Cash transfers, polygamy, and intimate partner violence: Experimental evidence from Mali

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ABSTRACT

Cash transfer programs primarily targeting women in Latin America and East Africa have been shown to reduce intimate partner violence (IPV), but knowledge gaps remain on how impacts differ by program features and context. Using a randomized control trial, we investigate the IPV impacts of Mali's national cash transfer program (Jigisémèjiri), which targets household heads (primarily men) in a West African context where nearly 40 percent of households are polygamous. The program causes significant decreases in IPV in polygamous households – where physical violence decreases by 7.2 percentage points, emotional violence decreases by 12.6 percentage points, and controlling behaviors decrease by 16.1 percentage points – but has limited effects in monogamous households. Evidence on mechanisms suggests that the program leads to significant decreases in men's stress and anxiety among polygamous households, and larger reductions in disputes in polygamous households compared to monogamous households.

1. Introduction

Recent multi-country studies show that intimate partner violence (IPV) is widespread and common around the world (Devries et al., 2013; WHO, 2013). The consequences of IPV are extensive and include the direct physical and mental harm of women that hinders their ability to reach their full potential (Mary Ellsberg et al., 2008; Kapiga et al., 2017). While these consequences are well documented, there is less evidence on policies and programs that are effective in reducing IPV in the developing world.

Emerging evidence from recent studies shows that several cash transfer programs decreased physical IPV by 5–11 percentage points, on average, although some subgroups of women were found at risk for an increase in violence (Angelucci, 2008; Bobonis et al., 2013; Hidrobo et al., 2016; Hidrobo and Fernald, 2013; Roy et al., 2018; Haushofer et al., 2019; Perova and Vakis, 2013). Given that cash transfer programs are currently implemented in over 130 countries, reaching approximately 718 million people globally, they represents a promising policy approach to reducing IPV worldwide (World Bank, 2015). However, the existing evidence focuses largely on cash transfers to women and is drawn mainly from Latin America and East Africa, leaving knowledge gaps on how impacts on IPV differ by program features and context. Of particular relevance to West Africa, where transfer programs are growing quickly, is whether impacts on IPV generalize to cases where household heads are targeted (a common design feature throughout Africa), in environments with diverse household structures such as polygamy (which is widespread in West Africa).

Whether the impacts of cash transfers on IPV differ by targeting and household structure depends on the pathways through which reductions occur. A recent mixed-methods review of cash transfers and IPV identifies three pathways supported by the literature– i) improved economic security of the household and emotional wellbeing of its members; ii) reduced intrahousehold conflict between men and women; and iii) increased women's empowerment (Buller et al., 2018). The first relates to an emerging literature on the psychology of poverty, showing that poverty affects individuals' mental health and cognitive function (Mani et al., 2013; Haushofer and Fehr, 2014), increasing stress and negative affective states that are risk factors for men perpetrating IPV. Thus, cash transfers may decrease IPV by reducing poverty, thereby reducing stress and improving the emotional well-being of household members including men. The second pathway focuses specifically on conflict that arises from stretched resources and tight budgets (Buller et al., 2016).

Cash transfers may decrease IPV by reducing arguments over spending money, such as those that arise from women having to ask for money for daily needs when men do not have enough to give. Cash transfers targeted to women could reduce women's need to ask for money, while cash transfers targeted to men could increase men's ability to provide it without conflict.[1] Lastly, cash transfers that are targeted to women may decrease IPV by increasing women's empowerment. Economic models of this last pathway are based on non-cooperative bargaining models where individuals' bargaining power depends on their threat point or out-of-marriage options (Farmer and Tiefenthaler, 1997; Tauchen et al., 1991). If cash transfers are targeted to women and remain in their control, their income and thus their threat points increase, improving their bargaining power in the relationship to reduce IPV.

Not all these pathways are likely to generalize across targeting criteria and household structure. Of the pathways described above, the third is unlikely to occur when cash transfers are targeted to men, which may in fact increase men's bargaining position relative to women's, potentially leading to increases in IPV. Alternatively, the fact that men receive the transfer could strengthen the first pathway; in addition to reducing stress, transfers could improve men's self-esteem and sense of masculinity in terms of being able to provide for their household. If a discrepancy between men's belief that they should be more powerful than their partners and the reality of their power leads men to seek redressing the situation through use of physical dominance (Dutton, 1988), men's improved self-esteem and sense of masculinity due to the transfers could potentially reduce IPV and controlling behavior. Thus far there is scarce evidence to address the empirical question of whether the first two pathways alone can lead to reductions in IPV in the context of transfers to men. To our knowledge, only one study (Haushofer et al. (2019) in Kenya) has shown that cash transfers to men can reduce IPV.

Household structure, and in particular polygamy, could also affect how the pathways play out. The effects of cash on IPV could differ if stress or conflict are higher (or lower) in polygamous households, or if intra-household dynamics differ such that the inflow of new resources leads to more (or less) conflict. If men have multiple wives with different status, the levels of conflict and bargaining position may vary across wives, and thus the pathways may play out differently for each of them. Norms and gender roles may also differ for household members in polygamous households, such that expectations on sharing, communication, or decision-making around resources are different. Previous economic household models on IPV do not account for complex household structures such as polygamy, where problems of coordination, asymmetric information, communication, and monitoring may be exacerbated (Rossi, 2016; Baland and Ziparo, 2017), and few empirical studies on cash transfers and IPV disaggregate treatment impacts by polygamy; to our knowledge, only Peterman et al. (2019) do so in the context of cash transfers targeted to women in Ghana.

We contribute evidence to these knowledge gaps by investigating the impacts on IPV of the national cash transfer program in Mali, *Jigisémèjiri*. During the period over which we collected data for this study, *Jigisémèjiri* provided unconditional cash transfers and accompanying measures (training sessions related to nutrition, health, and other topics) to poor rural households. The cash transfers were targeted to household heads – who were primarily men – in a context where nearly 40% of households were polygamous. The accompanying measures were open to all household members, although in practice attendance was low. Using a randomized control trial, we analyze impacts on IPV and controlling behaviors[2] disaggregated by polygamy and, within polygamous households, by rank of wife, to test whether household structure affects the impacts of the *Jigisémèjiri* program.

We find that, on average, there are small reductions in IPV and controlling behaviors from *Jigisémèjiri* ranging from 3 percentage points (non-significant) for physical violence to 6 percentage points (significant) for emotional violence and controlling behaviors. This small average effect masks large statistically significant reductions in violence in polygamous households. For these households, the prevalence of physical violence decreases by 7.2 percentage points, emotional violence by 12.6 percentage points, and controlling behaviors by 16.1 percentage points. These reductions in violence are particularly strong among second (and later) wives, who face the highest rates of violence in the absence of the program. Consistent with these results, analysis of mechanisms reveals that *Jigisémèjiri* leads to significant reductions in men's stress and anxiety among polygamous households, and larger reductions in reported disputes among polygamous households compared to monogamous households. We find no evidence that *Jigisémèjiri* increases women's bargaining power across domains related to labor and mobility, which is not surprising given the targeting of primarily male household heads as the main beneficiary. Although we cannot disentangle impacts of the cash transfers from those of the accompanying measures, in light of the low attendance to the accompanying measures – particularly among women – we interpret the effects as driven primarily by the cash transfers.

We explore potential explanations for differences in impacts between polygamous and monogamous households. First, we find that other observable characteristics correlated with polygamy lead to differential impacts of *Jigisémèjiri* on men's stress and anxiety as well as on disputes. These observables can largely explain the differential effects of *Jigisémèjiri* by polygamy status on physical and emotional IPV, but not on controlling behavior. Second, our evidence suggests that the institution of polygamy – because of coordination issues, norms, or different bargaining power of wives– leads to small differences across polygamous and monogamous households in sharing of and communication around the cash transfers with wives, as well as wives' expectations of these dynamics, which may contribute to differential impacts of *Jigisémèjiri* on IPV and controlling behaviors. Lastly, we observe that – whether due to observable correlates or the institution of polygamy – polygamous households in the control group face higher rates of anxiety, disputes, and violence than monogamous households, and within polygamous households, second and higher rank wives face the highest rates. These higher rates mean there is more potential for improvements, which is a possible reason for the larger impacts in polygamous households, and among second and higher rank wives.

The remainder of the paper is organized as follows. We begin by providing some background on the study context and polygamy in Section 2. We then describe the study design in Section 3, the data used in Section 4, and our estimation strategy in Section 5. Section 6 presents our main results, while Section 7 explores plausible mechanisms that underlie these. Section 8 discusses possible explanations for our findings in polygamous households, and Section 9 concludes.

2. Polygamy and IPV

2.1. a. Gender and polygamy in Mali

Gender inequality in Mali is high. As of 2014, Mali was categorized as having "very high" levels of gender discrimination in social institutions and ranked as the fourth most unequal among 108 ranked countries (Social Institutions and Gender Index, 2014). According to the Malian National Assembly's Family Code passed in 2011, men are considered "head of the household," with sole family and parental authority, and women are legally required to obey their husbands (OECD Development

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[1] (Buller et al., 2018) point out that cash transfer programs could also increase consumption of "temptation" goods, such as alcohol, that could trigger IPV. However, there has been little evidence that cash transfers increase consumption of temptation goods.

[2] In low- and middle-income settings, controlling behavior is considered a risk factor for violence rather than a type of violence itself, given what the instruments in these settings measure (a mix of patriarchal attitudes and coercive control) (Heise et al., 2019). Similar to other studies, we analyze the three together.

Centre, n.d.). Reports of IPV in Mali are also high, with nearly four in ten women age 15–49 having experienced physical violence from partners in their lifetimes and about a quarter of women experiencing physical violence in the last 12 months (CPS, 2012).

Polygamy is legal both under Mali's Marriage Code and under Islam, the predominant religion in the country (OECD Development Centre, n.d.). Men are permitted to marry up to four women. In the 2012 Demographic and Health Survey (DHS), about 35% of married women aged 15–49 in Mali were in a polygamous union, and 19% of men aged 15–49 had at least two wives; by age 45–49 about half of married women were in a polygamous marriage (CPS, 2012). Marriages in Mali can be civil or religious. In case of civil marriage – which is rare in rural areas – the marriage is recorded as either monogamous or polygamous on the marriage certificate; if recorded as monogamous, the husband may not marry another woman if the first marriage has not been dissolved or without the wife's consent to change the marriage from monogamous to polygamous. In religious marriages, the only condition concerning the number of spouses is that the husband must be able to support the needs of any additional wife – although anecdotally men are typically not prevented from taking additional wives due to insufficient means (Canada: Immigration and Refugee Board of Canada 2014). According to the 2012 DHS (CPS, 2012), polygamy is significantly more common in rural areas (38 percent in rural areas versus 22 percent in urban areas) and among women with low educational attainment (38 percent among women with no education versus 28 percent for women with primary education and 15 percent for women with secondary education or more). Although the top quintile of households in terms of wealth has the lowest rate of polygamous marriage (23 percent of women), there is no clear association between polygamy and wealth in the bottom four quintiles (with the highest proportion of women in polygamous marriages in the middle quintile).[3]

2.2. b. Relationship between polygamy, IPV, and intrahousehold dynamics in Sub-Saharan Africa

Evidence from diverse contexts in Sub-Saharan Africa – including Mali – shows positive associations between polygamous marriage and prevalence of IPV (Bove and Valeggia, 2009; Jewkes et al., 2002; Karamagi et al., 2006; Abramsky et al., 2011; González-Brenes, 2004; Kimuna and Djamba, 2008; Hayes and van Baak, 2017; McCloskey et al., 2005; Behrman, 2018). Studies largely do not distinguish if this association is causal or driven by characteristics associated with both IPV and polygamy – for example, rural residence, women's low educational attainment, larger age gap between spouses, or attitudes toward IPV (Gibson and Ruth, 2007; Rani et al., 2004; Bove and Valeggia, 2009). However, Behrman (2018) shows that polygamy in Nigeria remains associated with higher prevalence of physical, sexual, and emotional IPV even after controlling for observable characteristics.[4]

Consistent with studies that show higher IPV in polygamous households, some studies also suggest that interactions between household members are generally poorer in polygamous households. Barr et al. (2017) find that, in experimental games in Nigeria, cooperation and altruism are lower amongst members of polygamous households than

monogamous households. Bove and Valeggia (2009) find, across Sub-Saharan Africa, less spousal communication and weaker emotional ties in polygamous marriages. Dynamics between spouses also differ for senior wives and junior wives. Evidence suggests that senior wives have higher bargaining power, as reflected in better education and health outcomes of their children (Clignet, 1970; Kazianga and Klonner, 2009; Matz, 2016) and higher payouts from their husbands in laboratory games (Munro et al., 2010). In rural Mali, Bove et al., (2014) find a weaker emotional bond with wives inherited through the levirate, the tradition of a widow marrying her dead husband's brother, which is more likely to be the case for junior wives. Self-serving strategic behavior is also found to be more pervasive in polygamous households as seen by higher than optimal rates of fertility (Rossi, 2016) and more reciprocal giving (as oppose to altruistic) in lab-games (Barr et al., 2017). These studies suggest that less cooperation in polygamous households is due to competition amongst co-wives and increased problems with coordination, information, and monitoring (Baland and Ziparo, 2017; Rossi, 2016).

In a companion qualitative study specifically on intimate partner relationships in the region of Sikasso in Mali (Lees et al., 2018), respondents describe both monogamous and polygamous marriages as characterized by male authority and limited power for women to influence decisions, particularly in financial matters of the household. Respect for a man by his wife or co-wives, tightly linked to his sense of masculinity, is described as accepting his decisions and unequal power. Although expectations of male authority differ little between polygamous and monogamous marriages, a hierarchy amongst co-wives is described in polygamous marriages, with the first wife typically maintaining authority over the second wife and a closer relationship with the husband – although this dynamic can be reversed when the first wife becomes older. Masculinity is also linked to men being the household provider and taking responsibility for the household being financially stable, consistent with findings from Beynon and Allan (2001). Men's self-esteem is enhanced by their ability to meet their households' needs – across all wives, in the case of a polygamous marriage. In terms of IPV, in both monogamous and polygamous marriages, physical IPV is described as a consequence of disputes and tensions in relationships (consistent with Slegh and Barker, 2013) – while sexual IPV is explained in terms of men's authority and control over women's sexuality, sanctioned by gender norms. Controlling behavior is described as a way to enact masculinity through asserting male authority to control women. Although the description of what underlies IPV does not differ meaningfully between the types of marriages, disputes and tensions are described as being higher in polygamous marriages. In some situations, men are asked to resolve conflicts between co-wives, leading to extra tensions in polygamous marriages. Greater tensions are also indicated between husbands and their younger wives.

3. Study design

3.1. a. Intervention

In 2014, the Government of Mali began implementing "*Programme de Filets Sociaux (Jigisémèjiri)*," its national cash transfer program aimed at reducing poverty and improving human capital accumulation. To accomplish these goals, an integrated model—composed of cash transfers (CT), accompanying measures (AM), and preventive nutrition packages (PNP) targeted to children under 5 years and pregnant women—was developed. The program initially operated in six regions (Sikasso, Segou, Mopti, Koulikoro, Kayes, Gao) and the District of Bamako, and the CT component reached approximately 62,000 poor households.

The CT was valued at 10,000 FCFA per month scheduled to be paid every quarter over a 3-year period (the equivalent of USD 18.02/month, or 9 percent of beneficiary household's monthly consumption). Heads of household, mostly men, were the main beneficiaries of the CT and were given a beneficiary identity card; a substitute was also identified in case

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[3] The correlation between wealth and polygamy is weak at the country level because polygamy is less widespread in cities. However, using the DHS data, we find a small positive correlation between wealth and polygamy at the village level.

[4] A small set of studies employ structural estimation or theoretical modelling to isolate the causal role of polygamy on demographic or economic outcomes. Tertilt (2005) simulates the counterfactual effects of polygamy on an economy-wide model in which monogamy is enforced and finds that polygamy increases the average age gap between spouses – a risk factor for IPV. Akresh, Chen, and Moore (2016) show that agricultural production can be more efficient in polygamous households but gains are due to co-wives cooperating amongst themselves as opposed to with their husbands.

the head of household is unavailable to collect the money.[5] The CT was paid in person at a central location in the village through bank agents. The AM consisted of two training sessions per month conducted by nongovernmental organizations (NGOs) in each intervention commune and was open to other household members in addition to the head. The AM sessions were organized into groups of themes, with each group covered for a period of 6 months.[6] Although the CT was targeted to poor households based on geographical and community-based targeting, the AM was not targeted and was available to any household in communes that were selected for the program. At the time of the data collection used in this study, the PNP component had not yet been rolled out, and thus it is not a focus of this study.

Targeting of households for the CT component was as follows. Quotas were first developed at the commune level, based on the percentage malnourished and the percentage of extreme poor households within the commune. These quotas were then split proportionally by village (in terms of village population), to obtain village quotas. Households within villages were chosen on the basis of four criteria related to (1) food security, (2) ownership of agricultural equipment, livestock, and land, (3) "reliability" of income, and (4) household composition (at least 3–10 household members total, with at most 1–2 working adults). These households were selected through a two-stage process: first, village committees created a list of households meeting these criteria; second, commune committees assembled whole villages to validate the list. The criteria above were used to select households, with preference for those who met more than one, until the village quota was met.[7] Households were defined primarily on the basis of recognizing the authority of a common head.

