Basis for comparison in columns 1 and 2 is monogamous husband when playing with wife. Basis for comparison in columns 3 and 4 is monogamous playing pair. Basis for comparison in columns 5 and 6 is monogamous husbands and monogamous wives, respectively. For list and definitions of controls, see note for Table A.2. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. W1 = first wife of a polygynous husband; W2 = second wife of a polygynous husband.

Table A.5 Within-individual analyses of contributions

Dependent variable = contribution rate = contribution ÷ initial endowment.

	Wives of polygynous husbands only			Polygynous husbands only		
	(1)			(2)		
Constant	0.803	($<1e^{-8}$)	***	0.803	($<1e^{-8}$)	***
Playing with co-wife	-0.043	(0.008)	***			
Playing with 2nd wife				-0.025	(0.271)	
Experimental controls	no			no		
Demographic controls	no			no		
Individual fixed effects	yes			yes		
Observations	304			156		
R^2	0.005			0.002		

Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: Coefficients and corresponding p-values from linear regressions including decision-maker fixed effects reported. Standard errors adjusted for clustering within individuals. Basis for comparison in column 1 is wife playing with polygynous husband. Basis for comparison in column 2 is polygynous husband playing with 1st wife. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.6 Contributions in interhousehold games

Dependent variable = contribution rate = contribution ÷ initial endowment.

	(1) Husbands and wives			(2) Husbands			(3) Wives			(4) Husbands playing with women from other households			(5) Husbands playing with men from other households	
Constant	0.538	($<1e^{-8}$)	***	0.646	(0.034)	**	0.629	($<1e^{-8}$)	***	0.788	(0.008)	***	0.540	(0.114)
Polygynous	0.036	(0.310)		0.064	(0.314)		0.023	(0.583)		0.096	(0.262)		0.024	(0.813)
Observations	649			285			364			142			143	
R^2	0.109			0.129			0.166			0.168			0.163	
Experimental controls	yes			yes			yes			yes			yes	
Demographic controls	yes			yes			yes			yes			yes	

Source: Authors' data. Public good games with monogamous and polygynous spouses.

Note: Coefficients and corresponding *p*-values (bootstrapped to account for clustering, null: coefficient equals 0, in parentheses) from linear regressions reported. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.7 Contributions within households by different playing partner matches, controlling for within-household game order

Dependent variable = contribution rate = contribution ÷ initial endowment

	(1)			(2)			(3)			(4)			(5)			(6)		
Constant	0.815	($<1e^{-8}$)	***	0.813	($<1e^{-8}$)	***	0.824	($<1e^{-8}$)	***	0.823	($<1e^{-8}$)	***	0.813	($<1e^{-8}$)	***	0.812	($<1e^{-8}$)	***
Polygynous	-0.099	(0.020)	***	0.104	(0.004)	***												
Monogamous wife with husband							0.025	(0.448)		-0.025	(0.438)							
Polygynous husband with wife 1							0.097	(0.060)	*	-0.099	(0.040)	**						
Polygynous husband with wife 2							0.122	(0.018)	**	-0.124	(0.014)	**						
Polygynous wife 1 with husband							0.109	(0.028)	**	-0.111	(0.022)	**						
Polygynous wife 2 with husband							0.073	(0.122)		-0.076	(0.094)	*						
Wife 1 with wife 2							0.146	(0.014)	**	-0.149	(0.014)	**						
Wife 2 with wife 1							0.123	(0.044)	**	-0.125	(0.030)	**						
Pair includes polygynous husband (PPH)													-0.087	(0.026)	**	-0.091	(0.016)	**
Pair are co-wives (PCW)													-0.122	(0.016)	**	-0.125	(0.014)	**
Second intrahousehold game				010	(0.318)					0.004	(0.735)					0.007	(0.571)	
Experimental controls	yes			yes			yes			yes			yes			yes		
Demographic controls	no			no			no			no			no			no		
Test null: coeff PPH = coeff PCW (*p*-value)													0.496			0.501		
Observations	676			676			676			676			676			676		
R^2	0.140			0.140			0.145			0.145			0.143			0.143		

Source: Authors' data. Public good games with monogamous and polygynous spouses.

Note: Coefficients and corresponding *p*-values (bootstrapped to account for clustering, null: coefficient equals 0, in parentheses) from linear regressions reported. Basis for comparison in columns 1 and 2 is monogamous husband when playing with wife. Basis for comparison in columns 3 and 4 is monogamous playing pair. Basis for comparison in columns 5 and 6 is monogamous husbands and monogamous wives, respectively. For list and definitions of controls, see note for Table A.2. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.8 Contributions within households: Do polygynous spouses play their second intrahousehold game differently from their first?

Dependent variable = contribution rate = contribution ÷ initial endowment

	All polygynous (1)			Polygynous husbands (2)			Polygynous wives (3)		
Constant	0.721	(<1e^{-8})	***	0.729	(<1e^{-8})	***	0.718	(<1e^{-8})	***
Playing pair are co-wives	-0.034	(0.198)					-0.043	(0.072)	*
Second intrahousehold game	0.007	(0.561)		0.006	(0.825)		0.006	(0.701)	
Experimental controls	yes			yes			yes		
Demographic controls	no			no			no		
Observations	456			152			304		
R^2	0.158			0.159			0.218		

Source: Authors' data. Public good games with monogamous and polygynous spouses.

Note: Coefficients and corresponding p-values (bootstrapped to account for clustering, null: coefficient equals 0, in parentheses) from linear regressions reported. For list and definitions of controls, see note for Table A.2. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.9 Do monogamous spouses play their second interhousehold game differently from their first? And do spouses play interhousehold games differently depending on whether they have already played an intrahousehold game?

	Interhousehold decision by monogamous spouses		All interhousehold decisions		All interhousehold decisions	
Variable	**(1)**		**(2)**		**(3)**	
Constant	0.518	($<1e^{-8}$) ***	0.478	($<1e^{-8}$) ***	0.472	($<1e^{-8}$) ***
Second interhousehold game	-0.011	(0.456)				
Polygynous			0.039	(0.184)	0.063	(0.262)
Intrahousehold game already played (PostIntra)			-0.020	(0.318)	-0.008	(0.779)
Polygynous * PostIntra					-0.040	(0.575)
Experimental controls	yes		yes		yes	
Demographic controls	no		no		no	
Observations	440		668		668	
R^2	0.106		0.073		0.074	

Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: Coefficients and corresponding *p*-values (bootstrapped to account for clustering, null: coefficient equals 0, in parentheses) from linear regressions reported. For list and definitions of controls, see note for Table A.2. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.10 Bias in and inaccuracy of participant's guesses of playing partner's contributions

Variable	Bias Guess–Actual	Inaccuracy |Guess–Actual|
Monogamous		
Husband guesses wife's contribution	-0.056	0.199
Wife guesses husband's contribution	-0.045	0.145
Polygynous		
Husband guesses 1st wife's contribution	0.016	0.164
Husband guesses 2nd wife's contribution	-0.062	0.194
1st wife guesses husband's contribution	-0.026	0.208
1st wife guesses 2nd wife's contribution	-0.051	0.182
2nd wife guesses husband's contribution	0.044	0.209
2nd wife guesses 1st wife's contribution	0.038	0.167
Interhousehold		
One guesses the other's contribution	0.069	0.323

Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: Guess = participant's guess of the amount his or her playing partner contributed in a game, assuming an initial endowment of 220 naira, as a proportion of 220. Actual = amount that participant's playing partner contributed in the same game as a proportion of the partner's initial endowment.