3.2. b. Randomized design

In order to allow a rigorous and independent impact evaluation, the Government of Mali collaborated with research partners, International Food Policy Research Institute (IFPRI) and *Institut de recherché pour le développement* (IRD), to implement a two-stage randomized control trial in five regions of Mali: Sikasso, Koulikoro, Kayes, Segou, Mopti. Two government specifications were taken into account: (1) out of 96 eligible communes, only 20 communes could be retained as a control group that would not receive the interventions until 2 years after the initial program roll-out; (2) amongst the remaining 76 communes, the government would purposively select 19 communes in which PNP could be delivered, in consultation with a national technical committee. Per above, as PNP had not yet been rolled out at the time of the survey rounds used in this study, only the first-stage randomization (treatment vs. control) is used here. In the first stage, 96 communes were randomly assigned to 76 treatment communes and 20 control communes.[8] Randomization was stratified by region, and within each region approximately 20 percent of the eligible communes were randomly assigned to be in the control arm.

4. Data

4.1. a. Sample design

Data for this study consist of a baseline survey that was conducted from September 2014–February 2015, before the start of the *Jigisémèjiri* program; and a midline survey that was conducted from August

2016–November 2016, before the control group was rolled into the program.

The baseline sample was designed to include households from the 96 communes that are part of the impact evaluation. However, due to security issues, only 90 of the 96 communes were surveyed at baseline. The study sampling frame consisted of households selected as CT beneficiaries that additionally had a child aged 6–23 months at the time of the baseline survey (designated as the "index child"). The rationale for restricting beneficiary households to those with a child aged 6–23 months at baseline was that child nutrition outcomes (which are primary outcomes of the overall evaluation) are most responsive to intervention in the "first 1000 days" of life (conception to about 2 years of age). The sampling procedure for the baseline survey used a two-stage probability proportional to size sampling (PPS) method so that each eligible beneficiary household in the commune had the same probability of being sampled.[9] In total 3080 households across 90 communes were sampled at baseline.

The midline panel sample was designed to resurvey a random sample of 2560 households from the baseline survey, of which 2446 were successfully resurveyed, representing a success rate of 96 percent.[10] Households in the sample were defined consistent with the government's definition of a household. Thus, household members included individuals who recognized the authority of a common household head, in addition to living in the same communal residence and sharing meals.

4.2. b. Survey and outcome measures

The panel sample at midline was administered a survey composed of four questionnaires—household, mother-child, decisionmaker and spouse, and anthropometry. Household, mother-child (administered to the mother of the index child, mostly regarding the child), and anthropometry were all part of the baseline survey. The decisionmaker and spouse questionnaires were added at midline in order to better understand how the main decisionmaker of the household makes decisions and his/her relationship with other members of the family, in particular his/her spouse.

We selected the "decisionmaker" by first asking the household head, "Who in the household usually makes decisions about general expenses and income?" If the person named was not present that week or was older than 70,[11] then the individual in the household who was reported to make most of the decisions when the main decisionmaker was gone was selected as the "decisionmaker," provided he or she was present that week and less than 70 years old. The spouse of the selected decisionmaker was selected as the "spouse of decisionmaker." If there was more than one eligible female spouse for a male decisionmaker, as was the case in polygamous households, then we excluded the mother of the index child (who was administered the mother-child questionnaire) and randomly sampled from the remaining wives to select the "spouse of decisionmaker." We assess the sensitivity of our results to this sampling strategy in Section 6b.

The decisionmaker questionnaire consisted of modules on productive activities, decisionmaking with respect to productive activities and revenue, relationships and disputes, stress and anxiety, cognitive tests, time preference, self-esteem, and female status (only administered to women). The spouse questionnaire consisted of a subset of these modules. The

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[5] The program selected and enrolled beneficiaries prior to the start of the intervention, but did not continuously enroll beneficiaries afterward. Thus, if beneficiary households subsequently split, a new household head was not identified as an additional beneficiary.

[6] Details on the distribution of CT and AM are in Appendix A.

[7] In practice, selected households were largely poor, though not necessarily considered "extreme poor."

[8] Appendix B provides details on how the randomization was conducted.

[9] See Appendix C for details on sampling.

[10] A cross-section sample that draws a new sample of households was also collected at midline, but not used in this analysis. The cross-section sample was designed to capture child nutrition outcomes.

[11] We restrict the age of the decisionmaker to under 70 years old because questions on productive activities were more pertinent to younger individuals, and some modules (such as the Stroop test administered on a tablet) might be challenging for older individuals. Moreover, IPV declines with age, so we focused on a younger sample for the decisionmaker questions as well.

questionnaires were administered to the main decisionmaker and his or her spouse separately to ensure privacy.

Our main outcomes of interest are those related to IPV and potential pathways. At midline, the IPV questions were administered to one female in the household through the decisionmaker or spouse questionnaire.[12] IPV was measured using the internationally validated WHO Violence Against Women instrument and administered following the WHO protocol on ethical guidelines for conducting research on women's experience with IPV (WHO, 2016).[13] The WHO instrument asks multiple behaviorally specific questions on a range of abusive acts, a technique shown to maximize disclosure (M Ellsberg et al., 2001). We focused on two types of violence: emotional (4 questions) and physical (6 questions), and controlling behaviors (7 questions) from partner. For each act of violence or behavior, women were asked if their current husband had done this in the last 12 months.

From these questions two types of outcome measures are constructed. The first are binary indicators for any emotional violence experienced in the past 12 months, any physical violence experienced in the past 12 months, and any controlling behaviors experienced in the past 12 months. Each is coded as 1 if the woman responded that she had experienced any of the acts within each category (see Appendix D for the questions and categorizations) and 0 otherwise. The second type are indices for emotional violence, physical violence, and controlling behaviors. These indices are constructed by first creating normalized indicators (using the mean and standard deviation of the control group) with a mean zero and standard deviation of one for each question within each category (Kling et al., 2007). This ensures that variables with higher variance do not contribute disproportionately to the total index. We then sum these normalized indicators within each violence category and renormalize the final indices so each again has standard deviation of one.

One pathway through which transfers may affect IPV is through decreases in intrahousehold conflict. To examine whether the program led to improvements in marital quality we use female responses to questions on disputes, trust, and marriage capital. For disputes we create an indicator for prevalence and an index that are constructed from yes-no questions on disputes between spouses in the past 12 months across eleven areas (food expenses, non-food expenses, livestock purchases, agricultural purchases, purchases for microenterprises, child nutrition, child health, child education, child discipline, travel outside the plot, her employment, domestic work). For relationship capital and trust we create two indices from the ordinal responses to questions on 1) how often the couple laugh together, calmly discuss something, confide in each other, and go out to a leisure event (relationship capital), and 2) whether she respects her spouse, her spouse respects her, she has confidence that her spouse takes actions in her best interest, and she feels comfortable telling her spouse when she's not in agreement with him (trust). While the variables considered by Kling et al. (2007) are continuous, the variables included in the relationship capital and relationship trust indices are ordinal. For these variables, we create a series of binary variables out of each ordinal variable so that values of 1 always reflect greater relationship capital or trust, and then create an index out of these binary variables (see appendix F for more detail).

Another pathway through which CTs may affect IPV is through improvements in the emotional well-being of its household members. At midline, we collected information from the main decisionmaker on his/her level of anxiety or worry across 14 domains,[14] stress using Cohen's Perceived Stress Scale (PSS) (Cohen et al., 1983), and self-esteem using the Rosenberg Self-Esteem instrument (Rosenberg, 1965). Using the same technique described above for the relationship quality indices, we create indices for male decisionmakers of worry and low self-esteem. For stress of the male decisionmaker, we also create an index in addition to using the internationally validated 40-point scale indicator, which is constructed by adding up responses to the 10 items in the PSS instrument.

Lastly, we construct indicators on women's labor and mobility to reflect the third pathway of increased women's empowerment. For labor we create indicators for the extensive (whether or not women worked) and intensive margin (amount of time worked), and for mobility we create an index from ordinal responses to how often the woman visits/attends markets, family, friends, health centers, community meetings, and is away for at least a night.[15]

Our indicator for whether a relationship is classified as polygamous or monogamous is based on the decisionmaker and spouse's marital status at baseline. If the decisionmaker or spouse responded that they were "married (polygamous) living together with spouse(s)" or "married (polygamous) living separated from spouse(s)" or "married (polygamous) living with some spouses and separated from others", then they were considered to be in a polygamous relationship. All other response options, including "married (monogamous) living together with spouse," and "married (monogamous) living separated from spouse," were categorized as monogamous.[16]

4.3. c. Estimation sample, attrition, and balance of baseline characteristics

Our sample for estimating impacts of *Jigisémèjiri* on IPV draws on women who were either the selected decisionmakers in their households or the selected spouses and who completed the relevant questionnaire at midline. Similar to WHO norms, we restrict women in our estimation sample to be less than 50 years old at midline, when violence is more prevalent. We also restrict the sample to women who were in the baseline data and married at baseline in order to avoid selection into the household or marriage due to the program. Thus, our eligible sample is composed of 1550 women less than 50 years old who were in the baseline data and married at baseline. To qualify to answer the IPV module, women had to be living with their husbands in the last 12 months and alone at the time of the interview. Of the 1550 eligible sample, 1457 were living with their husbands at midline and 1261 were alone at the time of the interview (See appendix E). As revealed in Tables 1 and 2, attrition is not correlated with treatment for the full sample or for the subsamples of monogamous and polygamous households.

Table 1 also provides baseline characteristics of women in the sample and their partners across treatment and control groups. Women in the sample are on average 32 years old, very few are literate (only 5 percent), and most are the spouse of the household head, although in approximately 20 percent of cases they are the daughter or daughter-in-law.

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[12] The decisionmaker and spouse questionnaires were not administered at baseline. IPV questions were instead administered to the mother of the index child, through the mother-child questionnaire.

[13] This included ensuring adequate training of interviewers, guaranteeing privacy during interviews, ensuring informed consent and confidentiality of responses, and interviewing only one woman per household so that other household members were not aware that survey questions involved IPV. Referral services could not be arranged as they did not exist in most areas surveyed.

[14] Domains include health, relationship with other household members, accidents and disasters, problems with people from other ethnic groups, security issues due to terrorism, not enough money for basic needs, not enough money for other spending, not enough money for medicine, inability to educate children, difficulty finding a job, laziness of children or spouse, alcohol consumption of children or spouse, death of a family member, debts to others.

[15] We note that female labor force participation is not an unambiguous proxy for empowerment. Although our companion qualitative study from Mali suggests that women's income generation can be empowering as it provides women control over financial matters, it also suggests men allow women to work when there is financial need, suggesting women's work could capture economic necessity. Existing evidence that women's empowerment increases labor supply (e.g., Field et al 2016; Heath and Tan forthcoming) draws largely from South Asia, where female labor supply is lower than in our study context.

[16] Our categorization of polygamy uses the baseline marital status to avoid capturing potential endogenous response to treatment, but a relationship classified as monogamous at baseline will not necessarily remain monogamous thereafter.

Table 1
Baseline Summary statistics by intervention arm.

	N	Mean Control	Mean Treatment	P-value of diff.	Normalized difference
Attrition rate	1550	0.21	0.18	0.56	−0.07
Woman's age	1261	32.04	31.97	0.89	−0.01
Woman is household head or spouse	1261	0.78	0.76	0.67	−0.03
Woman is daughter or daughter-in-law of household head	1261	0.20	0.20	0.90	0.01
Number of children of woman 0–6 years	1261	1.64	1.70	0.41	0.06
Woman is literate	1261	0.04	0.05	0.51	0.04
Woman was away at least one month in the last year	1261	0.06	0.07	0.85	0.01
Husband's age	1241	44.51	44.50	0.98	−0.00
Husband is literate	1208	0.12	0.17	0.11	0.13
Husband was away at least one month in the last year	1208	0.15	0.15	0.96	−0.00
Number of wives of husband	1139	1.46	1.39	0.20	−0.11
Polygamous marriage at baseline	1261	0.39	0.37	0.57	−0.05
Household size	1261	10.19	10.29	0.83	0.02
Household head is Muslim	1261	0.82	0.92	0.20	0.31
Log value of household assets	1261	12.19	12.15	0.81	−0.03
Log value of total household consumption per capita	1171	8.81	8.81	0.99	−0.00
P-value from joint F-test				0.32	
Any physical violence on index mother, last 12 months	864	0.21	0.25	0.24	0.11
Any emotional violence on index mother, last 12 months	875	0.28	0.39	0.03	0.22
Any controlling behavior on index mother, last 12 months	880	0.62	0.62	0.84	−0.02

P-values are reported from Wald tests on the equality of means of the control and treatment groups for each variable.

Standard errors are clustered at the commune level. Baseline IPV questions were asked to the mother of the index child who is not necessarily the spouse of the decisionmaker at midline.

Husbands are on average 12 years older than their wives and a slightly higher percentage are literate (17 percent in the treatment group and 12 percent in the control group). Nearly 40 percent of the sample (37 percent in the treatment group and 39 percent in the control group) is in a polygamous marriage. For the full sample of women, there are no statistically significant differences in baseline characteristics between the treatment and control group, and with the exception of being Muslim, normalized differences are also well below the rule of thumb of .25 standard deviations (Imbens et al., 2015). For a subsample of households, we also have baseline measures of IPV for the mother of the index child (which overlaps with the woman in the midline sample in about 50 percent of the cases). Baseline emotional violence is significantly higher

in this subsample in the treatment group compared to the control group.

Table 2 shows baseline characteristics across the treatment and control group for the subsamples of monogamous and polygamous households. In monogamous households, none of the difference-in-means tests are significant at the 5 percent level, and the joint F-test of significance is also not significant. However, the normalized difference in means for being Muslim is large. In polygamous households, there are a couple of baseline characteristics of women that are significantly different across treatment and control households at the 5 percent level, although the joint F-test is not significant. In particular, women in treatment households compared to control households are younger and more likely to be literate. We control for these predetermined observable differences, which are also correlated with IPV, in our empirical specifications. There are also large differences in baseline emotional violence and controlling behaviors for the subsample of polygamous households for which we have IPV data on the mother of the index child. In particular treatment households have higher rates of baseline violence compared to control households. We address this issue of imbalance in section 6b by running specifications where we control for baseline IPV for the subsample of household for which we have IPV data.

5. Estimation strategy

We take advantage of the randomized experimental design and conduct an intent-to-treat (ITT) analysis using single difference estimation with the midline data. The randomized assignment and balance in baseline characteristics minimize concerns of bias in the single difference treatment estimates. We consider the effects of the treatment (T) on outcome Y on woman i in commune j, controlling for household and individual characteristics (X).

$$Y_{ij} = \beta\, T_j + X_{ij}' \delta + \varepsilon_{ij} \tag{1}$$

Standard errors are clustered at the commune level, which is the same level at which treatment was assigned. Given that communes are relatively isolated, the possibility for spillover effects on untreated communes is limited. The vector of control variables (X) includes region fixed effects, a woman's characteristics (age, whether she was the spouse of the household head, whether she was literate, number of children 0–6 years) and household characteristics (household size, log value of assets, and whether the household is Muslim), all as defined at baseline.[17]

As previously mentioned, we are particularly interested in whether the effects of the program vary by polygamy status at baseline ($Poly_{ij}$). Thus, we estimate equation (1) separately for polygamous and monogamous households. To test whether the interaction with polygamy ($\beta_2\, T_j \times Poly_{ij}$) is significant, we combine both subgroups and estimate the following equation:

$$Y_{ij} = \beta_1\, T_j + \beta_2\, T_j \times Poly_{ij} + X_{ij}' \delta + Poly_{ij} \times X_{ij}' \gamma + \varepsilon_{ij} \tag{2}$$

We include interactions of polygamy with each control variable, given the possibility that the effects of polygamy may vary by these baseline characteristics.

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[17] McKenzie (2012) points out that an ANCOVA specification which controls for the woman's level of the dependent variable at baseline increases efficiency when outcomes are not strongly autocorrelated. We do not have measures of IPV at baseline for the full sample of women in the analysis, so do not include baseline values in our main analysis. However we have IPV measures at baseline for a subsample of households (not necessarily the same woman was interviewed). As a robustness check, we control for household levels of IPV for the subsample of households for which we have the data in section 6b.

Table 2

Baseline summary statistics by intervention arm and polygamy status.