Table A.11 Conditional cooperation in monogamous and polygynous households: Regression analysis

Variable	(1)			(2)			(3)			(4)		
Constant	0.879	(<1e^{-8})	***	0.349	(<1e^{-8})	***	0.542	(<1e^{-8})	***	0.377	(<1e^{-8})	***
Polygynous	-0.095	(0.040)	**	-0.061	(0.010)	**	-0.319	(0.004)	**	-0.333	(0.004)	**
Guessed contribution rate				0.640	(<1e^{-8})	***	0.408	(<1e^{-8})	***	0.380	(<1e^{-8})	***
Polygynous*Guessed contr. rate							0.316	(0.006)	**	0.318	(0.002)	***
Experimental controls	no			no			no			yes		
Demographic controls	no			no			no			yes		
Observations	676			676			676			665		
R^2	0.025			0.417			0.435			0.510		

Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: Coefficients and corresponding *p*-values (bootstrapped to account for clustering, null: coefficient equals 0, in parentheses) from linear regressions reported. Guess = guess of playing partner's contribution assuming an initial endowment of 220 naira as a proportion of 220 naira. For list and definitions of controls, see note for Table A.2. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.12 Conditional cooperation: Cross-tabulation of beliefs about playing partners' contribution rate and own contribution rate

Monogamous

Own contribution rate	0.00	0.09	0.18	0.27	0.36	0.45	0.55	0.64	0.73	0.82	0.91	1.00	Obs
1.00	50	40	0	67	0	36	17	50	43	45	49	79	59.55
0.91	0	20	100	0	0	12	17	0	0	36	29	16	18.64
0.82	0	0	0	0	0	4	0	25	29	0	6	3	4.55
0.73	0	0	0	0	0	4	0	0	0	9	4	0	1.82
#0.64	0	0	0	0	33	0	33	25	0	0	2	0	2.27
0.55	0	0	0	0	0	20	17	0	0	0	2	1	3.64
#0.45	0	0	0	0	33	16	17	0	29	9	2	0	4.55
0.36	0	0	0	0	0	0	0	0	0	0	0	1	0.45
0.27	0	20	0	33	33	4	0	0	0	0	0	0	1.82
0.18	0	0	0	0	0	4	0	0	0	0	0	0	0.45
#0.09	0	20	0	0	0	0	0	0	0	0	6	0	1.82
0.00	50	0	0	0	0	0	0	0	0	0	0	0	0.45
	0.00	0.09	0.18	0.27	0.36	0.45	0.55	0.64	0.73	0.82	0.91	1.00	

Guess of other's contribution rate

Polygynous

Own contribution rate	0.00	0.09	0.18	0.27	0.36	0.45	0.55	0.64	0.73	0.82	0.91	1.00	Obs
1.00	0	14	25	30	7	20	4	40	58	33	39	77	48.90
0.91	0	10	0	0	7	7	13	20	0	33	38	16	17.76
0.82	0	0	0	0	0	2	4	0	8	17	9	2	3.73
0.73	0	0	0	0	0	3	0	0	8	8	1	1	1.32
#0.64	0	0	0	0	7	3	8	0	0	0	0	0	1.10
0.55	0	5	0	0	0	5	21	0	0	0	6	1	3.73
#0.45	0	0	0	10	14	25	33	20	0	8	5	0	7.02
0.36	0	0	13	0	29	19	13	20	0	0	2	0	4.82
0.27	0	0	0	20	21	5	4	0	17	0	0	1	2.85
0.18	0	0	38	20	14	2	0	0	8	0	1	1	2.63
#0.09	0	71	25	20	0	3	0	0	0	0	0	1	4.83
0.00	100	0	0	0	0	5	0	0	0	0	0	1	1.32
	0.00	0.09	0.18	0.27	0.36	0.45	0.55	0.64	0.73	0.82	0.91	1.00	

Guess of other's contribution rate

20%–49% of observations in column fall in this row.
50%–69% of observations in column fall in this row.
70+% of observations in column fall in this row.

Source: Authors' data. Public good games with monogamous and polygynous spouses.
Note: Numbers within the cross-tabulations are percentages of observations in the column falling within the given row.

Materials and Methods

6. Experimental procedures

During the final round of a panel survey, all adult respondents were invited to participate in a workshop to be held in their village or neighborhood a few weeks later. The only activities undertaken during these workshops were the two-person linear public goods games that generated the data presented in the paper entitled *Cooperation in Polygynous Households*. The workshops were described to the survey respondents as part of a study on how people make decisions about money. They were asked to come with (all) their spouses who were resident in the same community. Date and time were announced. They were reminded one day before and again on the morning of the workshops. To ensure a timely start and avoid lengthy waits for early birds, a focal person in each community assisted in the reminders and picked up any participants who were late.

A first set of instructions was given to all the participants in a session in the group training room. At the start of a session, the supervisor gave an introduction, after which the instructor read out the group training script (Section 9) while his aid presented the corresponding large visual aids (Section 10).

Subsequently, individuals were called forward one by one in an order randomized across sessions, males, females, singles, monogamous, and polygamous, to ensure that waiting times would be balanced across types.[3] Assistants escorted each participant to a private spot on the premises, literally read out the individual training script, asked four test questions to check and enhance understanding, recorded performance on the test questions, and explained the game again if necessary (Section 9).

The participants then played their three games. Prior to every game, they learned about their playing partner for that game. Prior to the start of a game with a spouse or co-wife, there were no cues that participants would be playing with their spouses or co-wives. This, combined with the random order of playing partners, is used to investigate whether participants played their three games as a portfolio rather than as separate interactions (Section 9). After they had played three games, participants were asked how much they believed each of their playing partners had put in the shared fund, assuming that they started with 220 naira (₦220). The beliefs were not elicited before playing the games to avoid priming the participants to think specifically about strategic considerations.

Finally, each participant was asked to wait in the second room until all the participants had finished and they could receive their individual earnings from the shared funds. On average, participants earned around ₦847 from the games.[4] In addition, each participant received a ₦250 show-up fee. For comparison, the median daily cash income in the study area, measured over the period of a year to include not only wage labor and employment but also seasonal income from agriculture and business, was ₦600.

7. Sample description

Table A.1 describes the sample of 448 married individuals (220 monogamous and 228 polygynous spouses). Men are on average 48 years old, women 37 years old. The average difference in age between husband and wife is more than 10 years in both monogamous and polygynous marriages. The majority of the players are Nupe (ethnicity) and Muslim (religion) with more religious diversity, especially for the monogamous players, than ethnic diversity. Levels of education are low, especially for women, who spent on average 1.55 years in school; 64 percent and 75 percent of monogamous and polygynous women, respectively, did not attend school. Almost everyone is involved in income-generating activities. A third of the monogamous and a tenth of the polygynous samples live in one of the three towns; the polygynous sample is concentrated in the rural communities. Comprehension of the game was good. Out of four test questions, on average, players answered 3.67 to 3.75 questions correctly. Eighty-one percent of all players got all the test questions right, more than 90 percent got three or more right, and 98 percent got half or more right without help.

[3] To take into account the potential effects of waiting time on decisions, we control for calling order in the analyses.
[4] The exchange rate at the time of the games (July 2013) was US$0.615 = 100 naira.

8. Protocols

The following protocols were followed when running the experimental sessions.

8.1. Conducting the session

8.1.1. Setting up the session location

In most villages of the project, two sessions will be conducted. The following notes describe how each session should be organized.

Space: To run a session, you need

- one space large enough to contain all of the participants (seated) for the group training;
- several locations for the individual interviews (these need to be private—that is, the participants must not be seen by anyone when making their decisions about how much money to take out and to leave in the envelopes); and
- one space large enough to contain all of the participants, while waiting to be paid, after they have made their decisions.

The participants for the second session in a community will arrive only after all the participants in the first have vacated the group training space. They can then wait there while the payments for the first session are being made. Do not start registering for the second session until the first is complete. The utmost care should be taken to avoid communication between the participants of the first and second sessions; remember, we want to capture the decisions of individuals and do not want them to be influenced by others who have already played the games.

Furniture: You will need

- a desk for the supervisor at the front of the space used for group training;
- chairs or benches for the participants in the location to be used for group training (if people are used to sitting on the floor, these may not be necessary; if people usually bring their own chairs to meetings, they could be encouraged to do this);
- chairs or benches for the participants in the location where participants will wait once they have played (see previous note and also note that chairs can be moved gradually from the group training area to the waiting area as a session progresses); and
- a pair of chairs (one for enumerator, one for participant) in each location to be used for private interviews (or if people bring their own chairs, they can take their own chair from group training to individual interview to waiting area).

8.1.2. Materials and setup for a session

Session ID badges: Conference badges bearing the session IDs (to be reused in each session) will be used to identify each participant. At the beginning of each session, participants will be registered and given the badges with the session IDs. It is very important that they receive the correct session ID as indicated on the registration form and the individual interview form. Always double-check!