	Monogamous households					Polygamous households				
	N	Mean Control	Mean Treat	P-value of diff.	Normalized diff	N	Mean Control	Mean Treat	P-value of diff.	Normalized diff
Attrition rate	981	0.25	0.18	0.23	−0.16	569	0.14	0.18	0.32	0.12
Woman's age	789	30.41	31.43	0.21	0.13	472	34.54	32.89	0.03	−0.21
Woman is household head or spouse	789	0.74	0.77	0.56	0.06	472	0.83	0.76	0.10	−0.18
Woman is daughter or daughter-in-law of household head	789	0.24	0.20	0.37	−0.09	472	0.14	0.21	0.08	0.18
Number of children of woman 0–6 years	789	1.83	1.90	0.46	0.07	472	1.34	1.35	0.87	0.02
Woman is literate	789	0.05	0.04	0.59	−0.04	472	0.02	0.05	0.04	0.19
Woman was away at least one month in the last year	789	0.05	0.06	0.59	0.05	472	0.09	0.08	0.82	−0.03
Husband's age	777	42.44	43.22	0.49	0.07	464	47.64	46.70	0.41	−0.10
Husband is literate	753	0.11	0.16	0.08	0.14	455	0.14	0.18	0.34	0.13
Husband was away at least one month in the last year	753	0.14	0.15	0.63	0.03	455	0.16	0.14	0.61	−0.06
Number of wives of husband	715	1.00	1.00			424	2.14	2.08	0.21	−0.17
Polygamous marriage at baseline	789	0.00	0.00			472	1.00	1.00		
Household size	789	8.34	8.83	0.17	0.14	472	13.03	12.79	0.70	−0.05
Household head is Muslim	789	0.76	0.91	0.18	0.40	472	0.90	0.94	0.46	0.16
Log value of household assets	789	12.12	11.95	0.39	−0.12	472	12.30	12.51	0.17	0.15
Log value of total household consumption per capita	737	8.94	8.88	0.48	−0.09	434	8.62	8.70	0.45	0.12
P-value from joint F-test				0.10					0.19	
Any physical violence on index mother, last 12 months	543	0.22	0.24	0.68	0.05	321	0.18	0.27	0.18	0.22
Any emotional violence on index mother, last 12 months	551	0.29	0.36	0.18	0.16	324	0.28	0.44	0.02	0.33
Any controlling behavior on index mother, last 12 months	553	0.67	0.58	0.10	−0.18	327	0.56	0.68	0.04	0.25

P-values are reported from Wald tests on the equality of means of the control and treatment group for each variable.

Standard errors are clustered at the commune level. Baseline IPV questions were asked to the mother of the index child who is not necessarily the spouse of the decisionmaker at midline.

6. Results

6.1. a. Main results

The first two columns of Table 3 display the mean rates of violence for monogamous and polygamous households, followed by the impacts of *Jigisémèjiri* for the overall sample and then disaggregated by monogamous and polygamous status. The last column reveals the differential impact of *Jigisémèjiri* by polygamy status (the interaction of treatment with polygamy estimated from equation (2)). Consistent with previous literature showing a positive correlation between polygamy and IPV, Table 3 reveals that polygamous households in the control group display higher rates of IPV and controlling behaviors compared to monogamous households in the control group. The overall treatment effect of *Jigisémèjiri* on prevalence of physical violence is statistically insignificant

and small in magnitude (2.9 percentage points), while the effects on prevalence of emotional violence and controlling behavior are statistically significant and modest in size (6 percentage point reductions in each). In terms of indices, in aggregate, there is an insignificant reduction of 0.12 standard deviations for emotional violence, and a significant 0.13 and 0.21 standard deviation reduction in physical violence and controlling behavior respectively.

However, the overall effects mask considerable heterogeneity. Disaggregating by monogamous or polygamous marriages shows a consistent pattern. Among women in monogamous marriages, there are *no* statistically significant impacts of treatment on physical violence, emotional violence, or controlling behavior, as measured by prevalence or indices. For women in polygamous marriages, treatment significantly reduces *all* prevalence and index measures for physical and emotional violence, and controlling behaviors. Specifically, within polygamous

Table 3

Impact of treatment on IPV.

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Any physical violence	0.121	0.177	−0.029	1261	−0.006	789	−0.072	472	−0.067
	(0.025)	(0.036)	(0.027)		(0.029)		(0.036)**		(0.035)*
Index of physical violence	−0.013	0.120	−0.135	1261	−0.061	789	−0.256	472	−0.195
	(0.075)	(0.110)	(0.075)*		(0.077)		(0.093)***		(0.082)**
Any emotional violence	0.241	0.336	−0.061	1261	−0.027	789	−0.126	472	−0.099
	(0.033)	(0.045)	(0.035)*		(0.036)		(0.048)**		(0.047)**
Index of emotional violence	−0.074	0.227	−0.117	1261	0.014	789	−0.329	472	−0.344
	(0.068)	(0.115)	(0.091)		(0.077)		(0.145)**		(0.128)***
Any controlling behavior	0.523	0.681	−0.060	1261	−0.007	789	−0.161	472	−0.153
	(0.038)	(0.044)	(0.032)*		(0.048)		(0.045)***		(0.067)**
Index of controlling behavior	−0.034	0.169	−0.208	1261	−0.113	789	−0.340	472	−0.227
	(0.079)	(0.094)	(0.080)**		(0.090)		(0.111)***		(0.127)*

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

marriages, treatment significantly reduces prevalence of physical IPV by 7.2 percentage points (or 0.26 standard deviations in terms of the index), prevalence of emotional IPV by 12.6 percentage points (or 0.33 standard deviations in terms of the index), and prevalence of controlling behavior by 16.1 percentage points (or 0.34 standard deviations in terms of the index). For all indicators, the difference in treatment effect between women in monogamous and polygamous marriages is statistically significant.

Table 4 examines the impact of *Jigisémèjiri* on individual indicators of IPV and controlling behavior that constitute the measures of overall prevalence and indices. We find broad, significant decreases in most of the individual IPV indicators among women in polygamous marriages and no significant decrease in the IPV indicators among women in monogamous marriages, suggesting that our core results are not driven by a few idiosyncratic measures. Specifically, in polygamous households we find significant decreases in the woman being slapped or having something thrown that could hurt her; being pushed or shoved or had her hair pulled; being kicked, dragged or beat up; and being choked or burned. For emotional violence, we find significant decreases in rates of insults, belittling, and things done to scare or intimidate her. For controlling behavior, we find significant decreases in the woman's report of her husband's restrictions of contact with family, insistence on knowing where she is at all times, getting angry if she speaks with another man, and expecting her to ask for permission before seeking health care for herself.

Given the concentration of effects among polygamous women, we next examine whether the effects vary between first wives and second (and later) wives. The first two columns of Table 5 reveal that rates of physical and emotional violence, and to a lesser extent controlling behaviors, are much higher for second (or later) wives compared to first

wives, suggesting that wives have different bargaining power in the household. Among first wives we only observe significant reductions in controlling behaviors as a result of the treatment, while for second (or later) wives we observe large and significant reductions in all measures of violence and controlling behaviors. The reductions are significantly larger in magnitude among second (or later) wives compared to first wives for physical and emotional violence. Taken together, these results suggest that impacts on controlling behaviors are similar across wives, but wives of different ranks experience different levels of emotional and physical violence, and impacts on these outcomes are also different by rank.

6.2. b. Robustness

We explore the robustness of our results in several ways in Appendix G. We first show that our results are similar for the full sample of women less than 70 years old (Appendix Table G1). We then show that the coefficient on treatment does not change meaningfully with inclusion of different control variables, including controlling for baseline levels of IPV for the subsample of households for which we have this data (Appendix Table G2). Next, we show that our inference is robust to correcting for multiple hypothesis testing, adjusting p-values following Westfall and Young (1993) (Appendix Table G3). Lastly, we bound our treatment estimates following Lee et al. (2009) to address issues of non-random selection into our sample that arise from only being able to interview the IPV module on women who are living with their husbands and with whom the enumerators could speak privately (Appendix Table G4). All four tables reveal a pattern similar to the main results, suggesting that the main results are not driven by selection into the sample, selection of control variables, or multiple hypothesis testing.

Table 4
Impact of treatment on individual indicators of IPV.

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Tries to keep you from seeing your friends	0.075 (0.020)	0.088 (0.027)	−0.009 (0.019)	1258	0.006 (0.021)	786	−0.021 (0.030)	472	−0.027 (0.033)
Tries to restrict contact with your family	0.080 (0.021)	0.153 (0.034)	−0.046 (0.020)**	1253	−0.014 (0.022)	783	−0.095 (0.036)**	470	−0.081 (0.039)**
Insists on knowing where you are at all times	0.364 (0.037)	0.396 (0.047)	−0.084 (0.044)*	1255	−0.060 (0.057)	786	−0.124 (0.063)*	469	−0.064 (0.081)
Ignores you and treats you indifferently	0.103 (0.023)	0.143 (0.033)	−0.049 (0.025)**	1253	−0.037 (0.025)	786	−0.069 (0.042)	467	−0.032 (0.047)
Gets angry if you speak with another man	0.279 (0.034)	0.327 (0.044)	−0.061 (0.032)*	1253	−0.034 (0.040)	785	−0.093 (0.047)**	468	−0.059 (0.056)
Is often suspicious that you are unfaithful	0.092 (0.022)	0.125 (0.031)	−0.040 (0.019)**	1258	−0.030 (0.018)	787	−0.039 (0.035)	471	−0.009 (0.039)
Expects you to ask his permission before seeking health care for yourself	0.397 (0.037)	0.491 (0.047)	−0.063 (0.036)*	1260	−0.022 (0.044)	789	−0.141 (0.051)***	471	−0.119 (0.062)*
Insulted you or made you feel bad about yourself	0.149 (0.027)	0.204 (0.038)	−0.025 (0.023)	1257	−0.002 (0.029)	786	−0.077 (0.030)**	471	−0.075 (0.039)*
Belittled or humiliated you in front of other people	0.057 (0.018)	0.142 (0.033)	−0.025 (0.026)	1255	0.012 (0.025)	786	−0.084 (0.039)**	469	−0.096 (0.037)**
Done things to scare or intimidate you on purpose	0.126 (0.025)	0.204 (0.038)	−0.057 (0.030)*	1258	−0.013 (0.028)	788	−0.119 (0.051)**	470	−0.106 (0.048)**
Threatened to hurt you or some one you care about	0.029 (0.013)	0.071 (0.024)	−0.004 (0.017)	1259	0.008 (0.016)	788	−0.022 (0.028)	471	−0.031 (0.030)
Slapped you or thrown something at you that could hurt you	0.057 (0.018)	0.098 (0.028)	−0.032 (0.020)	1258	−0.008 (0.023)	787	−0.073 (0.027)***	471	−0.064 (0.031)**
Pushed you or shoved you or pulled your hair	0.046 (0.016)	0.044 (0.019)	−0.021 (0.014)	1260	−0.019 (0.016)	788	−0.027 (0.016)*	472	−0.008 (0.016)
Hit you with his fist or with something else that could hurt you	0.075 (0.020)	0.081 (0.026)	−0.014 (0.018)	1256	−0.016 (0.018)	787	−0.008 (0.033)	469	0.008 (0.033)
Kicked you, dragged you or beat you up	0.017 (0.010)	0.053 (0.021)	−0.019 (0.010)*	1255	−0.001 (0.010)	784	−0.046 (0.014)***	471	−0.046 (0.016)***
Choked or burnt you on purpose	0.035 (0.014)	0.053 (0.021)	−0.019 (0.016)	1248	−0.006 (0.016)	778	−0.041 (0.019)**	470	−0.035 (0.017)*

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. Standard errors in parenthesis, clustered at the commune level. *$p < 0.1$ **$p < 0.05$; ***$p < 0.01$. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Table 5
Impact of treatment on IPV, polygamous women only.

	Mean of control, first wife	Mean of control, wife 2+	Effect on first wife	N	Effect on wife 2+	N	Diff, first wife vs 2+
Any physical violence	0.068	0.302	−0.007	242	−0.156	227	−0.149
	(0.033)	(0.064)	(0.039)		(0.064)**		(0.077)*
Index of physical violence	−0.156	0.434	−0.059	242	−0.487	227	−0.427
	(0.079)	(0.210)	(0.075)		(0.173)***		(0.191)**
Any emotional violence	0.237	0.453	−0.051	242	−0.215	227	−0.165
	(0.056)	(0.069)	(0.062)		(0.071)***		(0.096)*
Index of emotional violence	−0.033	0.528	−0.159	242	−0.522	227	−0.365
	(0.125)	(0.195)	(0.119)		(0.204)**		(0.186)*
Any controlling behavior	0.661	0.717	−0.138	242	−0.193	227	−0.056
	(0.062)	(0.062)	(0.067)**		(0.066)***		(0.096)
Index of controlling behavior	0.032	0.340	−0.273	242	−0.427	227	−0.157
	(0.119)	(0.148)	(0.147)*		(0.144)***		(0.192)

Sample includes women 49 years or younger who were in polygamous marriages at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Additionally, we investigate the extent to which our sampling strategy for selection of the spouse of the decisionmaker underlies the heterogeneity we see in treatment effects by polygamy status. In particular, we administered the spouse questionnaire to a wife other than the mother of the index child (if available) for decisionmakers in polygamous marriages, while we administered the spouse questionnaire to the wife of a monogamous decisionmaker regardless of whether she was the mother of the index child.[18] Appendix H explores the differential sampling by polygamy that results from this approach. We first construct a sample of all (likely) wives of decision-makers in polygamous households to assess the selection induced by our sampling strategy, then based on this exercise, assess robustness of the main results to a specification that controls for a woman being the index mother (and its interaction with polygamy) and a specification that includes age dummies (and their interaction with polygamy). We also estimate impacts on polygamous households reweighted for the proportion of first wives versus second wives in the actual sample. In all cases, the results are very similar, providing initial reassurance. Section 8a further assesses the extent to which a woman being the index mother and a woman's age may drive the heterogeneity in treatment impacts by polygamy status.

7. Mechanisms

We explore potential mechanisms through which *Jigisémèjiri* leads to decreases in IPV, presenting suggestive evidence linked to the pathways discussed in the introduction. First, we consider the pathway related to cash transfers improving household economic security and emotional well-being of men. Hidrobo et al. (2018) find that the *Jigisémèjiri* program increased food security, as well as savings and assets. Table 6 shows the effects on household-level economic outcomes for our sample of interest,

disaggregated by polygamy. Consistent with the results in Hidrobo et al. (2018), the cash transfer program leads to significant improvements in household assets but not the value of consumption.[19] More importantly, there are no significant differences across polygamous and monogamous households in the size of the impact, suggesting similar improvements in household's economic wellbeing across both groups.[20]

Table 7 examines whether the cash transfer program leads to improvements in men's emotional well-being which is hypothesized to result from improved economic security. We find statistically significant decreases for the overall sample in men's stress and anxiety. Improvements in men's emotional well-being are driven mainly by polygamous households for whom reductions in stress and anxiety are all significant and larger in magnitude compared to reductions in monogamous households, although differences across monogamous and polygamous households are not statistically significant at conventional levels. In addition to direct measures of emotional well-being of household members, we look at indirect measures. If emotional well-being is a main pathway for reducing violence in a household, then violence against other vulnerable members such as children should also be reduced (Bobonis et al., 2013). Table 8 reveals a similar pattern as those for IPV; the program leads to a reduction in violence against children in polygamous households but has no impact in monogamous households, and the difference in impact is significant.[21] Consistent with these results, the companion qualitative work (Lees et al., 2018) indicates that the cash transfers increase resources and reduce stress, particularly for men who feel able to fulfill their roles as household head. While the qualitative work is not designed to detect differences in magnitudes between polygamous and monogamous households, men in both households spoke of being happier. Taken together, Tables 6–8 along with the qualitative work suggest that *Jigisémèjiri* resulted in similar improvements in economic well-being for polygamous and monogamous households, and these translated to improvements in men's emotional well-being in both types of households, but improvements in men's emotional well-being were larger in polygamous households.

Next, we assess evidence for the pathway related to cash transfers reducing intrahousehold conflict due to stretched resources and tight budgets. Table 9 examines treatment effects on measures of conflict, as well as related measures of relationship quality, disaggregated by polygamy. Although not statistically significant at conventional levels, the signs of the coefficients reveal that disputes are reduced and relationships between spouses improve in polygamous households. The

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[18] Our initial reason for doing this was that we wanted to administer a particular module to both the mother of the index child (using the mother-child questionnaire) and to another wife in the household (using the spouse of decisionmaker questionnaire) for comparison in cases where both were available, thus we tried to minimize overlap in respondents.

[19] We examine effects on both levels and using the inverse hyperbolic sin transformation – IHS(y) = ln(y + sqrt(1 + y²)) – which is similar to the log transformation, but with the advantage that it is defined at zero. Hidrobo et al. (2018) show that the lack of significant impact on consumption is plausibly due to the long lag between midline data collection and the previous cash transfer.

[20] The difference in point estimates in the treatment effect on assets between polygamous and monogamous households is large in levels, albeit not statistically significant at traditional levels. The difference between these estimates and the estimates using the IHS transformation suggest that there are larger effects on polygamous households with high assets, whose contribution to the estimation is smaller when we transform it.

[21] Child violence indicators were created from the Multiple Indicator Cluster Survey (MICS) set of questions on child discipline. A subset of these questions refers to psychological aggression and physical punishment. These questions were administered to the mother of the index child aged 2–4 years at midline.

Table 6
Impact of treatment on household economic wellbeing.