Envelopes:

- 100 large white envelopes (A5), each containing three standard brown envelopes each containing money
- Within each white envelope, there must be one brown envelope labeled "1," one labeled "2," and one labeled "3." Please make sure that all 300 brown envelopes in the 100 white envelopes are labeled like this.
- Within each white envelope, all three of the brown envelopes must contain the same amount of money.

- The brown envelopes in 95 of the 100 white envelopes must each contain 11 ₦20 notes (₦220 in total).
- The brown envelopes in one of the 100 white envelopes must contain one ₦20 note (₦20 in total).
- The brown envelopes in one of the 100 white envelopes must contain three ₦20 notes (₦60 in total).
- The brown envelopes in one of the 100 white envelopes must contain five ₦20 notes (₦100 in total).
- The brown envelopes in one of the 100 white envelopes must contain seven ₦20 notes (₦140 in total).
- The brown envelopes in one of the 100 white envelopes must contain nine ₦20 notes (₦180 in total).

Place these in a box (preferably the box will be proportioned so that the envelopes stand up on one of their sides so that each and every one is equally accessible to a participant invited to take one). Make sure the envelopes are arranged in such a way that it is easy to pick out one of them. Also make sure the envelopes containing smaller amounts of money cannot be identified by the participants when they look at the box. And make sure that the five envelopes with less than ₦220 in each brown envelope are mixed up with the others (should not be put together as a bunch). A cardboard box, plastic box, crate, or similar can be used for this purpose.

At the end of each session, check the Excel data sheet to see whether any of the envelopes with less than ₦220 per brown envelope were picked. If they were, replace them, like-for-like. Then, replenish the box with enough envelopes containing exactly ₦220 per brown envelope to make it back up to 100 ready for the next session. Have enough envelopes prepared beforehand to replenish the box at the end of Session 1.

Money denominations: In addition to having the right total amount of money for the games, the exact denominations should be made available. For example, the denominations given to players should not constrain them from making contributions they would like to make; and when payments are made to the players at the end of the game, the necessary denominations for payments should be available. Preparing the right denomination of naira requires some planning. Banks in small towns may not have sufficient amounts of the required denominations.

If participants want to change a ₦20 note for two ₦10 notes from their pocket and leave, for example, ₦10, ₦30, or ₦50, and so forth in the envelope, they are allowed to do so. During final payoff, amounts can be rounded up to the nearest multiple of 5.

Visual aids: One set of the visual aids for the group training (size = A2) needs to be set up on a table at the front of the group training space.

Each enumerator who is going to undertake individual interviews needs one set of the visual aids for the individual interviews (size = A4).

Snacks and refreshments: Snacks and refreshments will be provided in the second space where participants arrive after they have made their decisions in the individual interview and where they wait to be paid.

8.1.3. Data sheet and payoff calculator

For each session, the relevant Excel data sheet and payoff calculator needs to be open on the laptop computer. The laptop officers will be in charge of this.

8.1.4. Session protocol

Participant arrival: The mobilization officers welcome people as they arrive. The mobilization officers will check their names on the sensitization and mobilization form, and direct them to the registration table.

A marriage group must be registered all at once, that is, only after all those in the marriage group who are to attend have arrived. Marriage groups who arrive one short but saying that the one is on his or her way must wait until that one has arrived before registering. The mobilization officers will tick off the people who have arrived on their sensitization and mobilization form to keep track of the people who are not there yet and who may need further mobilization effort.

In communities with two sessions, people can participate only in the session they are assigned to.

Registration starts when the first participants arrive. Since we do not expect all participants to turn up exactly at the appointed time, a time limit should be allotted to wait for latecomers (not more than 30 minutes after official starting time). The focal person can help mobilize participants who are late if the conditions allow (if their homes are near, for example). Once the group training has started, latecomers cannot participate anymore and will not receive any money. If some invited participants do not show up, adjustments will be made on the data sheet and the individual interview forms. This is described in another manual.

Registration and session ID badges: The registration form for the session has the list of people invited to the session, their survey IDs (from the panel survey), their games session IDs, and a column that should be ticked when participants arrive at the registration desk. When participants register, put a tick in the last column (with a heading "Present (√)"). After registration, participants will be given a badge with their assigned session ID. Make sure that each participant gets a badge with the correct session ID assigned to them as indicated in the registration form. (IT IS EXTREMELY IMPORTANT THAT THIS IS DONE CAREFULLY.)

Each participant is given a badge showing his or her session ID. Session IDs have been printed and put in the badge. IMPORTANT: The first part of a session ID indicates the type of marriage—monogamous (M), polygamous (P2, P3, . . .), co-wives (CW), single men (SM), and single women (SW). The following two numbers indicate specific partners in that type of marriage. These numbers must be the same for all individuals in the same marriage (this is why all the members of a specific marriage group must be registered at the same time).

Seating arrangements: Once a marriage group or individual has been registered and given their conference badges, they should be seated. Marriage groups must be separated. Have a zone where the husbands and single males sit, and another where monogamous, first, and single wives sit. Second wives should be seated apart from co-wives and their husband. The participant officers are in charge of seating people and ensuring that they do not regroup once seated.

Group training: Once all the participants are seated, the supervisor will give an introduction. Participants will be asked to switch off their mobile phones and remain silent. Then, the group trainer reads out the group training script, including the examples. When presenting the examples, the group trainer uses the visual aids.

Individual interviews: Once the group training is complete, the individual interviews start.

The enumerators who are going to do the interviews should join the supervisor at the front desk.

The supervisor calls one person forward at a time starting at the top of the registration form. A person should be called forward only when an enumerator is waiting to escort him or her to the private interview.

When a person comes forward,

- the supervisor checks whether the session ID on the registration form is the same as the session ID on the participant's badge;
- the participant picks any white envelope he or she chooses from the box and is told not to open it until asked to do so;
- the enumerator receives the participant's individual interview form (see Appendix Section 5.2 for examples of session ID numbers and Section 11.3 for an example of an individual interview form); and
- the enumerator escorts the participant to one of the locations set up for private interviews.

During each private interview, the enumerator follows the script for the individual interviews WITH GREAT CARE AND ATTENTION TO DETAIL AT ALL TIMES. The enumerator

- checks whether the session ID on the individual interview form is the same as the session ID on the participant's badge;
- fills in his interviewer ID code and the date at the top of the form;
- LITERALLY reads the description of the game at the beginning of the script;
- LITERALLY READS THE SCRIPT as he works through the example and asks the participant the test questions as written on the script, using the visual aids where appropriate, and records the participant's performance in the test questions on the individual interview form;
- LITERALLY READS THE SCRIPT as he plays games 1, 2, and 3 with the participant;
- records the amounts received in the envelope at the start of each game on the individual interview form;
- asks the participant to sign for the amounts;
- LITERALLY READS THE SCRIPT about the guess questions and records the answers on the individual interview form;
- LITERALLY READS THE SCRIPT about the sharing information questions and records the answers on the individual interview form;
- collects the white envelope from the participant and closes the interview;
- paper-clips all envelopes to the individual interview forms as demonstrated during the training;
- escorts the participant to the waiting area; and
- proceeds to the supervisor to hand in the individual interview form with the envelopes and pick up his next participant.

Calculation and making of payments: When an individual interview form with envelopes paper-clipped to it has been delivered back to the supervisor, she can start processing them. To do this, the supervisor

- checks whether all relevant boxes have been filled in properly by the enumerator;
- opens the envelope on which "1" is written and records the amount of money left in it in the box for "1st" game (in the column titled "Amount left in");
- opens the envelope on which "2" is written and records the amount of money left in it in the box for "2nd" game (in the column titled "Amount left in");
- opens the envelope on which "3" is written and records the amount of money left in it in the box for "3rd" game (in the column titled "Amount left in"); and
- puts the money left in the envelopes into the envelope cash bag.

Once the individual interview form is completely filled in, the supervisor passes it to the laptop officer, who

- enters the data on the individual interview form into the calculator data sheet.

Once all individual interview forms have been entered, the supervisor calls participants forward one at a time and

- takes back their session ID badge;
- pays them the amount next to their session ID in the final payoff column (this amount includes the show-up fee);
- asks them to sign at the bottom of their individual interview form; and
- tells them that they are free to go.