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Total value of consumption per capita (IHS transformation)	9.88 (0.05)	9.67 (0.05)	0.09 (0.06)	1187	0.10 (0.07)	750	0.08 (0.06)	437	−0.03 (0.07)
Total value of consumption per capita (FCFA)	11,474.38 (499.11)	9077.68 (471.43)	841.96 (515.07)	1187	801.27 (631.60)	750	890.81 (551.64)	437	89.54 (641.03)
Total value of assets per capita (IHS transformation)	11.14 (0.10)	11.18 (0.10)	0.21 (0.07)***	1249	0.24 (0.09)***	780	0.21 (0.12)*	469	−0.02 (0.15)
Total value of assets per capita (FCFA)	62,048.74 (4540.23)	54,430.78 (4144.50)	7074.06 (3457.55)**	1249	5017.31 (4423.74)	780	10,831.93 (5447.43)**	469	5814.61 (6696.69)

Sample includes households with a woman 49 years or younger who was married at baseline, listed as the decisionmaker or spouse of decision-maker, and able to be asked the IPV module in private. Standard errors in parenthesis, clustered at the commune level. $*p < 0.1$ $**p < 0.05$; $***p < 0.01$. Baseline control variables include household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Table 7
Impact of treatment on male spouse's emotional well-being.

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Perceived stress scale (0–40)	15.935 (0.457)	15.824 (0.589)	−1.375 (0.810)*	1143	−1.296 (0.922)	714	−1.750 (0.896)*	429	−0.454 (0.846)
Standardized stress index	0.015 (0.069)	0.032 (0.094)	−0.193 (0.118)	1143	−0.166 (0.133)	714	−0.263 (0.138)*	429	−0.097 (0.135)
Anxiety (worry) index	0.105 (0.077)	0.206 (0.096)	−0.274 (0.105)**	1143	−0.212 (0.110)*	714	−0.363 (0.138)**	429	−0.151 (0.131)
Low self esteem index	−0.108 (0.082)	−0.008 (0.106)	−0.142 (0.091)	1143	−0.104 (0.096)	714	−0.213 (0.144)	429	−0.109 (0.153)

Sample includes male spouses who were listed as the main decisionmaker in the household. Standard errors in parenthesis, clustered at the commune level. $*p < 0.1$ $**p < 0.05$; $***p < 0.01$. Baseline control variables include male spouse characteristics (age, whether he is literate), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Table 8
Impact of treatment on child violence.

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Any psychological aggression	0.578 (0.040)	0.692 (0.045)	−0.044 (0.035)	1131	0.006 (0.042)	709	−0.114 (0.060)*	422	−0.121 (0.074)
Any physical punishment	0.649 (0.039)	0.837 (0.036)	−0.066 (0.036)*	1131	0.005 (0.050)	709	−0.167 (0.048)***	422	−0.172 (0.068)**
Number of psychological and physical violent acts (0–8)	2.227 (0.158)	2.625 (0.181)	−0.334 (0.134)**	1131	−0.144 (0.170)	709	−0.596 (0.241)**	422	−0.452 (0.303)

Indicators come from mothers' reports of discipline for index child 2–4 years old at midline. Standard errors in parenthesis, clustered at the commune level. $*p < 0.1$ $**p < 0.05$; $***p < 0.01$. Baseline control variables include child characteristics (age, sex), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Table 9
Impact of treatment on women's reported relationship quality.

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Any dispute	0.299 (0.035)	0.354 (0.045)	−0.021 (0.044)	1260	0.025 (0.041)	789	−0.086 (0.059)	471	−0.111 (0.043)**
Dispute index	−0.019 (0.055)	0.073 (0.125)	0.023 (0.084)	1260	0.165 (0.102)	789	−0.139 (0.118)	471	−0.304 (0.141)**
Relationship quality index	0.031 (0.076)	−0.040 (0.102)	0.081 (0.075)	1242	0.057 (0.095)	776	0.147 (0.112)	466	0.090 (0.146)
Relationship trust index	0.078 (0.067)	−0.172 (0.102)	−0.073 (0.088)	1261	−0.174 (0.082)**	789	0.123 (0.155)	472	0.297 (0.166)*

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. Relationship quality and relationship trust coded so that higher numbers equal better relationship. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. $*p < 0.1$ $**p < 0.05$; $***p < 0.01$. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

same is not true for monogamous households where the signs of the coefficients show near zero impact or positive impacts on disputes and significant negative impacts on trust. These differences in patterns result in large and statistically significant differences in impact across polygamous and monogamous households in the dispute and trust indicators. Thus, findings suggest that the cash transfer reduced disputes and

Table 10
Impact of treatment on women's empowerment.

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Was employed/engaged in productive activity in the last 12 months, female	0.810 (0.030)	0.947 (0.021)	0.028 (0.027)	1261	0.051 (0.045)	789	−0.019 (0.024)	472	−0.070 (0.054)
Total hours worked in the last week	24.301 (2.221)	29.216 (2.555)	−0.664 (2.436)	1105	−1.826 (2.893)	694	0.524 (3.332)	411	2.350 (3.704)
Mobility Index	0.005 (0.073)	0.089 (0.094)	0.064 (0.076)	1261	0.081 (0.093)	789	0.058 (0.109)	472	−0.023 (0.118)

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *$p < 0.1$ **$p < 0.05$; ***$p < 0.01$. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

increased trust significantly more in polygamous than monogamous households.

Finally, to explore whether *Jigisémèjiri* improves a woman's threat point, we analyze the impact of the program on two empowerment domains: mobility and employment. Descriptive evidence from related work (Hidrobo et al., 2018) reveals that the cash transfer is physically collected by men, it is by and large not shared with other household members, and decisions about its use are predominantly made by men. Moreover, as discussed in section 2b, the beneficiary list was not updated after the program began, so women married to male heads in beneficiary households would lose program benefits if they were to leave the marriage, rather than gain benefits as new household heads. Accordingly, the program effects on women's outside option are likely to be minimal. Table 10 indicates that there are no impacts on women's mobility or employment in either the monogamous or polygamous samples. Lees et al. (2018) also find that there is little effect of the program on women's agency, in terms of decision making and control around sexual and financial matters, and potentially an increase in male authority. Thus, our quantitative and qualitative evidence together suggest that *Jigisémèjiri* decreased IPV in polygamous households while not meaningfully changing other measures of women's empowerment.

Overall, our suggestive evidence supports the possibility that improved economic security of the household and emotional well-being of men underlies the impacts of *Jigisémèjiri* on IPV, while also indicating that reductions in poverty-related conflict and resulting improvements in relationships may play a role. Consistent with the impacts on IPV, these mechanisms play out primarily in polygamous marriages. We do not find evidence suggesting that increases in women's empowerment drive reductions in IPV.

8. Understanding the effects on polygamous households

In this section we explore potential explanations for the larger impacts of cash transfers on IPV in polygamous households – specifically, why similar impacts on household level economic indicators in polygamous and monogamous households translate to large improvements in men's emotional well-being and larger reductions in disputes in polygamous households. One potential reason is that polygamous households are different from monogamous households in other observable ways (and unobservable ways, although we are not able to assess these) that lead to these differences in impact. For example, if polygamous households are larger or poorer than monogamous households, it is possible that similar changes in household-level economic security could translate to differential changes in men's emotional well-being. A second potential explanation is that the institution of polygamous marriage itself – whether due to coordination issues, sociocultural norms, or different bargaining positions across wives – leads to different distributions of or communication regarding the cash transfer across household members (Barr et al., 2017), even with similar economic effects at the household level. Differences in distribution or communication between polygamous and monogamous households – or in expectations around these – could

lead to differences in impacts on conflict. Lastly, the prevalence of IPV, stress, and disputes is higher in polygamous households – whether due to correlates of polygamy or due to the institution of polygamy itself – and thus there is simply greater potential for an intervention to reduce these in polygamous households than monogamous ones. While we cannot disentangle these three explanations or comprehensively explore any of them, we look more closely into suggestive evidence on each.

8.1. a. Differences due to observable correlates of polygamy

We begin by examining the extent to which observable correlates of polygamy can explain the differential impacts on IPV and its mechanisms by polygamy status. To do so, we first assess which correlates appear relevant, by identifying which variables in our data are both correlated with IPV among polygamous or monogamous households (Appendix Table I1) and are significantly different on average between polygamous and monogamous households in our sample (Appendix Table I2). This analysis, yields seven baseline variables: the woman's age, whether the woman was married previously, the number of children 0–6 years of the woman, the age gap between the woman and her husband, household size, the log value of household assets, and whether the household head is Muslim. Next, we assess whether inclusion of each of these de-meaned variables, along with an interaction with the treatment indicator, meaningfully changes our estimates of the treatment effect on polygamous households as well as the differential treatment effect by polygamy status. Any change indicates whether differences in these observable correlates can "explain" the differential treatment effects we find on polygamous households.

We conduct the analysis first on the mechanisms related to men's emotional wellbeing[22] and relationship quality, and then on IPV (Tables 11–13). For ease of interpretation, we present estimates from equation (2), but interact Treatment with an indicator of whether the household is monogamous. Thus, the impact on Treatment represents the impact on polygamous households, while the interaction represents the differential effect with respect to being monogamous. The bottom row indicates whether the specification includes the additional observable characteristics interacted with treatment.

Table 11 reveals that the significant reductions due to treatment among polygamous households in men's perceived stress scale, men's standardized stress index, and men's anxiety are well-explained by other observable characteristics of polygamous households. In other words, the large and significant treatment effect among polygamous households disappears when baseline correlates and their interaction with treatment are added. The same is not true for men's low self-esteem indicator; adding the additional covariates increases the magnitude of the treatment effect on low self-esteem for polygamous households, making it significant.

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[22] For analysis of men's emotional well-being, only variables relevant to men and the household are included.

Table 11
Impacts of treatment on male emotional well-being, controlling for differential effect of observables.

	Perceived stress scale (0–40)	Perceived stress scale (0–40)	Standardized stress index	Standardized stress index	Anxiety (worry) index	Anxiety (worry) index	Low self esteem index	Low self esteem index
Treatment	−1.750	0.152	−0.263	−0.010	−0.363	0.050	−0.213	−0.448
	(0.893)*	(1.316)	(0.137)*	(0.204)	(0.138)**	(0.170)	(0.143)	(0.243)*
Monogamous marriage at baseline	−2.925	−2.644	−0.489	−0.450	−0.353	−0.236	−0.392	−0.509
	(1.655)*	(1.626)	(0.266)*	(0.262)*	(0.291)	(0.302)	(0.273)	(0.269)*
Treatment X Monogamous marriage	0.454	0.322	0.097	0.082	0.151	0.040	0.109	0.268
	(0.846)	(0.840)	(0.135)	(0.128)	(0.131)	(0.136)	(0.153)	(0.142)*
R^2	0.05	0.06	0.05	0.06	0.04	0.05	0.03	0.04
N	1143	1143	1143	1143	1143	1143	1143	1143
Interaction with observables		yes		yes		yes		yes

Sample includes male spouses who were listed as the main decisionmaker in the household. Standard errors in parentheses, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Continous control variables are de-meaned. Interactions with observables include treatment status interacted with each of the following variables: the agegap between the woman and her husband, household size, the log value of household assets, and whether the household head is Muslim.

Table 12
Impacts of treatment on women's reported relationship quality, controlling for differential effect of observables.

	Any dispute	Any dispute	Dispute index	Dispute index	Relationship quality index	Relationship quality index	Relationship trust index	Relationship trust index
Treatment	−0.086	−0.026	−0.139	0.030	0.147	−0.201	0.123	−0.131
	(0.059)	(0.080)	(0.118)	(0.172)	(0.112)	(0.196)	(0.155)	(0.223)
Monogamous marriage at baseline	0.031	0.085	−0.179	−0.002	−0.096	−0.251	0.209	0.123
	(0.096)	(0.119)	(0.188)	(0.181)	(0.335)	(0.381)	(0.328)	(0.365)
Treatment X Monogamous marriage	0.111	0.066	0.304	0.104	−0.090	0.013	−0.297	−0.145
	(0.043)**	(0.077)	(0.141)**	(0.130)	(0.146)	(0.158)	(0.166)*	(0.199)
R^2	0.02	0.03	0.04	0.05	0.05	0.06	0.04	0.05
N	1260	1230	1260	1230	1242	1217	1261	1230
Interaction with observables		yes		yes		yes		yes

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. Relationship quality and relationship trust coded so that higher numbers equal better relationship. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Continous control variables are de-meaned. Interactions with observables include treatment status interacted with each of the following variables: the woman's age, whether the woman was married previously, the number of children 0–6 years of the woman, the agegap between the woman and her husband, household size, the log value of household assets, and whether the household head is Muslim.

Table 13
Impacts of treatment on IPV, controlling for differential effect of observables.

	Any physical violence	Any physical violence	Any emotional violence	Any emotional violence	Any controlling behavior	Any controlling behavior
Treatment	−0.072	−0.040	−0.126	−0.114	−0.161	−0.147
	(0.036)**	(0.058)	(0.048)**	(0.090)	(0.045)***	(0.101)
Monogamous marriage at baseline	−0.112	−0.058	−0.030	−0.020	−0.001	−0.035
	(0.095)	(0.103)	(0.104)	(0.110)	(0.138)	(0.144)
Treatment X Monogamous marriage	0.067	−0.014	0.099	0.053	0.153	0.172
	(0.035)*	(0.046)	(0.047)**	(0.053)	(0.067)**	(0.073)**
R^2	0.05	0.06	0.04	0.05	0.07	0.07
N	1261	1230	1261	1230	1261	1230
Interaction with observables		yes		yes		yes

Sample includes women 49 years and younger were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Continuous control variables are de-meaned. Interactions with observables include treatment status interacted with each of the following variables: the woman's age, whether the woman was married previously, the number of children 0–6 years of the woman, the agegap between the woman and her husband, household size, the log value of household assets, and whether the household head is Muslim.

For relationship quality, Table 12 shows that the significantly larger reduction in disputes and larger improvements in relationship trust due to treatment that is reported by women in polygamous households is also well-explained by observable correlates of polygamy. In other words, the magnitude of the differential effect of treatment by polygamy status (treatment interacted with an indicator for the household being monogomous) decreases and becomes insignificant when the correlates of polygamy interacted with treatment are added.

To assess the overall contribution of these correlates to explaining differential impacts on IPV, we conduct the same exercise for IPV outcomes as for the mechanisms. Table 13 shows that overall these correlates explain nearly all the differential reduction from treatment in physical violence among polygamous households, as well as much of the differential reduction from treatment in emotional violence among polygamous households. By contrast, the differential reduction in controlling behavior among polygamous households remains unexplained by other observable differences between polygamous and monogamous households.

Taking this together with the findings on mechanisms, our interpretation is that the program's reduction in men's stress and anxiety among polygamous households as well as its differential impacts on disputes and trust can be explained largely by observable correlates of polygamy rather than the "institution of polygamy" per se. So too can the differential reductions in physical violence, which the qualitative work (Lees et al., 2018) indicates is in fact primarily the result of stress, tension, and disputes. Observable correlates of polygamy also explain the differential reduction in emotional violence; while emotional violence is not discussed explicitly in the Mali qualitative work, global evidence suggests it has substantial overlap with physical violence (Heise et al., 2019). On the other hand, the differential treatment effect on controlling behavior is not completely explained by our observable correlates of polygamy, nor are the improvements in men's self-esteem among polygamous households. These findings are internally consistent, as disputes for example are less likely to lead to controlling behaviors than to physical or emotional IPV.

Findings leave open the possibility that the differential treatment effects on controlling behaviors as well as on men's self-esteem may be attributable to other explanations, including unobservable characteristics that we cannot account for in this analysis. One such unobservable characteristic is masculinity. We do not have direct evidence on masculinity in our data, but other evidence suggests that, although masculinity in Mali is linked to being able to financially support the household in both marriage types, this is particularly salient for polygamous husbands (Lees et al., 2018). As noted above, in religious polygamous marriages, the core condition concerning the number of spouses is that the husband must be able to support the needs of all wives (Canada: Immigration and Refugee Board of Canada 2014). Thus, it is plausible that men in polygamous marriages more acutely perceive the ability to support the household and all their wives as central to their masculinity. If so, the same improvement in economic well-being across polygamous and monogamous households may lead to larger improvements in polygamous men's self-esteem, independent of the effect on disputes. This could explain the differential reduction in controlling behavior – which is less driven by stress and disputes than physical violence and was not explained by the observable correlates assessed above.

8.2. b. Differences due to differential resource distribution or communication under polygamy

We next explore descriptive and qualitative evidence on whether the institution of polygamous marriages leads to differences in the distribution of or communication regarding the CT which may lead to differences in impacts on IPV and its mechanisms. To assess distribution, we analyze differences across polygamous and monogamous households for indicators of who received the cash and whether it was shared with others. Table 14 reveals that in both monogamous and polygamous households, men are the main beneficiaries of the program and the main decisionmakers with respect to the transfer. Approximately 51 percent report distributing part of the cash transfer to other household members for household or individual purchases in both types of households, though this is often to another male member. However, monogamous households are significantly more likely than polygamous households to distribute the cash to a female for household or individual purchases (17 percent versus 12 percent).

In terms of communication about the transfer, we assess an indicator on whether other members (in particular the mother of the index child) knew about the program. We assume that, if the mother of index child was informed about the program, it was through the household head, and thus there is some communication across household members. Table 14 shows that most mothers knew about the program, most knew that their household had received the transfer in the last 24 months, and fewer

Table 14

Decisionmaking and intrahousehold distribution of the transfer in treatment communes by polygamous status.