8.1.5. Transition to second session

Just as it is important for participants not to talk to each other *during* a session (so that they cannot influence each other's decision), it is also important that participants in the first session do not talk to participants who arrive for the second session. Therefore, the transition to the second session should be carefully organized.

Once all participants in the first session have made their individual decisions and have moved to the waiting room where they wait to be paid out, the participants in the second session can enter the group training room. The mobilization officers will record on the sensitization form all participants who have entered.

Only after all participants for the second session are in the group training room can the first-session participants be paid and leave the venue. If most but not all of second-session participants have arrived, the mobilization officers can wait for the latecomers outside the venue to direct new participants immediately to the group training room while urging first-session participants not to talk to the newcomers. Latecomers will be recorded as "arrived" and "late" in the data sheet.

Before registration of the second-session participants, the appropriate ID badges should be returned to the registration desk and put in order. Also, the box with white envelopes should be refilled to contain 100 white envelopes. The data sheet will indicate the number of white envelopes that contained less than ₦220 (see Section 8.1.2) and how much was in those envelopes instead.

8.2. General guidelines

Experimental games should be conducted in similar conditions for all participants—otherwise, actions of the players will differ depending on the different conditions they experience during the games, and not only because of differences in their individual behavior. To avoid this, research assistants should **strictly adhere to the protocols.** The protocols should be **consistently** implemented **across different sessions** in the same village as well as across villages. Strict adherence to the protocols guarantees that comparable data are collected from all players.

Utmost care should be taken to avoid contamination between sessions. In most of the study villages, two sessions will be conducted. Please ensure as much as possible that participants of the second session are not communicating upon arrival with those from the first session who have already played the games.

The utmost care should also be given to avoid communication and contamination within sessions themselves. Please make clear to the participants that talking to each other after the session has started is strictly prohibited. The threat of expulsion from the game is usually a good enforcement mechanism for this. Enumerators can ask participants to remain silent on the supervisor's behalf.

In addition to players talking to each other, contamination in a session could occur if players can see each other when they make their decisions; observing the decisions of others may influence decisions. To avoid this, please ensure that players are making decisions in private without others observing them. After the game instructions have been read, players should be taken to a place where they can make their decisions in private. In every instance, stress that players should make their own decisions without the influence of others.

The decisions of players can also be influenced by inadvertent actions of research assistants. Research assistants should not give any signal—either verbal or nonverbal—that may give the impression that certain decisions of the players are "good" or "bad." This can be in the form of verbal cues that may encourage the players to choose some decisions. Or it can be in the form of nonverbal cues, such as gestures that show approval or disapproval. Always remember, the games attempt to capture the decisions of the players themselves as much as possible without influence from other players or research assistants.

Research assistants should remember that the experimental games are conducted to learn about the behavior of participants. The purpose of the games is neither to "teach" players nor "help" participants financially. For example, although agricultural extension agents may use games to teach farmers better methods of doing things, these experimental games do not have the objective of teaching something to the participants. Charity organizations give money or other materials to support people, but the experimental

games are not providing charity or aid. Always remember, the experimental games are conducted for the purpose of research in order to understand how people make their decisions.

Reading instructions during the games: The scripts should be read slowly, clearly, and in a loud voice. Research assistants should read the scripts without giving any additional explanation. If participants have questions, research assistants should answer the questions as neutrally as possible—that is, without giving any suggestion that certain decisions are better or preferable. The decisions of the participants should be their own.

Research assistants should make sure that they do not impart any information on the nature of the games before the games start; as much as possible, participants have to get information about the games from the instructions.

8.3. Sensitization

All participants have been informed and invited to the games during the end-line survey of the Financial Diaries. A few days prior to the games (workshop) being held, further sensitization will be done in each community. In each community, a focal person is appointed by the supervisor. The enumerators will first decide on an appropriate venue and timing for the two sessions in consultation with the focal person. They will then fill in the venue and the timing on the personal invitations that will be prepared for all participants. Finally, they will visit all households to hand over the invitation and urge the participants to come to the workshop. The focal person will assist in handing out the personal invitations to participants who are absent at the time of the visit.

In most communities there will be two sessions, run one after the other. In such cases, the starting times for two sessions need to be planned in such a way that the participants who have finished the first session can leave only after participants in the second session have arrived. Planning two hours between the first and second sessions in a community seems best, but this may be adjusted at a later stage in the fieldwork based on your experiences.

Two types of invitation letters are distributed to the households during the sensitization visit. The first is to be used for both monogamous and polygamous married people in the sample, and the second is for unmarried individuals or married individuals whose spouses are living outside the community. On each invitation, the research assistants will write down the date, location, and exact time the participant is expected to show up. If a participant is not present during the sensitization visit, the focal person should deliver the personal invitation to the participant's house.

For married people, please emphasize that the presence of **all spouses** from a household is crucial. Since the workshop requires the participation of all spouses, please encourage and get assurance that all invited spouses will come to the workshop. It is important to clarify that the invitation is not for one person to "represent" the household.

Also, stress that it is important that the husband and his wife or wives all turn up to the workshop together, that is, at the same time.

In some marriages the spouse resides elsewhere, either in the community or outside the community. If a spouse does not live in the household but in the community, he or she is also invited (see separate list for ID codes). Spouses who reside outside the community are not invited.

Singles (or married persons with a spouse outside the community) will receive a personal invitation for a "single" person. They are invited individually and do not need to arrive together with any married individuals in their household.

In most of the villages two sessions will be held, one after the other. Please emphasize that people must come to the session to which they are assigned. People listed for the first session should go to the first session and people listed for the second session should go to the second session. Swapping between sessions is also not allowed—that is, people cannot exchange their places across sessions.

Please explain that, at the workshop, participants will get money that they can take home (a show-up fee of ₦250 and an additional amount of up to ₦800, or somewhat less or even more). Emphasize that the amount of money they will get to take home will depend on the decisions they and others make in the workshop. The amount will vary across participants.

Also explain that the money is from research institutions in Europe and that the information gathered during the workshop will be used only for research and without revealing the individual identities of the participants. Indicate that the game is part of the Financial Diaries research.

Research assistants should strongly indicate that the participation of all invited household members is extremely important. In cases where the invited people definitely know that they cannot make it on the day, please record this fact. But please encourage people to attend and get a firm commitment.

Sensitization will take place one or more days before the workshop takes place. There are five communities in Bacita and Shonga, and six communities in Lafiagi. This means that the team of research assistants will split up in groups of two for the sensitization visits.

For each sensitization visit, the research assistants need to bring the personal invitations (including notes) and the sensitization form(s) for that particular community. The notes that go with the invitation

indicate which respondents require particular attention—for example, because we do not yet have a name or have very similar names for different persons, and so forth.

Each workshop is registered on one sensitization form; so if two workshops are to be held in one community, there will be two sensitization forms. The sensitization form lists the names and identification numbers of the participants in the game. If it becomes clear during the handing out of the invitations that a participant will not attend the workshop, that should be indicated on the sensitization form so that the mobilization officers know not to wait for that person at the start of the workshop.

9. Instructions and scripts

9.1. Script for group training

[INTRODUCTION. BY THE SUPERVISOR (IN ENGLISH), INTERPETATION TO NUPE BY PETER. MAKE SURE SLIDES ARE IN THE RIGHT ORDER AND THAT YOU HAVE TWO BROWN ENVELOPES + MONEY + COMMON BUNDLE FOR DEMONSTRATION.]

Welcome. Thank you for taking the time to come today. We are researchers from the University of Ilorin Teaching Hospital. [INTRODUCE THE RESEARCH TEAM MEMBERS.] *We have invited you here because we want to learn about how people in this area take decisions. You are going to play a game that involves making decisions about money. We will provide you the money, and whatever money you get because of your decisions will be yours to keep.*

The decisions you will make are not difficult, and there are no correct or wrong answers. All you need to think about is making the decisions that seem right to you. It is important to think seriously about your decisions because they will affect how much money you will take home.

Before we ask you to make any decisions, we will tell you everything you need to know about the game. But first we want to say a few other things.

First of all, the money we are going to use to play the game is not our own. We belong to a research organization that has given us the money to use for research.