	N	Mean mono	Mean poly	P-value of diff.
Main beneficiary is male	925	0.92	0.89	0.24
Main recipient is male	942	0.91	0.90	0.80
Only men are main decisionmakers with respect to transfer	942	0.83	0.84	0.56
Part of transfer is distributed to other household member	942	0.51	0.51	0.86
Part of transfer is distributed to female household member	942	0.17	0.12	0.05
Last transfer created conflict in household over use	942	0.02	0.01	0.15
Worried that other non-household members may know a/b transfer and ask for some	942	0.07	0.06	0.72
Index mother had knowledge of the Jigisemejiri program	883	0.94	0.92	0.17
Index mother had knowledge that household received transfer in last 24 months	883	0.90	0.88	0.17
Index mother had knowledge on the date household received the last transfer	883	0.63	0.67	0.29

Sample is composed of households in the IPV analysis who are in the treatment arm.

P-values are reported from Wald tests on the equality of means of monogomous and polygamous households for each variable.

Polygamy status is defined at the household level at baseline. Standard errors are clustered at the commune level.

knew the date of the last transfer – but these measures of knowledge about the transfer did not vary by polygamy status. However, a process evaluation that accompanied this impact evaluation (Zongrone et al., 2018) suggests that women in monogamous households were more involved with the transfer – in terms of providing input on how to use and manage it and alerting the household head of household needs – than those in polygamous households, reflecting greater communication in monogamous households.

We remain agnostic as to whether sharing or communication with women leads to better or worse relationships between spouses, but note that for this dynamic to explain our polygamy results, sharing or communicating would have to lead to more strained relationships in the household. An example would be if the fact that men communicate less with wives in polygamous marriages (Bove and Valeggia, 2009) leads to less expectation from polygamous wives of involvement and thus less dissatisfaction or distrust regarding men deciding how the transfers are being used. If men in both marriage types dominate the decisionmaking on transfers, as our quantitative and qualitative work suggest, this might explain increased strain in monogamous relationships relative to polygamous relationships – potentially explaining the significant reduction in relationship trust and positive point estimate on disputes among monogamous households shown in Table 9. The qualitative work, though not conclusive on this point, includes quotes that hint at such a dynamic. Although both polygamous and monogamous wives indicate that men dominate the decisionmaking about transfers, monogamous wives' quotes reflect some dissatisfaction while polygamous wives' quotes are more matter-of-fact about the arrangement (Lees et al., 2018). For example, one monogamous wife says, "Frankly, he gets money from the program, he shares all the money with his children and I don't get a dime. I disagree with him on this point," and another says, "When I ask him (for) money, he says he doesn't have any, but he does have some. He doesn't want to give me any." Meanwhile, a polygamous wife says, "This is the head of household who makes the decision on how to spend money

from the program, he buys food, meat with that money … He explains how to spend the money."[23]

8.3. c. Differences due to greater initial IPV, stress, and conflict in polygamous marriages

Lastly, we explore whether IPV, stress, and conflict are higher in polygamous than monogamous households in the absence of intervention – whether due to correlates of polygamy or due to the institution of polygamy itself – which may imply greater potential for an intervention to reduce these in polygamous households. Table 3 reveals that physical IPV, emotional IPV, and controlling behaviors are all more prevalent among polygamous control households (column 2) than monogamous control households (column 1), and that within polygamous marriages, the prevalence is higher among second or later wives (Table 5). Similarly, Table 7 shows that emotional well-being is worse among men in polygamous control households compared to monogamous control households, according to indicators of anxiety and low self-esteem; Table 8 reveals higher levels of violence inflicted on children in polygamous control households compared to monogamous control households, and Table 9 reveals on average higher disputes, lower relationship quality, and lower relationship trust among polygamous households than monogamous households. Taken together, these indicate that the treatment caused larger improvements in the subgroups that were worse off in the absence of intervention, in terms of IPV, men's emotional well-being, and relationship quality, supporting the hypothesis that the differential potential for impact could play a role.

9. Conclusion

Given that one in three women globally is a victim of IPV in her lifetime (Devries et al., 2013), it is important to find scalable interventions that reduce IPV. Cash transfer programs are a promising tool given their scalability and global relevance. While previous evidence shows that cash transfer programs reduce IPV on average, this evidence has mainly focused on cash transfer programs targeted to women from programs in Latin America. Thus, knowledge gaps remain on whether cash transfer programs that target household heads (primarily men) in other regions of the world with different household structures also lead to reductions in IPV.

This study uses a randomized control trial design to investigate whether Mali's national cash transfer program, *Jigisémèjiri*, leads to reductions in IPV. Like many programs in Africa, *Jigisémèjiri* targets household heads who are mainly men, in a context where nearly 40 percent of households are polygamous. We find that the program causes significant decreases in IPV, which are mainly concentrated in polygamous households. In particular, we find that in polygamous households the prevalence of physical violence decreases by 7.2 percentage points, emotional violence decreases by 12.6 percentage points, and controlling behaviors decrease by 16.1 percentage points. These reductions in violence are significantly different from the impacts on monogamous households and are particularly strong among second (and later) wives, who face the highest rates of violence in the absence of intervention. Using data collected on the emotional well-being of the perpetrator (men in this case) and marital quality, we investigate potential mechanisms and find significant reductions in men's stress and anxiety among

polygamous households and larger reductions in reported disputes in polygamous households compared to monogamous households. We find little evidence of improvements in women's bargaining power, which is not surprising in our context where men usually receive the transfer and make decisions about its use.

We explore potential reasons for why we find larger impacts in polygamous households – in particular whether these effects are due to other observable differences across polygamous and monogamous households; whether the institution of polygamy leads to differences in the distribution of or communication regarding transfers – or in expectations around these – leading to differences in how the program affects conflict; and whether impacts are simply strongest where there is greatest potential in terms of the highest prevalence of IPV, male stress and anxiety, and disputes in the absence of intervention. Our suggestive evidence indicates all these possibilities. Observable characteristics of polygamous households largely explain the patterns of program impact on men's stress, spousal disputes and trust, and accordingly largely explain the differential impacts by polygamy status on physical and emotional violence; however, observable correlates of polygamy do not fully explain differential impacts on men's self-esteem or controlling behaviors, which maybe better explained by unobservable characteristics such as masculinity. Polygamous households distribute the transfer and communicate about the transfer differently, with women less likely to directly benefit; but there is some indication that monogamous wives' greater involvement may be accompanied by dissatisfaction at not having further involvement, possibly due to differing expectations about spousal involvement by marriage type. Among polygamous households in the control group, prevalence of IPV is higher, men's emotional well-being is worse, and relationships are lower quality than monogamous households from the control group; within polygamous households, second and later wives report higher prevalence of IPV than first wives.

To our knowledge, our results are the first rigorous evidence showing impacts of a national cash transfer program that target household heads (mainly men) on IPV. These results are consistent with those in Haushofer et al. (2019) that show that cash transfers in Kenya that randomly target males or females both lead to decreases in IPV. It is also similar to findings in Ghana that show that household structure, mainly polygamy, matter for impacts of cash transfers on IPV (Peterman et al., 2019). In Ghana, cash transfers that targeted women led to significant decreases in IPV in monogamous households, but not polygamous households, and the empowerment pathway was especially important in explaining impacts. These results together with ours highlight that cash transfers can lead to decreases in IPV, but program design features and context together shape the way that mechanisms play out and the impacts on IPV that result.

Some caveats are worth noting. First, while polygamy is common in West Africa, this is not the case in many other regions of the world. Given that impacts are concentrated in polygamous households, questions remain on whether our results would generalize to other settings where polygamy rates are low. Our results suggest that the impacts are driven in part by observable characteristics of the woman and her household; thus woman and households with these characteristics may disproportionately benefit across settings. Second, the Jigisémèjiri program was a bundled program that included accompanying measures (AM) sessions or trainings, and we are not able to separate out the impact of the cash from the AM sessions. Although we believe that the cash transfers drive our results – as the AM sessions were not mandatory, the proportion of households attending was relatively low, the frequency of attendance was low within those that ever attended, and the sessions had little focus on IPV or intra-household relations (Hidrobo et al., 2018) – we cannot conclusively rule out that the AM sessions contributed to the decrease in IPV. Third, our sample restrictions mean that we cannot estimate the effect of the treatment on a representative sample of beneficiaries in the treatment villages in Mali. In particular we restrict our sample to women 15–49 years old who are married at baseline, still living with their spouses 2 years later and alone at the time of the interview. While we

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[23] We also explored whether the program induced households that were monogamous at baseline to take on another wife and become polygamous by midline, as this could plausibly change the distribution of or communication around transfers – or otherwise reduce relationship trust – among formerly monogamous households. We found no evidence for this occurring. In addition, we explored whether the treatment induced displacement of conflict from spousal disputes to co-wife disputes in polygamous households and found no evidence for this.

present Lee bounds in appendix G to assess the impact of possible selection on the internal validity of our results, we point out that these sample restrictions have implications for the generalizability of our results.

Bearing in mind these caveats, we believe that our findings have important policy implications. Our results suggest that targeting household heads, who are primarily men, reduces women's experience of IPV but does not improve other dimensions of her empowerment. That is, we find that when transfers are given to men, the lives of women from polygamous households – especially second and higher wives, who are not considered empowered by traditional measures – get better in some dimensions, even though they largely do not receive the transfer themselves, do not have a say in how it is spent, and do not show improvements in mobility or economic empowerment. Our paper thus indicates that dimensions of women's wellbeing can be improved by transfers, even when measures of their empowerment do not increase (Roy et al., 2015). However, targeting household heads, and in particular men, may reinforce gender norms and male authority as seen in the companion qualitative study (Lees et al., 2018). If impacts of cash transfers on men's emotional wellbeing are not sustained once the transfer program ends, and there are no sustained impacts on women's empowerment, then it is likely that relationship dynamics will also revert to the way things were before the program (Roy et al., 2018). Thus, a key policy implication of our findings is that some aspects of vulnerable women's lives can improve if their husbands are made better off, but that these effects may depend on household structure and may not be sustained after programs end unless improvements in well-being persist for their husbands as well.

Appendix

Appendix A. Program components

Cash transfers (CT) are paid at a central location in the village. In order to receive payments, the beneficiaries or their substitute must present their beneficiary card and identification card to bank or program agents. In cases where a payment is missed in one quarter, a double payment is made in the following quarter.

The accompanying measures (AM) training sessions are conducted by nongovernmental organizations (NGOs) in each intervention village. The curriculum for these sessions is developed by the government, which then conducts regional training for the NGOs on each group of themes just before its 6-month term. The NGO adapts messages to the regional context with input from health center doctors, translates them to the local language with assistance from village-level and circle-level health staff, develops a dissemination strategy (which can include images or radio) validated by the government office at the circle level, and trains fieldworkers. In total, six groups of themes had been developed for the first three years of the program (see Appendix Table A1). The CT distribution is also used as an opportunity to present information, as some beneficiaries who do not attend the sessions are present.

Appendix Table A1
Accompanying measures topics.

Groups of themes	Themes
1st theme	1 Use of Cash Transfer for essential needs
	2 Exclusive Breastfeeding
2nd theme	3 Complementary feeding (including PNP cooking demonstration sessions)
	4 Beneficiaries participation in organizations of the social and solidarity economy (mutual health, associations and cooperatives)
3rd theme	5 Prenatal and postnatal consultations
	6 Nutrition practices of women, in particular, pregnant women, and of sick and malnourished children
	7 Children's rights - Vaccination calendar for children and mothers
	8 Children's rights - Birth registration
4th theme	9 Respiratory Infections of Children - IRA
	10 Water, Hygiene and Sanitation - WASH
5th theme	11 Universal health and sickness coverage (CMU) - Medical Assistance Scheme (RAMED) - Health insurance schemes
	12 Importance of children and teenagers' education, in particular, young girls' education
	13 Family Economy and Stock Management
6th theme	14 Initiation and development of Income Generating Activities (IGA)

Appendix B. Details on Randomization

The first-stage randomization of communes to Treatment vs. Control occurred in a July 2014 meeting between government officials and the evaluation team, using colored beads drawn from a bag. For each region, a number of green beads corresponding to the number of intended Treatment communes and a number of red beads corresponding to the number of Control communes were put inside a closed bag. As the name of each study commune in the region was read aloud, officials took turns drawing a bead from the bag without being able to see inside; the commune was assigned to Treatment if green was drawn, and it was assigned to Control if red was drawn.

The second-stage randomization of villages to PNP or Non-PNP occurred in the following months, in public meetings within each PNP-Eligible Treatment commune. To maximize transparency and public acceptance, community leaders, including village chiefs, were in attendance. Government officials supervised these meetings and explained the rationale to all present, with a member of the evaluation team also present in many cases. In each meeting, a number of paper slips corresponding to half the number of total villages in the commune indicated receipt of PNP in the first year, and a

number of paper slips corresponding to the remaining half indicated receipt of PNP the following year. These were placed face down on a table visible to everyone present. As each village name was read aloud, a village leader would come forward and draw a face-down slip of paper which assigned the village to either "PNP" in the first year or to PNP the following year ("Non PNP"), depending on which paper was drawn.

The evaluation design is summarized in Appendix Figure B.1. Within each region, the breakdown on the number of Treatment and Control communes was chosen to be roughly proportional, so that about 20 percent of each region's communes would be Control, as summarized in Appendix Table 2. A map of the distribution of the study communes (Appendix Figure B.2) reveals that treatment and control communes are well spread out across the five southern regions of Mali.
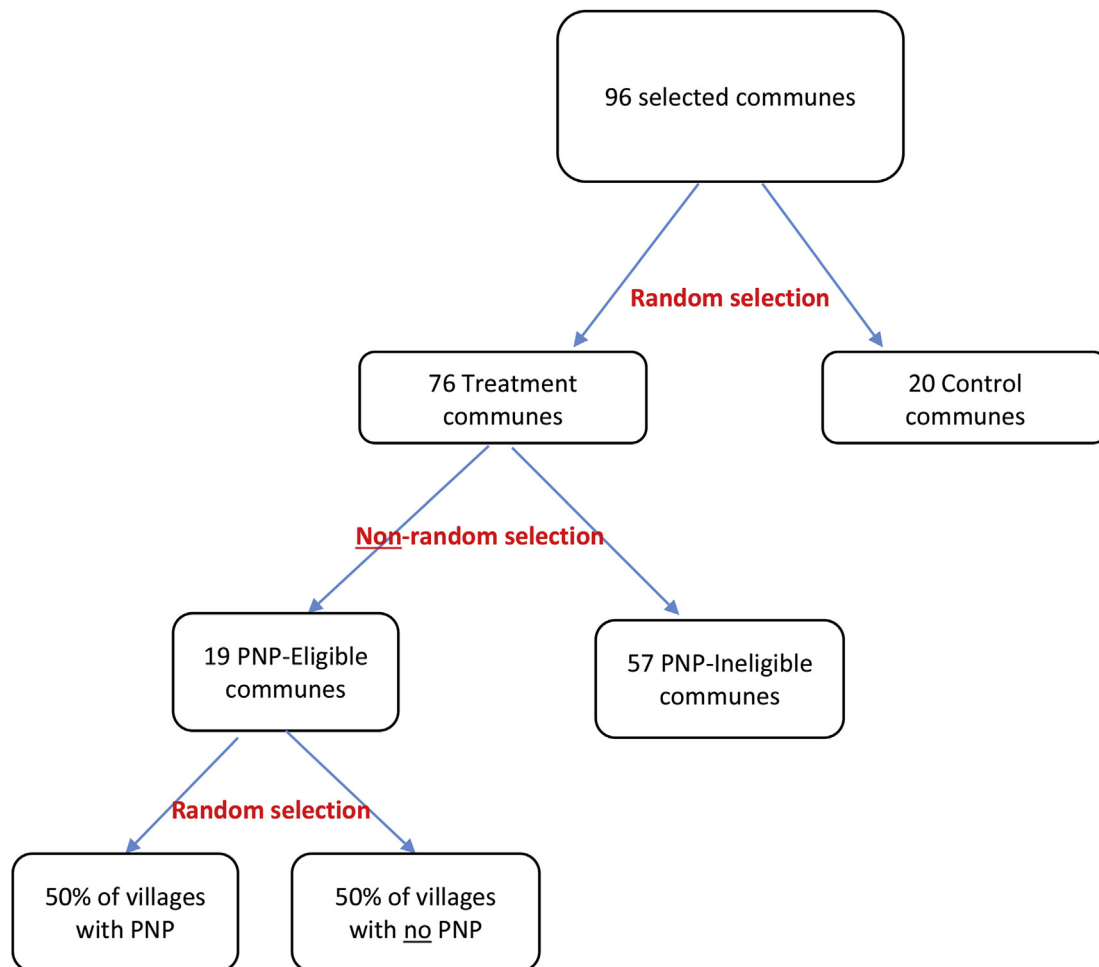
Appendix Fig. B.1. Two-stage randomized evaluation design
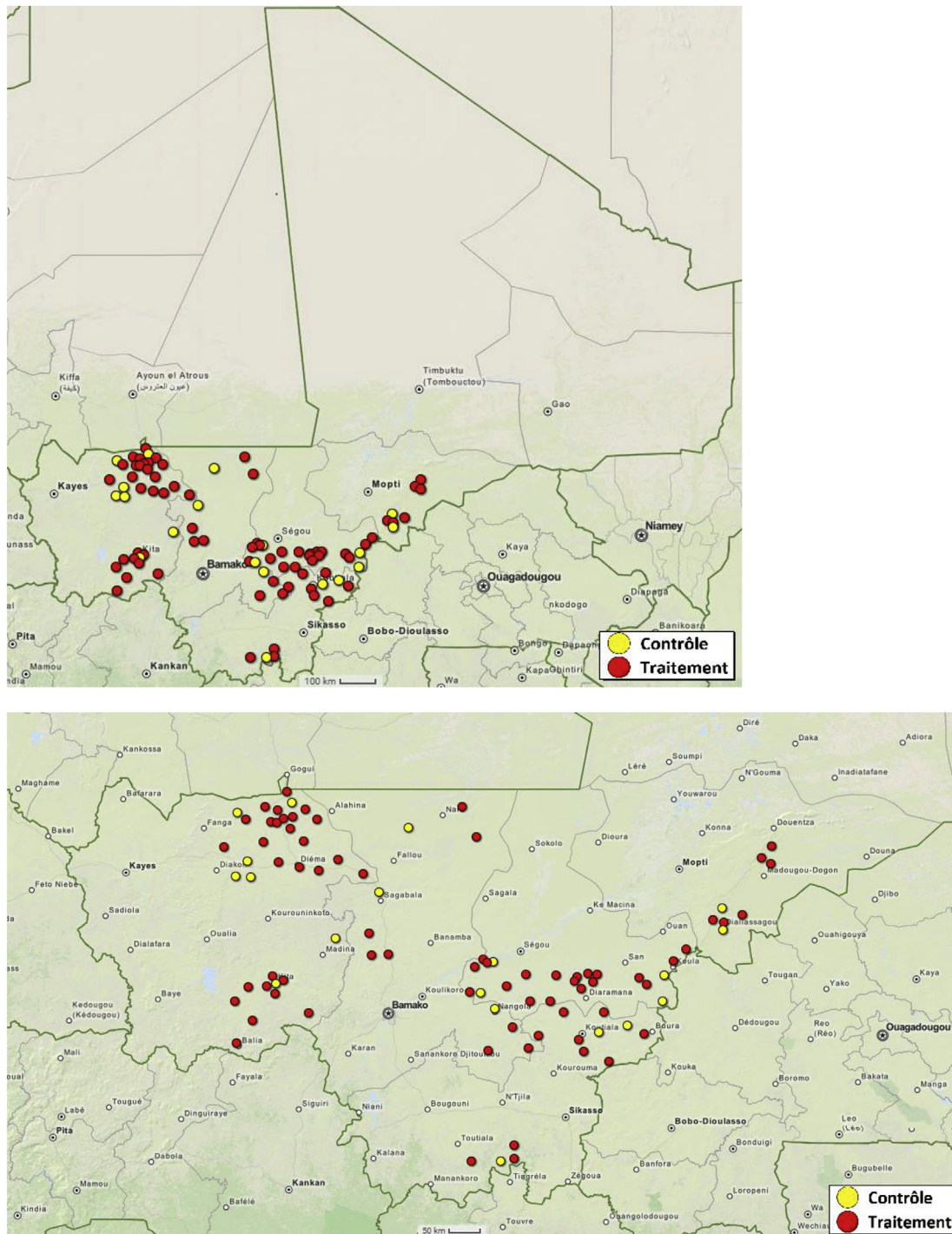
Appendix Fig. B.2. Maps of study communes in evaluation design