Second, this study is about how each of you makes decisions on your own. Therefore, it is important that you do not talk or communicate in any other way amongst yourselves once we start explaining the game. This is very important. Please be sure to obey this rule. If just one person communicates with another, it could spoil the research. I'm afraid that if we find you talking or trying to signal to each other, we will have to send you home, and you will not collect money here today. Later you will have an opportunity to ask all your questions.

Third, we would like to kindly request all of you to put your handsets on silence because you cannot take phone calls while in this room. [WAIT FOR A MINUTE.]

Finally, make sure that you listen carefully to us. Each of you could make a good amount of money here today. But this will only be possible if you understand the decisions you are making. So listen to the instructions, ask us your questions when the opportunity arises, and do not sleep.

Okay. Now our instructor will start explaining the game.

[START OF THE GAME. PETER CONTINUES FROM HERE IN NUPE. IZAIA ILLUSTRATES. PETER PAUSES WHEN IZAIA IS ACTING.]

You play the game in pairs. You always play the game with someone else who is here today.

The game starts when we give each of you an envelope like this. [HOLD UP BROWN ENVELOPE.] *It contains some money.* [TAKE OUT THE MONEY THAT IS INSIDE AND SHOW IT.] *The person you are playing the game with will also receive an envelope. However, you will not know how much money is in your partner's envelope, and they will not know how much money is in yours.*

The money in the envelope is yours. You can put all of it or some of it in your pocket (or bag or wrapper) straightaway. **[**PUT A FEW NOTES IN POCKET.] *You can also decide to put some or all back in the envelope.* [PUT THE REST OF THE NOTES BACK IN ENVELOPE.] *Any money you put back in the envelope will go into a common bundle.* [EMPTY ENVELOPE WITH MONEY IN BUNDLE.] *Also your partner will decide how much of his or her own money to put in his or her pocket straightaway, and how much to put back in the envelope to go into the common bundle.* [SHOW ANOTHER BROWN ENVELOPE AND EMPTY IN BUNDLE.] *Both you and your partner will make your decisions in private. So you will not know your partner's decision, and he or she will not know yours.*

So you have to choose to do either of three things with the money in the envelope: either put all the money in your pocket straightaway; or put some in your pocket and put some back into the envelope for the common bundle; or put it all back in the envelope for the common bundle.

Now, to whatever is in the common bundle <supervisor's name> will add half again. [HOLD UP A FEW NOTES AND THEN PUT IT IN BUNDLE.] *For example, if there is ₦100 in the common bundle, <supervisor's name> will add another ₦50 to make the total ₦150. If there is ₦400 in the common bundle, she will add another ₦200 to make a total of ₦600 and so on.*

After that, each of you will get half of the money in the common bundle. [TAKE ALL MONEY OUT OF BUNDLE AND SHOW HALF IN EACH HAND.] *For example, if there is ₦160 in the common bundle after <supervisor's name> has added to it, you will each get ₦80. If there is ₦600 in the common bundle, you will each get ₦300 and so on.*

That is it. That is the game.

[EXAMPLES. IZAIA GETS SLIDES. REMAIN **NEUTRAL**! PETER POINTS AT SLIDES. IF THEY LOOK LIKE THEY ARE ABOUT TO START TALKING, ASK THEM NOT TO. IF THERE ARE QUESTIONS, TELL THEM THAT THEY HAVE AN OPPORTUNITY TO ASK THEM LATER.]

Now, to be sure that you really understand the game, I will give you some examples.

[show image 1] *In this first example a man and a woman are playing the game.*

[show image 2] *Each of them finds ₦220 in their envelope at the start of the game. Each of them decides to put all the money in their pocket straightaway. They both end up with ₦220, exactly the same amount as when they started the game.*

[go back to image 1] *Now let's look at a second example. Again, a man and a woman are playing the game.*

[show image 2] *Each of them finds ₦220 in their envelope at the start of the game.*

[show image 3] *Now suppose that each of them decides to put all ₦220 back into their envelope to go into the common bundle.*

[show image 4] *Both of them did not put any money in their pocket straightaway, but there is ₦440 in the common bundle.*

[show image 5] *<supervisor's name> then adds half as much again to the common bundle. That is, <supervisor's name> adds half of ₦440, which is ₦220, to the common bundle.*

[show image 6] *So now there is ₦660 in the common bundle.*

[show image 7] *Then, the common bundle is divided equally between the man and the woman.*

[show image 8] *So each of them get ₦330. That is, they both end up with much more money than the ₦220 that they started with.*

Now let us see what happens if they put only some of the money back to go into the common bundle instead of all.

[show image 9] *So, here is a different man and woman.*

[show image 10] *As in my first example, each of them finds ₦220 in their envelope at the start of the game.*

[show image 11] *However, in this case, they both decide to put only ₦20 back into their envelopes to go into the common bundle.*

[show image 12] *So each of them puts ₦200 in their pocket straightaway, and there is only ₦40 in the common bundle.*

[show image 13] *<supervisor's name> then adds half as much again to the common bundle. In other words, <supervisor's name> adds half of ₦40, which is ₦20, to the common bundle.*

[show image 14] *So now there is ₦60 in the common bundle.*

[show image 15] *Then, the common bundle is divided equally between the man and the woman.*

[show image 16] *So each of them gets ₦30 from the common bundle to add to the ₦200 they put in their pockets earlier. So, in this case, they both end up with ₦230. This is a lot less than the man and woman got in the previous example, who both put all their money in the common bundle and got ₦330 each.*

*So what we have learned here is that the more money you **both** decide to put back in the envelopes to go into the common bundle, the more money in total you **both** get in the end.*

*But something is tricky in the game. Note that you will never know how much money your partner in the game has decided to put in his or her pocket and how much he or she put back in the envelope. For example, assume you decide to put **all** your money back in the envelope. Assume that your partner puts most in his or her pocket and puts only a **little** back in his or her own envelope. Then, let's see what happens.*

[show image 17] *So, in this example, two men are playing the game.*

[show image 18] *As before, each of them finds ₦220 in their envelope at the start of the game.*

[show image 19] *The man on the left decides to put all of his money back in the envelope to go into the common bundle. However, the man on the right* [POINT TO THE MAN ON THE RIGHT] *decides to put most of the money in his pocket straightaway and puts only ₦20 back in his envelope to go into the common bundle.*

[show image 20] *So, at this stage of the game, the man on the left has no money in his pocket because he has put all his money back in the envelope, while the man on the right has ₦200 in his pocket because he only put ₦20 in the envelope. And so, there is ₦240 in total in the common bundle.*

[show image 21] *<supervisor's name> then adds half as much again to the common bundle. That is, she adds half of ₦240, which is ₦120, to the common bundle.*

[show image 22] *So now there is ₦360 in the common bundle.*

[show image 23] *Then, the common bundle is divided equally between the two men.*

[show image 24] *So each of them gets ₦180 from the common bundle to add to whatever they put in their pockets earlier. So the man who put all of his money in the envelope* **[**POINT TO THE MAN ON THE LEFT**]** *ends up with ₦180. The man who only put ₦20 in his envelope and pocketed the rest* **[**POINT TO THE MAN ON THE RIGHT**]** *ends up with ₦380.*

So now you see the tricky part of the game.

[show overview 1] *If both persons put all their money back in the envelope* [EXAMPLE 220–220 LEFT-HAND SIDE]*, they both end up much better off than at the start and get ₦330 each* [EXAMPLE 220–220 RIGHT-HAND SIDE]*. But perhaps* ***one*** *person puts all money in the envelope, and* ***one*** *person puts only a* ***little*** *in the envelope and the rest of it in his or her pocket. Then* ***this*** *person ends up with only ₦180* [EXAMPLE 220–20 RIGHT-HAND SIDE]*, so much less than he or she started with. While* ***this*** *person ends up with ₦380, much more than at the start, and more than anyone else in the examples. But note that* ***in total****, these two persons* ***jointly*** *earn* ***less*** *than these two persons.* [EXAMPLE 220–220 RIGHT-HAND SIDE]

[show overview 2] *But remember: if* ***both*** *persons put a little in the envelope and a lot in their pocket, as in this example* [EXAMPLE 0–0 LEFT-HAND SIDE]*, and in this example* [EXAMPLE 20–20 LEFT-HAND SIDE]*, then* ***both*** *will end up with only ₦220 or ₦230* [EXAMPLES 0–0 AND 20–20 RIGHT-HAND SIDE]*, about as much as they started with. So what you end up with also depends on what your partner decides. And you have no way of knowing this before you make your decision.*

Something else that is important to know is that not everyone will start with the same amount of money in their envelopes. Most of you will have ₦220 in the envelope at the start of the game. A few of you may by chance start with less than that, between ₦20 and ₦200. You will not know how much your partner is starting with, and he or she will not know either how much you are starting with. How much is in your envelope depends on which envelope you pick from this box. [IF THEY LOOK LIKE THEY ARE ABOUT TO START TALKING, ASK THEM NOT TO.]