Appendix C. Details on sample design

The sampling procedure for the baseline survey used a two-stage probability proportional to size sampling (PPS) method. In the first stage, villages were sampled based on their "population" size (where population refers to total number of CT beneficiary households), and in the second stage, the same number of households within each selected village were randomly sampled. With this process, larger villages in terms of total number of beneficiaries had a higher probability of being sampled in the first stage; and in the second stage, beneficiary households in larger villages had a smaller probability of being sampled. The second stage compensated for the first stage, so that each beneficiary household in the commune had the same probability of being sampled. Given that the Second level randomization of PNP was at the village level, sample size calculations for the comparison of child outcomes in PNP villages to Non-PNP villages showed more villages required in PNP-Eligible communes. Thus, the number of villages selected per commune depended on the treatment status of the commune. The final number of villages targeted to be sampled in each commune was 8 in Control

communes, 5 in PNP-Ineligible Treatment communes, and 10 in PNP-Eligible Treatment communes. Within each of the selected villages, 5 beneficiary households with children age 6–23 months were sampled to meet the baseline sample size requirements (see baseline report for more details). In total, 3175 households across 96 communes were planned to be sampled at baseline. Due to security issues, only 3080 households across 90 communes were actually sampled and form part of the baseline data.

Appendix D. IPV questions

READ ALOUD: Now I would like to ask you some questions about your relationship. I know some of these questions are very personal. However, your answers are very important to help us understand the situation of women in Mali. I guarantee your answers will be kept strictly confidential and will not be repeated to anyone. If anyone interrupts us I will change the topic of conversation.

IK10: To continue only if the women is alone or in the presence of children less than 59 months old.

1 = Yes she is alone or only with children less than 59 months old

2 = No she is not alone [CAPI→NEXT SECTION]

IK11. Thinking about your partner in the last 12 months, would you say that:

1 = Yes

2 = No

98 = Refuse to respond

99 = Don't know

a	He tries to keep you from seeing your friends
b	He tries to restrict contact with your family ?
c	He insists on knowing where you are at all times?
d	He ignores you and treats you indifferently?
e	He gets angry if you speak with another man?
f	He is often suspicious that you are unfaithful?
g	He expects you to ask his permission before seeking health care for yourself??
h	He does not trust you with money
I	He insults you or made you feel bad about yourself?
J	He said or did something humiliate you in front of other people?
K	He does things to scare or intimidate you (e.g. by the way he looked at you, by yelling and smashing things)?
l	He threatens to hurt you or someone you care about?

ENUMERATOR TO SAY: The next questions are about things that happen to many women, and that your current partner, or any other partner may have done to you.

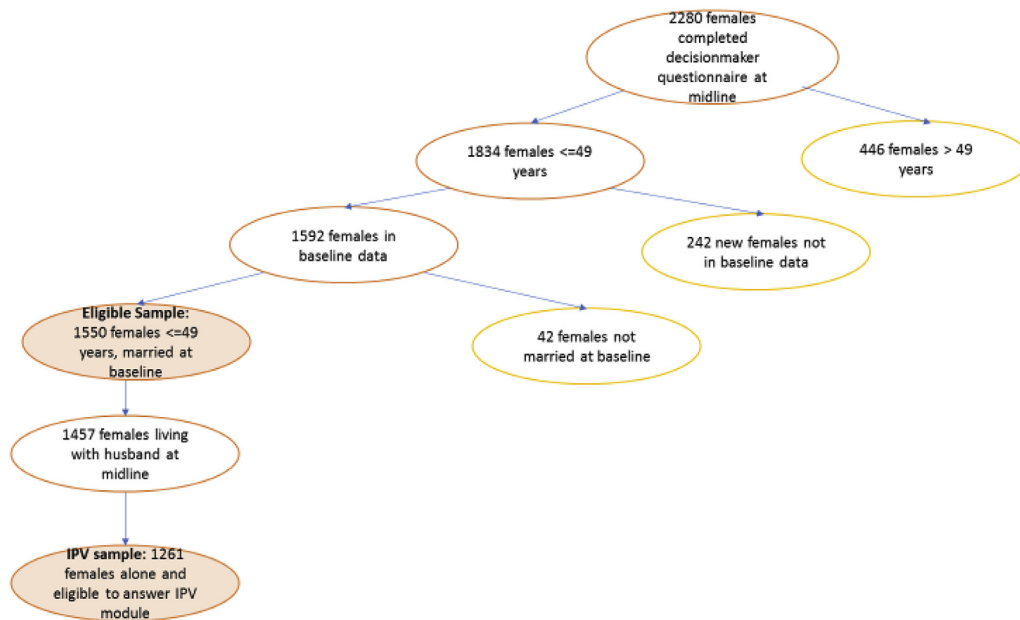IK13. In the last 12 months, has your partner …:

1 = Yes

2 = No

98 = Refuse to respond

A	Slapped you or thrown something at you that could hurt you?
B	Pushed you or shoved you or pulled your hair?
C	Hit you with his fist or with something else that could hurt you?
D	Kicked you, dragged you or beat you up?
E	Choked or burnt you on purpose?

Appendix E. IPV sample

Appendix F. Construction of Indices for Categorical Variables

Several of the variables included in our relationship quality and relationship trust index are categorical. For instance, for the question "Do you respect your spouse?", the possible responses were most of the time, sometimes, rarely and never. We transform the response to this question into three binary variables:

- Respect spouse rarely, sometimes, or most of the time
- Respect spouse sometimes or most of the time
- Respect spouse most of the time

Note that after this transformation, the more values of 1 the respondent gives, the greater the relationship trust. We prefer this transformation to treating the categorical variables as continuous, which assumes a constant marginal effect of going from never to rarely, from rarely to sometimes, and from sometimes to most of the time. If the marginal effect of each change is indeed not constant, treating the categorical variable as continuous would throw away important information by weighting each incremental change equally.

We do the same for each categorical variable included in the index, then combine these into an index by standardizing each binary variable (using the mean and standard deviation of the control group) and summing the standardized variables, in the same way as the other indices. For groups of binary variables (e.g., a set of seven areas in which couples could have a dispute), we likewise standardize and then sum each binary variable included.

Appendix G. Robustness of results.

Table G1
Impact of treatment on IPV, sample of women <70 years

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Any physical violence	0.106	0.162	−0.014	1507	0.002	930	−0.042	577	−0.044
	(0.022)	(0.032)	(0.025)		(0.026)		(0.035)		(0.032)
Index of physical violence	−0.048	0.074	−0.090	1507	−0.044	930	−0.169	577	−0.125
	(0.066)	(0.096)	(0.066)		(0.070)		(0.086)*		(0.077)
Any emotional violence	0.216	0.315	−0.045	1508	−0.014	930	−0.097	578	−0.083
	(0.029)	(0.041)	(0.032)		(0.033)		(0.045)**		(0.043)*
Index of emotional violence	−0.117	0.179	−0.094	1508	0.029	930	−0.276	578	−0.305
	(0.060)	(0.103)	(0.082)		(0.068)		(0.131)**		(0.113)***
Any controlling behavior	0.508	0.646	−0.050	1508	−0.018	930	−0.108	578	−0.090
	(0.036)	(0.042)	(0.033)		(0.043)		(0.051)**		(0.066)
Index of controlling behavior	−0.067	0.103	−0.183	1508	−0.125	930	−0.243	578	−0.118
	(0.071)	(0.086)	(0.077)**		(0.085)		(0.105)**		(0.117)

Sample includes women under age 70 who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private.

All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Table G2a
Impact of treatment on any physical violence

	Overall sample				Monogamous				Polygamous			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	−0.03	−0.03	−0.04	−0.05	0.00	−0.01	−0.02	−0.03	−0.06	−0.07	−0.08	−0.08
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)*	(0.04)	(0.04)	(0.05)
										**	**	
Woman's age		−0.01	−0.01	−0.01		−0.00	−0.00	−0.00		−0.01	−0.01	−0.01
		(0.00)	(0.00)	(0.00)		(0.00)*	(0.00)*	(0.00)		(0.00)	(0.00)	(0.00)
		***	***	***						***	***	***
Woman is household head or spouse		0.03	0.02	−0.02		0.01	0.00	−0.04		0.04	0.04	0.02
		(0.03)	(0.03)	(0.03)		(0.03)	(0.03)	(0.04)		(0.04)	(0.05)	(0.06)
Woman is literate		−0.01	−0.03	−0.00		0.01	−0.02	0.01		−0.02	−0.03	−0.00
		(0.04)	(0.04)	(0.05)		(0.05)	(0.05)	(0.06)		(0.07)	(0.07)	(0.11)
Number of children of woman 0–6 years		−0.02	−0.02	−0.02		−0.02	−0.02	−0.02		−0.02	−0.02	−0.02
		(0.01)	(0.01)	(0.01)		(0.01)*	(0.01)	(0.02)		(0.01)	(0.01)	(0.02)
		**	**									
Household size		0.00	0.00	0.00		−0.00	−0.00	−0.01		0.01	0.01	0.01
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.01)
Household head is Muslim		0.03	0.03	−0.00		0.08	0.08	0.06		−0.09	−0.09	−0.21
		(0.03)	(0.03)	(0.04)		(0.03)	(0.03)	(0.03)*		(0.07)	(0.07)	(0.10)
						***	***					**
Log value of household assets		−0.00	−0.00	0.00		−0.00	0.00	0.00		0.00	0.00	−0.00
		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)
Assets missing at baseline		0.00	0.00	0.03		0.01	0.01	0.03		−0.01	0.00	0.04
		(0.05)	(0.05)	(0.08)		(0.06)	(0.07)	(0.12)		(0.07)	(0.08)	(0.12)

Table G2a (*continued*)

	Overall sample				Monogamous				Polygamous			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Polygamous marriage at baseline		−0.00 (0.02)	0.00 (0.02)	0.01 (0.03)								
Age gap, M-F			−0.00 (0.00)	−0.00 (0.00)			−0.00 (0.00)	−0.00 (0.00)			−0.00 (0.00)	−0.00 (0.00)
Husband is literate			0.01 (0.02)	0.01 (0.03)			0.01 (0.03)	0.02 (0.04)			0.01 (0.04)	0.01 (0.05)
Husband was away at least one month in the last year			−0.04 (0.02)	−0.04 (0.03)			−0.01 (0.03)	0.00 (0.04)			−0.07 (0.04)*	−0.09 (0.05)*
Any physical violence on index mother, last 12 months				0.02 (0.03)				0.08 (0.04) **				−0.06 (0.05)
Constant	0.15 (0.03) ***	0.33 (0.11) ***	0.35 (0.12) ***	0.39 (0.14) ***	0.15 (0.03) ***	0.24 (0.13)*	0.25 (0.15)*	0.26 (0.18)	0.16 (0.03) ***	0.52 (0.15) ***	0.55 (0.16) ***	0.74 (0.22) ***
R^2	0.01	0.03	0.03	0.03	0.01	0.03	0.03	0.05	0.01	0.07	0.08	0.10
N	1261	1261	1208	834	789	789	753	523	472	472	455	311

Sample includes women under age 49 who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private.

All specifications include regional strata dummies. Standard errors in parenthesis, clustered at the commune level. *$p < 0.1$ **$p < 0.05$; ***$p < 0.01$.

Table G2b

Impact of treatment on any emotional violence

	Overall sample				Monogamous				Polygamous			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	−0.06 (0.03)	−0.06 (0.03)*	−0.06 (0.04)	−0.09 (0.04) **	−0.02 (0.04)	−0.03 (0.04)	−0.02 (0.04)	−0.06 (0.04)	−0.11 (0.05) **	−0.13 (0.05) **	−0.13 (0.05) **	−0.18 (0.06) ***
Woman's age		−0.01 (0.00) ***	−0.01 (0.00) ***	−0.01 (0.00) ***		−0.00 (0.00)	−0.00 (0.00)	−0.00 (0.00)		−0.01 (0.00) ***	−0.02 (0.00) ***	−0.02 (0.00) ***
Woman is household head or spouse		0.04 (0.04)	0.05 (0.04)	0.01 (0.04)		0.01 (0.04)	0.02 (0.04)	−0.04 (0.05)		0.06 (0.06)	0.09 (0.06)	0.10 (0.06)
Woman is literate		0.04 (0.06)	0.03 (0.06)	0.07 (0.07)		0.10 (0.08)	0.08 (0.07)	0.09 (0.08)		0.01 (0.11)	−0.00 (0.11)	0.09 (0.15)
Number of children of woman 0–6 years		0.00 (0.01)	−0.00 (0.01)	0.00 (0.01)		0.01 (0.01)	0.01 (0.01)	0.01 (0.02)		−0.01 (0.02)	−0.02 (0.02)	−0.01 (0.02)
Household size		0.00 (0.00)	0.00 (0.00)	0.00 (0.00)		0.00 (0.00)	0.00 (0.00)	0.00 (0.01)		0.00 (0.00)	0.00 (0.00)	0.00 (0.01)
Household head is Muslim		0.04 (0.04)	0.05 (0.04)	0.03 (0.05)		0.05 (0.04)	0.06 (0.04)	0.04 (0.05)		0.01 (0.07)	0.01 (0.07)	−0.03 (0.10)
Log value of household assets		0.00 (0.01)	0.00 (0.01)	−0.00 (0.01)		0.00 (0.01)	−0.00 (0.01)	−0.01 (0.01)		0.00 (0.01)	0.00 (0.01)	0.01 (0.01)
Assets missing at baseline		0.04 (0.05)	0.04 (0.05)	−0.04 (0.07)		0.06 (0.07)	0.07 (0.07)	−0.10 (0.10)		−0.02 (0.08)	−0.02 (0.09)	0.03 (0.14)
Polygamous marriage at baseline		0.02 (0.02)	0.03 (0.03)	0.04 (0.03)								
Age gap, M-F			−0.00 (0.00) ***	−0.01 (0.00) ***			−0.00 (0.00) **	−0.01 (0.00) **			−0.01 (0.00) **	−0.01 (0.00) **
Husband is literate			0.03 (0.03)	0.01 (0.04)			0.03 (0.04)	0.04 (0.05)			0.04 (0.06)	−0.02 (0.05)
Husband was away at least one month in the last year			0.03 (0.03)	0.03 (0.04)			0.06 (0.05)	0.08 (0.06)			−0.01 (0.06)	−0.04 (0.07)
Any emotional violence on index mother, last 12 months				0.14 (0.03) ***				0.15 (0.03) ***				0.11 (0.05) **
Constant	0.28 (0.04) ***	0.35 (0.12) ***	0.43 (0.14) ***	0.46 (0.16) ***	0.24 (0.05) ***	0.19 (0.16)	0.25 (0.17)	0.39 (0.20)*	0.33 (0.05) ***	0.67 (0.20) ***	0.84 (0.22) ***	0.74 (0.25) ***
R^2	0.01	0.03	0.03	0.06	0.01	0.02	0.03	0.07	0.02	0.07	0.08	0.12
N	1261	1261	1208	845	789	789	753	531	472	472	455	314

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private.

All specifications include regional strata dummies. Standard errors in parenthesis, clustered at the commune level. *$p < 0.1$ **$p < 0.05$; ***$p < 0.01$.

Table G2c
Impact of treatment on any controlling behavior

	Overall sample				Monogamous				Polygamous			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	−0.05	−0.06	−0.05	−0.03	−0.00	−0.01	0.01	0.05	−0.14	−0.16	−0.17	−0.16
	(0.03)	(0.03)*	(0.03)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)
									***	***	***	***
Woman's age		−0.01	−0.01	−0.00		−0.00	−0.00	−0.00		−0.01	−0.01	−0.01
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
		***	***	**						***	***	***
Woman is household head or spouse		−0.03	−0.02	−0.00		−0.03	−0.03	−0.05		−0.04	0.01	0.09
		(0.04)	(0.04)	(0.05)		(0.05)	(0.06)	(0.07)		(0.06)	(0.06)	(0.08)
Woman is literate		0.13	0.12	0.12		0.14	0.16	0.15		0.14	0.10	0.10
		(0.06)*	(0.07)*	(0.07)		(0.09)	(0.09)*	(0.10)		(0.09)	(0.09)	(0.12)
Number of children of woman 0–6 years		0.02	0.02	0.01		0.02	0.03	0.03		−0.00	−0.01	−0.02
		(0.01)	(0.01)	(0.02)		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
Household size		0.01	0.01	0.01		0.01	0.01	0.01		0.00	0.01	0.00
		(0.00)*	(0.00)*	(0.00)		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)
Household head is Muslim		0.03	0.03	0.02		−0.00	−0.00	−0.03		0.05	0.05	0.01
		(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.06)		(0.08)	(0.08)	(0.12)
Log value of household assets		−0.00	−0.00	−0.01		0.00	0.00	0.00		−0.00	−0.01	−0.01
		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)		(0.02)	(0.02)	(0.02)
Assets missing at baseline		−0.13	−0.12	−0.12		−0.19	−0.17	−0.14		−0.04	−0.04	−0.03
		(0.05)	(0.05)	(0.08)		(0.08)	(0.08)	(0.11)		(0.07)	(0.06)	(0.10)
		**	**			**	**					
Polygamous marriage at baseline		0.04	0.04	0.05								
		(0.03)	(0.03)	(0.04)								
Age gap, M-F			−0.00	−0.00			0.00	0.00			−0.01	−0.01
			(0.00)*	(0.00)			(0.00)	(0.00)			(0.00)	(0.00)
											***	***
Husband is literate			0.04	0.09			−0.02	0.03			0.12	0.15
			(0.04)	(0.05)*			(0.05)	(0.07)			(0.06)	(0.06)
											**	**
Husband was away at least one month in the last year			0.00	0.04			0.01	0.04			−0.02	0.03
			(0.04)	(0.05)			(0.05)	(0.07)			(0.05)	(0.06)
Any controlling behavior on index mother, last 12 months				−0.01				0.02				−0.03
				(0.03)				(0.04)				(0.05)
Constant	0.60	0.68	0.74	0.73	0.56	0.52	0.49	0.51	0.65	0.98	1.33	1.21
	(0.03)	(0.14)	(0.14)	(0.16)	(0.05)	(0.17)	(0.17)	(0.22)	(0.05)	(0.24)	(0.25)	(0.27)
	***	***	***	***	***	***	***	**	***	***	***	***
R^2	0.04	0.06	0.06	0.06	0.02	0.04	0.04	0.05	0.07	0.11	0.14	0.15
N	1261	1261	1208	850	789	789	753	533	472	472	455	317

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private.

All specifications include regional strata dummies. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01.

Table G3
P-values on treatment effects with multiple testing corrections following Westfall and Young (1993)

Treatment effects from Table 3	Overall	Mono	Poly
Any physical violence	0.3693	0.9967	0.0959
Index of physical violence	0.2769	0.9114	0.0670
Any emotional violence	0.2769	0.9114	0.0670
Index of emotional violence	0.3693	0.9967	0.0959
Any controlling behavior	0.2769	0.9967	0.0309
Index of controlling behavior	0.1051	0.6975	0.0595
Treatment effects from Table 4	Overall	Mono	Poly
Tries to keep you from seeing your friends	0.8677	0.9994	0.8297
Tries to restrict contact with your family	0.4219	0.9973	0.2984
Insists on knowing where you are at all times	0.5370	0.9772	0.4898
Ignores you and treats you indifferently	0.5294	0.8533	0.5703
Gets angry if you speak with another man	0.5370	0.9950	0.4898
Is often suspicious that you are unfaithful	0.5092	0.7936	0.7566
Expects you to ask his permission before seeking health care for yourself	0.5498	0.9994	0.2747
Insulted you or made you feel bad about yourself	0.7763	0.9994	0.2984
Belittled or humiliated you in front of other people	0.7774	0.9994	0.4432
Done things to scare or intimidate you on purpose	0.5370	0.9994	0.3764
Threatened to hurt you or some one you care about	0.8677	0.9994	0.8297
Slapped you or thrown something at you that could hurt you	0.5721	0.9994	0.2823
Pushed you or shoved you or pulled your hair	0.6267	0.9594	0.5680
Hit you with his fist or with something else that could hurt you	0.8020	0.9950	0.8297
Kicked you, dragged you or beat you up	0.5370	0.9994	0.1616
Choked or burnt you on purpose	0.7760	0.9994	0.4487
Treatment effects from Table 6	Overall	Mono	Poly

Table G3 (*continued*)

Treatment effects from Table 3	Overall	Mono	Poly
Total value of consumption (IHS transformation), per capita	0.1526	0.3396	0.2984
Value of total consumption in past 30 days (FCFA), per capita	0.1526	0.3580	0.2412
Total value of assets, per capita (IHS transformation)	0.0181	0.0282	0.2412
Total value of assets (FCFA), per capita	0.1229	0.3580	0.2133
Treatment effects from Table 7	Overall	Mono	Poly
Perceived stress scale (0–40)	0.2310	0.4516	0.1370
Standardized stress index	0.2360	0.5264	0.1370
Anxiety (worry) index	0.0711	0.3235	0.0646
Low self esteem index	0.2360	0.5264	0.1571
Treatment effects from Table 8	Overall	Mono	Poly
Any psychological aggression	0.2806	0.9529	0.0914
Any physical punishment	0.1666	0.9529	0.0104
Number of emotional and physical violent acts (0–8)	0.0622	0.7559	0.0694
Treatment effects from Table 9	Overall	Mono	Poly
Any dispute	0.8528	0.8065	0.5301
Dispute index	0.8528	0.3312	0.5301
Relationship quality index	0.7394	0.8065	0.5301
Relationship trust index	0.7881	0.1918	0.5301
Treatment effects from Table 10	Overall	Mono	Poly
Was employed/engaged in productive activity in the last 12 months, female	0.6986	0.6144	0.8371
Total hours worked in the last week	0.7959	0.6616	0.8840
Mobility Index	0.6986	0.6616	0.8621

Coefficients below report P-values from treatment effects given in Tables 3 and 4 and 6–10 adjusted for multiple testing following the free step-down resampling procedure proposed in Westfall and Young (1993). The family in each case (within which the family-wise error rate is controlled) is the set of treatment effects for each table for all households, monogamous households, and polygamous households, respectively. 10,000 bootstrap replications used in resampling.

Lee Bounds on IPV Results

Following Lee (Lee et al., 2009), we bound our estimates by trimming the upper and bottom tails of the distribution of the outcome variable. For monogamous households, treatment is positively associated with the probability of being observed, so we trim the treatment group's distribution. For polygamous households, treatment is negatively associated with the probability of being observed, so we trim the distribution of the control group. The trimming proportion is the difference in the proportion of non-missing outcomes between the treated and control group over the proportion non-missing in the treatment group. The identifying assumption for calculating Lee bounds is monotonicity, which implies that treatment assignment affects sample selection only in one direction. We assume monotonicity holds within monogamous households and polygamous households. In monogamous households, the treatment group compared to the control group is more likely to live with their husband in the last 12 months and more likely to be alone at the time of the interview. In polygamous households the treatment group is less likely to live with their husband in the last 12 months and less likely to be alone at the time of the interview. Thus within each group of households, the selection into the sample goes in the same direction.

Table G4a
Lee bounds by polygamy, physical violence

	Monogamous						Polygamous					
	Any physical			Index of physical			Any physical			Index of physical		
	Beta	Upper	Lower	Beta	Upper	Lower	Beta	Upper	Lower	Beta	Upper	Lower
Treatment	−0.01	0.00	−0.09	−0.06	−0.04	−0.25	−0.07	−0.03	−0.08	−0.26	−0.03	−0.27
	(0.03)	(0.03)	(0.03)***	(0.08)	(0.08)	(0.07)***	(0.04)**	(0.04)	(0.04)**	(0.09)***	(0.05)	(0.10)***
R^2	0.03	0.03	0.05	0.02	0.02	0.06	0.07	0.06	0.08	0.07	0.06	0.08
N	789	739	738	789	739	738	472	466	467	472	466	467
Mean of control group	0.11	0.11	0.11	−0.05	−0.05	−0.05	0.16	0.12	0.17	0.07	−0.14	0.09

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Table G4b
Lee bounds by polygamy, emotional violence

	Monogamous						Polygamous					
	Any emotional			Index of emotional			Any emotional			Index emotional		
	Beta	Upper	Lower	Beta	Upper	Lower	Beta	Upper	Lower	Beta	Upper	Lower
Treatment	−0.03	−0.01	−0.10	0.01	0.05	−0.24	−0.13	−0.09	−0.14	−0.33	−0.13	−0.35
	(0.04)	(0.04)	(0.04)***	(0.08)	(0.08)	(0.07)***	(0.05)**	(0.04)**	(0.05)***	(0.14)**	(0.09)	(0.16)**
R^2	0.02	0.02	0.03	0.01	0.02	0.04	0.07	0.07	0.07	0.07	0.05	0.07
N	789	739	738	789	739	738	472	466	467	472	466	467
Mean of control group	0.22	0.22	0.22	−0.12	−0.12	−0.12	0.32	0.28	0.33	0.18	−0.01	0.20

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Table G4c
Lee bounds by polygamy, controlling behaviors

	Monogamous						Polygamous					
	Any controlling			Index of controlling			Any controlling			Index of controlling		
	Beta	Upper	Lower	Beta	Upper	Lower	Beta	Upper	Lower	Beta	Upper	Lower
Treatment	−0.01	0.04	−0.05	−0.11	−0.06	−0.30	−0.16	−0.15	−0.19	−0.34	−0.21	−0.37
	(0.05)	(0.05)	(0.05)	(0.09)	(0.09)	(0.09)***	(0.05)***	(0.05)***	(0.04)***	(0.11)***	(0.09)**	(0.11)***
R^2	0.04	0.04	0.05	0.06	0.05	0.08	0.11	0.10	0.12	0.12	0.10	0.12
N	789	739	738	789	739	738	472	466	467	472	466	467
Mean of control group	0.51	0.51	0.51	−0.07	−0.07	−0.07	0.65	0.63	0.67	0.10	−0.02	0.14

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Appendix H. Implications of sampling strategy for spouse of decisionmaker

The spouse of the selected decisionmaker was selected as the "spouse of decisionmaker." If there was more than one eligible female spouse for a male decisionmaker, as was the case in polygamous households, then we excluded the mother of the index child (who was administered the mother-child questionnaire) and randomly sampled from the remaining wives to select the "spouse of decisionmaker." The sampling strategy meant that index mothers in polygamous households were less likely to be selected for the intimate partner violence questions than index mothers in monogamous households. In particular, in monogamous households 76 percent of women in the analysis were the mother of the index child, while in polygamous households only 10 percent of women were the mother of the index child.

Note that some of this selection is inherent in the nature of each type of household. That is, even if we had sampled a spouse of the decision-maker randomly in polygamous households to ask IPV questions, this spouse would be less likely to be mother of the index child, both because there are more wives in polygamous households, and because wives of the household head tend to be older in polygamous households.

To assess the effect that our sampling strategy had on polygamous versus monogamous households, we reconstruct a sample of all the likely wives of the index decision-maker. This procedure is not exact, because, if the decision-maker is not the head, we do not know for certain who his wives are, though we can make educated guesses based on their relationship to the household head (and that of the index-decision-maker). In particular, we assume that.

- If the index decision-maker is the household head, married women listed as wives are considered to be his spouse(s)
- If the index decision-maker is the son of a household head, married women listed as daughter in laws are considered to be his spouse(s)
- If the index decision-maker is the brother of a household head, married women listed other (related) are considered to be his spouse(s)
- If the index decision-maker is the son-in-law of a household head, married women listed as daughters are considered to be his spouse(s)
- If the index decision-maker is the step-sibling a household head, married women listed as other (not related) are considered to be his spouse(s)
- If the index decision-maker is the parent-in-law of a household head, married women listed as parent-in-laws are considered to be his spouse(s)
- If the index decision-maker is the nephew of a household head, married women listed as niece are considered to be his spouse(s)

We use this sample to assess the relationship between the age, status as the index mother, and literacy of women in monogamous versus polygamous households, both in the IPV sample and in the sample of all likely wives in Appendix Table H1.

Table H1
Summary statistics of reconstructed sample.

	monogamous	polygamous – actually sampled	polygamous – all likely wives	P-value: mono vs poly (as actually sampled)	P-value: mono vs poly (all likely wives)	P-value for test of difference in differences
age	35.570	37.840	36.219	0.000	0.000	0.034
	0.586	0.106	0.321	0.000	0.000	0.000

Table H1 (*continued*)

	monogamous	polygamous – actually sampled	polygamous – all likely wives	P-value: mono vs poly (as actually sampled)	P-value: mono vs poly (all likely wives)	P-value for test of difference in differences
index mother literate	0.043	0.054	0.063	0.269	0.193	0.220

Sample of all likely wives constructed using information about household members relationship to household head; see appendix H for details. Sampling of actual wives described in section 4b.

This test confirms that the sampling strategy increased differences in the likelihood that a respondent of the IPV sample in a polygamous household is the index mother and resulted in an older sample of women in polygamous households. As such, we conduct the following robustness tests for our main results. First, in Appendix Table H2, we control for whether the respondent is the index mother (and its interaction with polygamy). Second, while the main results controlled for age linearly, in Appendix Table H3, we include age dummies (and their interaction with polygamy). The results, given below, are essentially unchanged, providing some initial reassurance. In Section 8a, we go one step further, showing that being an index mother is not significantly associated with our IPV outcomes (Appendix Table I1) and allowing for age to be interacted with treatment to assess its role in explaining heterogeneous treatment impacts by polygamy status (Tables 11–13).

Finally, in Appendix Table H4, we show our estimates on polygamous households reweighted for the proportion of first wives versus second wives in the actual sample, versus the whole sample of wives of decision-makers. We do this because the sampling strategy also oversampled first wives (who are 42.8 of the actual sample, versus 39.5 of the sample of all likely wives). While this difference is not statistically significant (P = 0.4156), we nonetheless assess the extent of the changes in the results. The results are again very similar.

Table H2
Impact of treatment on IPV controlling for index mother interacted with polygamy status

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Any physical violence	0.106	0.162	−0.014	1507	0.002	930	−0.043	577	−0.046
	(0.022)	(0.032)	(0.025)		(0.026)		(0.035)		(0.035)
Index of physical violence	−0.048	0.074	−0.092	1507	−0.045	930	−0.176	577	−0.135
	(0.066)	(0.096)	(0.066)		(0.069)		(0.086)**		(0.078)*
Any emotional violence	0.216	0.315	−0.044	1508	−0.013	930	−0.097	578	−0.082
	(0.029)	(0.041)	(0.032)		(0.033)		(0.045)**		(0.043)*
Index of emotional violence	−0.117	0.179	−0.094	1508	0.026	930	−0.277	578	−0.295
	(0.060)	(0.103)	(0.082)		(0.068)		(0.131)**		(0.115)**
Any controlling behavior	0.508	0.646	−0.049	1508	−0.019	930	−0.101	578	−0.094
	(0.036)	(0.042)	(0.033)		(0.043)		(0.051)*		(0.067)
Index of controlling behavior	−0.067	0.103	−0.183	1508	−0.129	930	−0.232	578	−0.116
	(0.071)	(0.086)	(0.077)**		(0.085)		(0.107)**		(0.120)

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators. In addition, an indicator for whether the woman was the mother of the index child interacted with polygamy are included.