[HOW THE GAME IS GOING TO BE PLAYED.]

OK. So now I am going to tell you how we are to proceed.

Each of you is going to play the game three times. [PUT THREE FINGERS IN THE AIR.] *And each time you play the game with a different partner. There will be a* ***separate*** *common bundle for* ***each*** *of the games that you play. So you will have a separate common bundle with each of the three partners.*

<supervisor's name> will call you one by one. When called, you will go up to <supervisor's name's> desk and pick a white envelope from this box. [POINT TO BOX WITH WHITE ENVELOPES.] *In each white envelope, there are three brown envelopes. In most brown envelopes, you will find ₦220. In a few you will find less money; between ₦20 and ₦200. An enumerator will then escort you to a place where you will make your three decisions in private. That is also the time to ask your questions.*

You will get the money from the three games together in one total amount at the end of the workshop, so you will not know what each individual partner decided and your partners will not know what you decided. Please remember not to talk or communicate with each other in any way. If you have questions about the game, you can ask the enumerators in private.

4.2 Script for individual interviews

Check whether the ID on the participant's badge is the same as the ID on the form. Take the interview form and guide the participant (with his or her envelope) to your bench.

> *"I will explain the game once more. In the white envelope that you picked, there are three brown envelopes. There is one brown envelope for each of the three games. Each game is with a different partner. In most envelopes, there is ₦220. In a few envelopes, there will be less, between ₦20 and ₦200. How much is in yours depends on which envelope you picked from the box."*
>
> *"At the start of each game, I will tell you with whom you are playing this game. You will then count the money in the brown envelope and decide how much to put in your pocket and how much you will put back in the envelope for the common bundle. I will turn away while you are doing so. Your partner will decide how much to put in his or her pocket and in his or her envelope as well. You will both not know what the other one decided."*
>
> *"<supervisor's name> will then increase the amount of money in the common bundle by adding half as much again. And then we will divide the money in the common bundle equally between you and your partner. There will be a separate common bundle with each of the three games."*
>
> *"Do you have any questions?"*
>
> *"Now, let's work through one more example together."*

[show image TE1] "*So, in this example, two women are playing and each of them finds ₦220 in their envelope at the start of the game."*

[show image TE2] "*Suppose that this woman decides to put ₦120 back in her envelope to go into the common bundle* [point to woman on left]. *How much money can she put in her pocket straightaway?"* [Answer to Test Question 1: ₦100.]

If the participant gives the correct answer without help/repeating the question: Correct fast.
If not, repeat the question. If the participant gives the correct answer now: Correct slow.
But if the participant is still struggling after having repeated the question, say:
"*She received ₦220. She puts ₦120 back in the envelope. How much can she put in her pocket straightaway?*"
If the participant gives the correct answer now: Needed help. You can repeat this question if she needs more help. Do not continue until she understands. If necessary, explain images TE1 and TE2 again (use script).
If participant really does not understand: Confused. Ask to deduct ₦120 from ₦220.

[show image TE3] "*OK. Now suppose that this woman decides to put ₦200 back in her envelope to go into the common bundle* [point to woman on right]. *How much money can she put in her pocket straightaway?* [Answer to Test Question 2: ₦20.]

If the participant gives the correct answer without help/repeating the question: Correct fast.
If not, repeat the question. If the participant gives the correct answer now: Correct slow.
But if the participant is still struggling after having repeated the question, say:
"*She received ₦220. She puts ₦200 back in the envelope. How much can she put in her pocket straightaway?*"
If the participant gives the correct answer now: Needed help. You can repeat this question if she needs more help. Do not continue until she understands. If necessary, repeat images TE1 through TE3.
If participant really does not understand: Confused. Ask to deduct ₦200 from ₦220. Will be rare.

[show image TE4] "*OK. So one woman contributed ₦120 to the common bundle and the other woman contributed ₦200, making a total of ₦320. How much will <the supervisor> now add to the common bundle?"* [Answer to Test Question 3: ₦160.]

If the participant gives the correct answer without help/repeating the question: Correct fast.
- If he or she has the right logic (he or she indicates that <the supervisor> will add half of 320 but cannot calculate 320/2), help her do the division and write Correct slow.
- Also, if she gives the correct answer after repeating the question: Correct slow.
- But if the participant is still struggling after having repeated the question, say:
"Remember. <supervisor's name> will add half of all the money in the common bundle."

If the participant gives correct answer now: Needed help. If the participant is still struggling, say:
"She will add half of ₦320, which is . . . ?"
Correct answer? Needed help. If the participant is still struggling, say:
"How many notes of ₦20 are in the common bundle? [Answer: 16 notes.] *For every note of ₦20 in the common bundle, [the supervisor] will add one note of ₦10. How many notes of ₦10 will <supervisor's name> add?* [Answer: 16 notes.] *So how much naira will <supervisor's name> add to the common bundle?"*
If after that she is still struggling, write Confused. Will be rare.

[show image TE5] "*That's right. She will add ₦160. So the bundle now contains ₦480. Remember that the two women also put money in their pockets straightaway. This money is theirs to keep and is not in the common bundle. This woman* [point at left] *has ₦100 in her pocket, and this woman* [point at right] *has ₦20 in her pocket."*

[show image TE6] "*Now, the common bundle is divided equally between the two women. So each gets ₦240 from the common bundle. So this woman* [point to woman on left] *goes home with ₦240 plus the ₦100 she put in her pocket earlier, making a total of ₦340. What about this woman,* [point to woman on right] *how much does she go home with?*" [Answer to Test Question 4: ₦260.]

"Do you have any questions?"

[See the final page of the script for frequently asked questions and appropriate answers.]

"OK! I think we are ready to play."

[Repeat the steps in this box for games #1, #2, and #3.]

"Let's play your . . . (first/second/third) game."

[1] *"You are playing this game with . . ."* [Give type of partner from interview form.]

- Refer to playing partner written on interview form. DO NOT MAKE A MISTAKE!

[2] *"Please take the brown envelope with a . . . ("1"/"2"/"3") on it out of the white envelope. Open the envelope and let's see how much money you have in it."*
- Check that the participant has the right envelope.
- Watch carefully as the participant counts the money and count with him or her.
- Record the amount of money on the interview form.
- In game #3, also let the participant sign or put thumbprint:
  "Please sign here for the amounts you found in each of the three envelopes."

[3] *"While I am turned away, please decide how much money to put in your pocket and how much to put back in the envelope to go into the common bundle with* [PARTNER]. *Let me know when you are ready."*
- Turn away. Turn back after one-half minute or when the participant signals he or she is done.
- When the participant has finished, take the envelope and put it to one side.
- Check that the participant has put away the money.

"Now I want you to guess how much each of your playing partners left in their envelopes to go into the common bundle. Let's suppose that each of them started out with ₦220 in their envelope. How much do you guess that . . . (you played with in the first/second/third game) left in his or her envelope?"

[Husbands and monogamous wives:] *"Finally, before I let you go, if a . . . [husband/wife] puts some of the money in his/her pocket, do you think he/she will tell that to his/her . . . [wife/husband]?"*

[Polygamous wives:] *"If a wife in a polygamous marriage puts some of the money in her pocket, do you think she will tell that to her . . . (a) husband?*
(b) co-wife?"

"OK! We are finished! Please will you now go and sit over there."

- Take the white envelope, fold it around the brown envelopes and put paper clips on the sides.
- Escort participant to the waiting area.
- Go to <the supervisor>, and give her the form with the envelopes. Await to be assigned your next participant.

[FREQUENTLY ASKED QUESTIONS]

How much do you want me to put back in the envelope?

[Say:] *"There is no right or wrong decision. It is up to you."*

- Never say anything that suggests that some decisions are better than others. Always remain neutral.

What is this game all about?

[Say:] *"This game is research. To understand how people here make decisions about money. Please note that this is not a raffle. We are interested in your decisions."*

Where can I put the money? [if person does not have a pocket]

[Say:] *"In your bag or wrapper."*

Who is the other person (man/woman) that I am playing with?

[Say:] *"This is another person who was also in the group training room."*

Why should I put money in the common bundle?

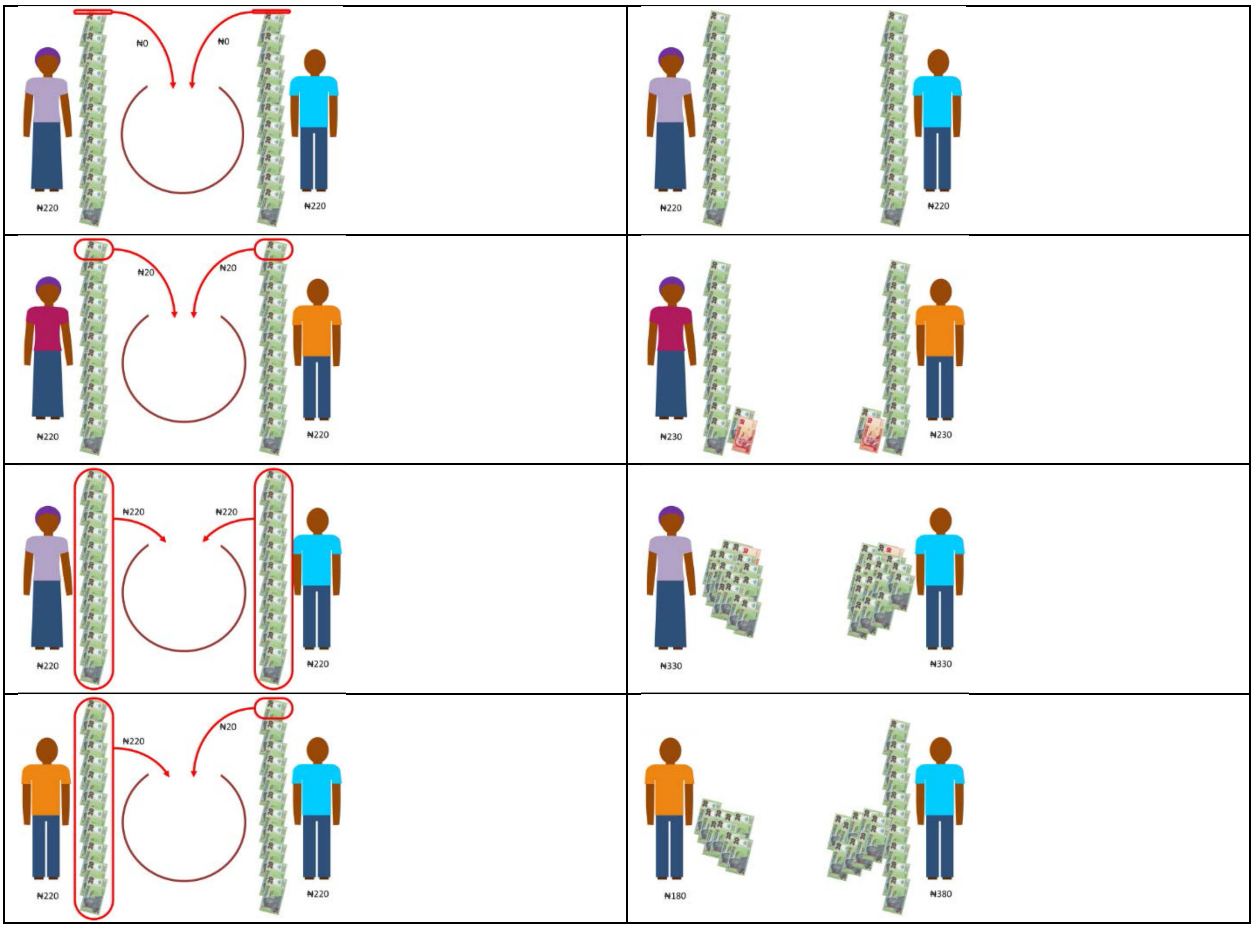
[Say:] *"Because to whatever is in the common bundle, <the supervisor> will add half as much again."*

Can I use money from game 1 in game 2?

[Say:] *"No. You can only use the money from envelope 2 in game 2. And you can only use the money from envelope 3 in game 3."*

10. Visual aids

To facilitate understanding, visual aids for group training and individual interviews were used. Here are some examples:



11. Other materials

11.1. Registration form

Registration form

Community		**Date**		**Time**	
		Session			

No.	**Survey ID**	**Name**	**Session ID**	**Present (√)**
1				
2				
. **.** **.**				
37				
38				

11.2. Examples of session IDs

Session IDs for monogamous couples (1-2)

M01H	**M01W**
M02H	**M02W**

Session IDs for polygamous marriages with two wives (1-2)

P201H	**P201W1**
P201W2	**P202H**
P202W1	**P202W2**

11.3. Individual interview form

Individual interview form

KANGI PILOT W1

DATE	ENUMERATOR ID	SESSION ID
		M01W

1. Test questions

	Correct fast (4)	Correct slow (3)	Needed help (2)	Confused (1)
Test question 1				
Test question 2				
Test question 3				
Test question 4				

2. Amount in envelope at the start of the game

Game 1 | **Game 2** | **Game 3** | Signature/thumbprint

3. Playing partners (DO NOT FORGET TO MENTION!)

#1:	**A man**
#2:	**Your husband**
#3:	**A woman**

4. How much do you guess that…

		Guess
1st **The man**	you played with in the 1st game left in the envelope?	
2nd **Your husband**	you played with in the 2nd game left in the envelope?	
3rd **The woman**	you played with in the 3rd game left in the envelope?	

5. Sharing information

In general, how much of the earnings from the games you think a woman would reveal to her...

	%	%
(a) husband?		LEAVE EMPTY

6. Payoff (Dr. Ameen)

Amount left in Envelope 1 | **Amount left in Envelope 2** | **Amount left in Envelope 3**

Total payoff | **Signature/thumbprint**

REFERENCES

Akresh, R., J. J. Chen, and C. T. Moore. 2012. "Productive Efficiency and the Scope for Cooperation in Polygynous Households." *American Journal of Agricultural Economics* 94 (2): 395–401.

———. 2016. "Altruism, Cooperation, and Efficiency: Agricultural Production in Polygynous Households." *Economic Development and Cultural Change* 64 (4): 661–696.

Amey, F. K. 2002. "Polygyny and Child Survival in West Africa." *Social Biology* 49 (1–2): 74–89.

Baird, S., F. Ferreira, B. Özler, and M. Woolcock. 2014. "Conditional, Unconditional, and Everything in Between: A Systematic Review of the Effects of Cash Transfer Programmes on Schooling Outcomes." *Journal of Development Effectiveness* 6 (1): 1–43.

Banerjee, A., E. Duflo, N. Goldberg, D. Karlan, R. Osei, W. Parienté, J. Shapiro, B. Thuysbaert, and C. Udry. 2015. "A Multifaceted Program Causes Lasting Progress for the Very Poor: Evidence from Six Countries." *Science* 348 (6236): 772–788.

Banerjee, A., D. Karlan, and J. Zinman. 2015. "Six Randomized Evaluations of Microcredit: Introduction and Further Steps." *American Economic Journal: Applied Economics* 7 (1): 1–21.

Bezu, S., and S. Holden. 2015. "Generosity and Sharing among Villagers: Do Women Give More?" *Journal of Behavioral and Experimental Economics* 57: 103–111.

Bove, R., and C. Valeggia. 2009. "Polygyny and Women's Health in Sub-Saharan Africa." *Social Science and Medicine* 68 (1): 21–29.

Browning, M., F. Bourgignon, P. A. Chiappori, and V. Lechene. 1994. "Incomes and Outcomes: A Structural Model of Intra-household Allocation." *Journal of Political Economy* 102 (6): 1067–1096.

Dalton, J. T., and T. C. Leung. 2014. "Why Is Polygyny More Prevalent in Western Africa? An African Slave Trade Perspective." *Economic Development and Cultural Change* 62 (4): 599–632.

Elbedour, S., A. J. Onwuegbuzie, C. Caridine, and H. Abu-Saad. 2002. "The Effect of Polygamous Marital Structure on Behavioral, Emotional, and Academic Adjustment in Children: A Comprehensive Review of the Literature." *Clinical Child and Family Psychology Review* 5 (4): 255–271.

Gächter, S., and E. Renner. 2010. "The Effects of (Incentivized) Belief Elicitation in Public Goods Experiments." *Experimental Economics* 13 (3): 364–377.

Garcia, M., and C. T. Moore. 2012. *The Cash Dividend: The Rise of Cash Transfer Programs in Sub-Saharan Africa.* Washington, DC: World Bank.

Gyimah, S. O. 2009. "Polygynous Marital Structure and Child Survivorship in Sub-Saharan Africa: Some Empirical Evidence from Ghana." *Social Science and Medicine* 68: 334–342.

Hadley, C. 2005. "Is Polygyny a Risk Factor for Poor Growth Performance among Tanzanian Agropastoralists?" *American Journal of Physical Anthropology* 126 (4): 471–480.

Iversen, V., C. Jackson, B. Kebede, A. Munro, and A. Verschoor. 2011. "Do Spouses Realise Cooperative Gains? Experimental Evidence from Rural Uganda." *World Development* 39 (4): 569–578.

Iyengar, R., and G. Ferrari. 2016. "Comparing Economic and Social Interventions to Reduce Intimate Partner Violence: Evidence from Central and Southern Africa." In *African Successes,* vol. 2, *Human Capital,* edited by S. Edwards, S. Johnson, and D. N. Weil, 165–214. Chicago: University of Chicago Press.

Jankowiak, W., M. Sudakov, B. C. Wilreker. 2005. "Co-wife Conflict and Cooperation." *Ethnology* 44 (1): 81–98.

Manser, M., and M. Brown. 1980. "Marriage and Household Decision-Making: A Bargaining Analysis." *International Economic Review* 21 (1): 31–44.

McElroy, M., and M. J. Horney. 1981. "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand." *International Economic Review* 22 (2): 333–349.

Morduch, J. 2011. "Why Finance Matters." *Science* 332 (6035): 1271–1272.

Shepard, L. D. 2013. “The Impact of Polygamy on Women’s Mental Health: A Systematic Review.” *Epidemiology and Psychiatric Sciences* 22 (1): 47–62.

Stephen, J., G. Ferrari, C. H. Watts, H. R. Hargreaves, J. C. Kim, G. Phetla, L. A. Morison, J. D. Porter, T. Barnett, and P. M. Pronyk. 2011. “Economic Evaluation of a Combined Microfinance and Gender Training Intervention for the Prevention of Intimate Partner Violence in Rural South Africa.” *Health Policy and Planning* 26 (5): 366–372.

Tertilt, M. 2005. “Polygyny, Fertility, and Savings.” *Journal of Political Economy* 113 (6): 1341–1371.

Udry, C. 1996. “Gender, Agricultural Production, and the Theory of the Household.” *Journal of Political Economy* 104 (5): 1010–1046.

Vu, N. T. H., R. van Velzen, R. Lensink, and E. Bulte. 2015. *The Impact of Gender and Business Training for Female Microfinance Clients in Vietnam.* 3ie Final Grantee Report. New Delhi: International Initiative for Impact Evaluation (3ie).

World Bank. 2010. *Designing and Implementing a Rural Safety Net in a Low Income Setting: Lessons Learned from Ethiopia’s Productive Safety Net Program 2005–2009.* Washington, DC.

Zeitzen, M. K. 2008. *Polygamy: A Cross-Cultural Analysis.* Oxford, UK: Berg.

RECENT IFPRI DISCUSSION PAPERS

For earlier discussion papers, please go to www.ifpri.org/publications/discussion_papers.
All discussion papers can be downloaded free of charge.

1624. *Farmers' quality assessment of their crops and its impact on commercialization behavior: A field experiment in Ethiopia.* Gashaw Tadesse Abate and Tanguy Bernard, 2017.

1623. *Changing gender roles in agriculture?: Evidence from 20 years of data in Ghana.* Isabel Lambrecht, Monica Schuster, Sarah Asare, and Laura Pelleriaux, 2017.

1622. *Improving the targeting of fertilizer subsidy programs in Africa south of the Sahara: Perspectives from the Ghanaian experience.* Nazaire Houssou, Collins Asante-Addo, and Kwaw S. Andam, 2017.

1621. *El agro Argentino: Un sistema productivo y organizacional eficiente.* Valeria Piñeiro, Miguel Robles, and Pablo Elverdin, 2017.

1620. *Local corruption and support for fuel subsidy reform: Evidence from Indonesia.* Jordan Kyle, 2017.

1619. *Smog in our brains: Gender differences in the impact of exposure to air pollution on cognitive performance in China.* Xi Chen, Xiaobo Zhang, and Xin Zhang, 2017.

1618. *Existing data to measure African trade.* Cristina Mitaritonna and Fousseini Traoré, 2017.

1617. *Misreporting month of birth: Implications for nutrition research.* Anna Folke Larsen, Derek Headey, and William A. Masters, 2017.

1616. *He says, she says: Exploring patterns of spousal agreement in Bangladesh.* Kate Ambler, Cheryl Doss, Caitlin Kieran, and Simone Passarelli, 2017.

1615. *Forced gifts: The burden of being a friend.* Erwin Bulte, Ruixin Wang, and Xiaobo Zhang, 2017.

1614. *Institutional versus noninstitutional credit to agricultural households in India: Evidence on impact from a national farmers' survey.* Anjani Kumar, Ashok K. Mishra, Sunil Saroj, and P. K. Joshi, 2017.

1613. *Cost-effectiveness of community-based gendered advisory services to farmers: Analysis in Mozambique and Tanzania.* Tewodaj Mogues, Valerie Mueller, and Florence Kondylis, 2017.

1612. *The European Union–West Africa Economic Partnership Agreement: Small Impact and new questions.* Antoine Bouët, David Laborde, and Fousseini Traoré, 2017.

1611. *The returns to empowerment in diversified rural households: Evidence from Niger.* Fleur Wouterse, 2017.

1610. *Prospects for the Myanmar rubber sector: An Analysis of the viability of smallholder production in Mon State.* Joanna van Asselt, Kyan Htoo, and Paul A. Dorosh, 2017.

1609. *How do agricultural development projects aim to empower women?: Insights from an analysis of project strategies.* Nancy Johnson, Mysbah Balagamwala, Crossley Pinkstaff, Sophie Theis, Ruth Meinzen-Dick, and Agnes Quisumbing, 2017.

1608. *Stimulating agricultural technology adoption: Lessons from fertilizer use among Ugandan potato farmers.* Lydia Nazziwa-Nviiri, Bjorn Van Campenhout, and David Amwonya, 2017.

1607. *Strengthening and harmonizing food policy systems to achieve food security: A case study and lessons from Ghana.* Suresh Chandra Babu and Sylvia Blom, 2017.

1606. *Trade and economic impacts of destination-based corporate taxes.* Will Martin, 2017.

1605. *Can better targeting improve the effectiveness of Ghana's Fertilizer Subsidy Program? Lessons from Ghana and other countries in Africa south of the Sahara.* Nazaire Houssou, Kwaw Andam, and Collins Asante-Addo, 2017.

1604. *The impact of Ethiopia's Productive Safety Net Programme on the nutritional status of children: 2008–2012.* Guush Berhane, John Hoddinott, and Neha Kumar, 2017.

1603. *Economic transformation in Africa from the bottom up: Evidence from Tanzania.* Xinshen Diao, Josaphat Kweka, and Margaret McMillan, 2017.

1602. *Liquid milk: Cash constraints and day-to-day intertemporal choice in financial diaries.* Xin Geng, Wendy Janssens, and Berber Kramer, 2017.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

www.ifpri.org

IFPRI HEADQUARTERS

2033 K Street, NW
Washington, DC 20006-1002 USA
Tel.: +1-202-862-5600
Fax: +1-202-467-4439
Email: ifpri@cgiar.org