Table H3
Impact of treatment on IPV controlling for age dummies interacted with polygamy status

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Any physical violence	0.106	0.162	−0.022	1507	−0.002	930	−0.044	577	−0.056
	(0.022)	(0.032)	(0.026)		(0.027)		(0.034)		(0.037)
Index of physical violence	−0.048	0.074	−0.114	1507	−0.049	930	−0.172	577	−0.156
	(0.066)	(0.096)	(0.069)		(0.072)		(0.087)*		(0.082)*
Any emotional violence	0.216	0.315	−0.050	1508	−0.017	930	−0.099	578	−0.092
	(0.029)	(0.041)	(0.033)		(0.033)		(0.046)**		(0.043)**
Index of emotional violence	−0.117	0.179	−0.111	1508	0.025	930	−0.281	578	−0.308
	(0.060)	(0.103)	(0.086)		(0.069)		(0.131)**		(0.108)***
Any controlling behavior	0.508	0.646	−0.065	1508	−0.022	930	−0.110	578	−0.111
	(0.036)	(0.042)	(0.032)**		(0.043)		(0.053)**		(0.063)*
Index of controlling behavior	−0.067	0.103	−0.203	1508	−0.131	930	−0.247	578	−0.152
	(0.071)	(0.086)	(0.079)**		(0.086)		(0.108)**		(0.117)

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators. In addition, age dummies interacted with polygamy are included.

Table H4
Impact of treatment on IPV (sample weights for first versus later wives)

	Mean of control, mono	Mean of control, poly	Overall effect	N	Effect on mono	N	Effect on poly	N	Diff poly vs mono
Any physical violence	0.106	0.162	−0.022	1507	−0.002	930	−0.039	577	−0.053
	(0.022)	(0.032)	(0.026)		(0.027)		(0.033)		(0.036)
Index of physical violence	−0.048	0.074	−0.114	1507	−0.049	930	−0.158	577	−0.147
	(0.066)	(0.096)	(0.069)		(0.072)		(0.082)*		(0.080)*
Any emotional violence	0.216	0.315	−0.050	1508	−0.017	930	−0.093	578	−0.088
	(0.029)	(0.041)	(0.033)		(0.033)		(0.046)**		(0.042)**
Index of emotional violence	−0.117	0.179	−0.111	1508	0.025	930	−0.268	578	−0.300
	(0.060)	(0.103)	(0.086)		(0.069)		(0.128)**		(0.107)***
Any controlling behavior	0.508(0.036)	0.646(0.042)	−0.065(0.032) **	1508	−0.022(0.043)	930	−0.107(0.053) **	578	−0.109(0.064)*
Index of controlling behavior	−0.067(0.071)	0.103(0.086)	−0.203(0.079) **	1508(0.086)	−0.131(0.108) **	930(0.116)	−0.240	578	−0.146

Sample includes women 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. All indices normalized to have standard deviation one. Standard errors in parenthesis, clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01. Baseline control variables include female respondent characteristics (age, whether she is head or spouse of head, whether she is literate, number of children 0–6 years), household level characteristics (household size, log value of assets, and whether household head is Muslim) and region indicators.

Appendix I. Explaining observable differences across polygamous and monogamous households

Table I1
Bivariate associations of IPV by polygamy status

	Any physical violence		Any emotional violence		Any controlling behaviors	
	Mono	Poly	Mono	Poly	Mono	Poly
Woman's age	−0.00	−0.02	−0.00	−0.02	−0.01	−0.01
	(0.00)	(0.00)***	(0.00)	(0.00)***	(0.00)*	(0.01)**
Woman is household head or spouse	0.04	−0.04	−0.09	0.15	−0.19	−0.07
	(0.05)	(0.09)	(0.08)	(0.09)	(0.08)**	(0.14)
Woman is literate	−0.01	−0.18	0.10	−0.34	0.03	0.32
	(0.11)	(0.03)***	(0.19)	(0.06)***	(0.19)	(0.06)***
Woman was away at least one month in the last year	0.14	0.13	0.14	0.07	−0.16	0.02
	(0.15)	(0.13)	(0.11)	(0.17)	(0.16)	(0.17)
Woman's age at first marriage	−0.01	−0.01	−0.01	0.00	−0.03	−0.00
	(0.01)*	(0.01)	(0.01)**	(0.02)	(0.01)***	(0.02)
Woman was married previously	−0.13	0.06	−0.25	0.15	−0.02	−0.08
	(0.03)***	(0.11)	(0.03)***	(0.17)	(0.15)	(0.17)
Number of children of woman 0–6 years	−0.02	0.03	−0.01	0.07	0.02	0.02
	(0.04)	(0.03)	(0.03)	(0.03)**	(0.04)	(0.03)
Mother of index child	−0.01	0.02	−0.12	−0.14	0.03	−0.09
	(0.05)	(0.15)	(0.07)	(0.17)	(0.09)	(0.18)
Age gap, M-F	0.00	0.01	−0.00	−0.00	0.00	−0.00
	(0.00)*	(0.00)**	(0.00)	(0.01)	(0.00)	(0.01)
Husband is literate	0.04	−0.13	0.11	−0.00	−0.01	−0.02
	(0.09)	(0.08)*	(0.11)	(0.14)	(0.15)	(0.15)
Husband was away at least one month in the last year	−0.05	−0.15	0.03	−0.14	0.02	0.05
	(0.05)	(0.09)*	(0.10)	(0.12)	(0.14)	(0.09)
Household size	−0.00	0.02	0.02	0.01	0.00	0.00
	(0.01)	(0.00)***	(0.01)*	(0.01)	(0.01)	(0.01)
Log value of household assets	−0.02	0.01	0.04	−0.02	0.02	−0.04
	(0.02)	(0.02)	(0.02)**	(0.03)	(0.03)	(0.03)
Log value of total household consumption per capita	0.00	−0.03	0.06	−0.05	0.06	−0.09
	(0.03)	(0.06)	(0.04)	(0.06)	(0.05)	(0.09)
Household head is Muslim	0.06	−0.11	0.00	−0.03	0.03	0.05
	(0.03)*	(0.16)	(0.07)	(0.17)	(0.10)	(0.17)

Each cell represents a regression of the IPV indicator with the baseline characteristic. Sample includes women from the control group whom are 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. Standard errors in parenthesis clustered at the commune level. *p < 0.1 **p < 0.05; ***p < 0.01.

Table I2
Difference in means across polygamous and monogamous households

	Mean of control, mono	Mean of control, poly	Difference in means
Woman's age	31.21	33.29	2.08
	[7.44]	[7.93]	(0.51)***
Woman is household head or spouse	0.76	0.78	0.02
	[0.43]	[0.42]	(0.03)

(continued on next column)

Table I2 (*continued*)

	Mean of control, mono	Mean of control, poly	Difference in means
Woman is literate	0.04	0.04	0.00
	[0.21]	[0.21]	(0.01)
Woman was away at least one month in the last year	0.05	0.08	0.03
	[0.23]	[0.28]	(0.02)
Woman's age at first marriage	16.51	16.46	−0.05
	[2.63]	[2.61]	(0.15)
Woman was married previously	0.07	0.11	0.04
	[0.26]	[0.32]	(0.02)**
Number of children of woman 0–6 years	1.88	1.35	−0.54
	[0.98]	[1.11]	(0.06)***
Mother of index child	0.76	0.10	−0.66
	[0.43]	[0.29]	(0.02)***
Age gap, M-F	11.81	13.65	1.84
	[7.86]	[7.85]	(0.48)***
Husband is literate	0.15	0.17	0.02
	[0.36]	[0.38]	(0.02)
Husband was away at least one month in the last year	0.15	0.15	−0.00
	[0.36]	[0.35]	(0.02)
Household size	8.72	12.84	4.12
	[3.69]	[4.80]	(0.28)***
Log value of household assets	11.98	12.46	0.48
	[1.44]	[1.45]	(0.09)***
Log value of total household consumption per capita	8.89	8.68	−0.21
	[0.67]	[0.67]	(0.05)***
Household head is Muslim	0.87	0.93	0.06
	[0.33]	[0.25]	(0.03)*

Sample includes women who are 49 years or younger who were married at baseline who were listed as the decisionmaker or spouse of decision-maker and were able to be asked the IPV module in private. Standard deviations in brackets, Standard errors in parenthesis clustered at the commune level. *$p < 0.1$ **$p < 0.05$; ***$p < 0.01$.

References

Abramsky, Tanya, H Watts, Charlotte, Garcia-Moreno, Claudia, Devries, Karen, Kiss, Ligia, Ellsberg, Mary, Jansen, Henrica AFM., Heise, Lori, 2011. What factors are associated with recent intimate partner violence? Findings from the WHO multi-country study on women's health and domestic violence. BMC Public Health 11 (1), 109. https://doi.org/10.1186/1471-2458-11-109.

Akresh, Richard, Chen, Joyce J., Moore, Charity T., 2016. Altruism, cooperation, and efficiency: agricultural production in polygynous households. Econ. Dev. Cult. Change 64 (4), 661–696.

Angelucci, Manuela, 2008. Love on the rocks: domestic violence and alcohol abuse in rural Mexico love on the rocks: domestic violence and alcohol abuse in rural Mexico *. Journal of Economic Analysis & Policy Contributions The B.E. Journal of Economic Analysis & Policy 8 (1). https://doi.org/10.2202/1935-1682.1766.

Baland, Jean-marie, Ziparo, Roberta, 2017. Intra-household bargaining in poor countries. WIDER Working. Paper 2017/108.

Barr, Abigail, Dekker, Marleen, Janssens, Wendy, Kebede, Bereket, Kramer, Berber, 2017. Cooperation in Polygynous Households. IFPRI Discussion Paper 1625.

Behrman, Julia Andrea, 2018. "Polygynous Unions and Intimate Partner Violence: A Social Interrogation of 'Risk Factors' in Nigeria. Oxford.

Beynon, John, Allan, Stuart, 2001. Masculinities and Culture. Open University Press.

Bobonis, Gustavo J., González-Brenes, Melissa, Castro, Roberto, 2013. Public transfers and domestic violence: the roles of private information and spousal control. Am. Econ. J. Econ. Policy 5 (1), 179–205. https://doi.org/10.1257/pol.5.1.179.

Bove, Riley, Valeggia, Claudia, 2009. "Polygyny and women's health in sub-saharan Africa. Soc. Sci. Med. 68 (1), 21–29. https://doi.org/10.1016/j.socscimed.2008.09.045.

Bove, Riley, Vala-Haynes, Emily, Valeggia, Claudia, 2014. "Polygyny and women's health in rural Mali. J. Biosoc. Sci. 46 (1), 66–89. https://doi.org/10.1017/S0021932013000059.

Buller, Ana Maria, Hidrobo, Melissa, Peterman, Amber, Heise, Lori, 2016. "The way to a man's heart is through his stomach?: a mixed methods study on causal mechanisms through which cash and in-kind food transfers decreased intimate partner violence. BMC Public Health 16 (488), 1–13. https://doi.org/10.1080/13552074.2014.920986.

Buller, Ana Maria, Peterman, Amber, Ranganathan, Meghna, Bleile, Alexandra, Hidrobo, Melissa, Heise, Lori, 2018. A Mixed-Method Review of Cash Transfers and Intimate Partner Violence in Low- and Middle-Income Countries. World Bank Research Observer.

Canada: Immigration and Refugee Board of Canada, 2014. Mali: Polygamy, Including Conditions to Be Met for a Man to Be Able to Marry a Second Wife; Divorce, Specifically when a Woman Requests a Divorce, Including the Grounds and Treatment of Women by Society and the Authorities (2012-December 2013), 2014.

Clignet, Remi, 1970. Many Wives, Many Powers: Authority and Power in Polygynous Families. Northwestern University Press, Evanston, IL.

Cohen, S., Kamarck, T., Mermelstein, R., 1983. A global measure of perceived stress. J. Health Soc. Behav. 24, 385–396.

CPS, SSDSPF, Instat, and Info-stat, 2012. RÉPUBLIQUE DU MALI Enquête Démographique et de Santé (EDSM V).

Devries, K.M., Mak, J.Y.T., García-Moreno, C., Petzold, M., Child, J.C., Falder, G., Lim, S., et al., 2013. The global prevalence of intimate partner violence against women. Science 340 (6140).

Dutton, Donald G., 1988. Domestic Assault of Women : Psychological and Criminal Justice Perspectives. UBC Press.

Ellsberg, M., Heise, L., Peña, R., Agurto, S., Winkvist, A., 2001. Researching domestic violence against women: methodological and ethical considerations. Stud. Fam. Plan. 32 (1), 1–16.

Ellsberg, Mary, Jansen, Henrica AFM., Heise, Lori, H Watts, Charlotte, Garcia-Moreno, Claudia, 2008. "Intimate partner violence and women's physical and mental health in the WHO multi-country study on women's health and domestic violence: an observational study. The Lancet 371 (9619), 1165–1172.

Farmer, Amy, Tiefenthaler, Jill, 1997. An economic analysis of domestic violence. Rev. Soc. Econ. 55 (3), 337–358. https://doi.org/10.1080/00346769700000004.

Gibson, Mhairi A., Ruth, Mace, 2007. Polygyny, reproductive success and child health in rural ethipia: why marry a married man? J. Biosoc. Sci. 39 (02), 287. https://doi.org/10.1017/S0021932006001441.

González-Brenes, Melissa, 2004. Domestic Violence and Household Decision-Making: Evidence from East Africa. Unpublished Manuscript vol. 510, 1–45.

Haushofer, Johannes, Fehr, Ernst, 2014. On the psychology of poverty. Science 344, 862–867.

Haushofer, Johannes, Ringdal, Charlotte, Shapiro, Jeremy, Wang, Xiao Yu, 2019. "Income changes and intimate partner Violence : evidence from unconditional cash transfers in Kenya.

Hayes, Brittany E., van Baak, Carlijn, 2017. Risk factors of physical and sexual abuse for women in Mali: findings from a nationally representative sample. Violence Against Women 23 (11), 1361–1381. https://doi.org/10.1177/1077801216658979.

Heise, Lori, Pallitto, Christina, García-Moreno, Claudia, Clark, Cari Jo, 2019. Measuring psychological abuse by intimate partners: constructing a cross-cultural indicator for the sustainable development goals. SSM - Population Health. https://doi.org/10.1016/J.SSMPH.2019.100377. March, 100377.

Hidrobo, Melissa, Fernald, Lia, 2013. Cash transfers and domestic violence. J. Health Econ. 32 (1), 304–319. https://doi.org/10.1016/j.jhealeco.2012.11.002.

Hidrobo, Melissa, Peterman, Amber, Heise, Lori, 2016. The effect of cash, vouchers, and food transfers on intimate partner violence: evidence from a randomized experiment in northern Ecuador. Am. Econ. J. Appl. Econ. 8 (3) https://doi.org/10.1257/app.20150048.

Hidrobo, Melissa, Roy, Shalini, Huybregts, Lieven, Njee-Bugha, Leila, Sessou, Eric, Kameli, Yves, 2018. Filets Sociaux (Jigisémèjiri) Program Midline Report. Washington, D.C.

Imbens, Guido, W., Rubin, Donald B., 2015. Causal Inference in Statistics, Social, and Biomedical Sciences. Cambridge University Press, New York.

Jewkes, Rachel, Levin, Jonathan, Penn-Kekana, Loveday, 2002. Risk factors for domestic violence: findings from a South African cross-sectional study. Soc. Sci. Med. 55.

Kapiga, Saidi, Harvey, Sheila, Muhammad, Abul Khalie, Stockl, Heidi, Mshana, Gerry, Hashim, Ramadhan, Hansen, Christian, Lees, Shelley, Watts, Charlotte, 2017. Prevalence of intimate partner violence and abuse and associated factors among women enrolled into a cluser randomised trial in northwestern Tanzania. BMC Public Health 17 (190), 1–11. https://doi.org/10.1016/j.amepre.2006.01.015.

Karamagi, As, Charles, James, K Tumwine, Tylleskar, Thorkild, Heggenhougen, Kristian, 2006. Intimate Partner Violence against Women in Eastern Uganda: Implications for HIV Prevention. https://doi.org/10.1186/1471-2458-6-284.

Kazianga, Harounan, Klonner, Stefan, 2009. The Intra-household Economics of Polygyny: Fertility and Child Mortality in Rural Mali. Economics Working Paper Series.

Kimuna, Sitawa R., Djamba, Yanyi K., 2008. Gender based violence: correlates of physical and sexual wife abuse in Kenya. J. Fam. Violence 23 (5), 333–342. https://doi.org/10.1007/s10896-008-9156-9.

Kling, Jeffrey, Liebman, Jeffrey, Katz, Lawrence, 2007. Experimental analysis of neighborhood effects. Econometrica 75 (1), 83–119.

Lee, David S., Buchsbaum, Emily, Hwa, Vivian, Niu, Xiaotong, Pei, Zhuan, Guido, Imbens, Mccrary, Justin, et al., 2009. Training, wages, and sample selection: estimating sharp bounds on treatment effects. Rev. Econ. Stud. 76, 1071–1102. https://doi.org/10.1111/j.1467-937X.2009.00536.x.

Lees, Shelley, Kyegombe, Nambusi, Diatta, Ampa, Zongrone, Amanda, Roy, Shalini, Hidrobo, Melissa, 2018. Intimate Partner Relationships and Gender Norms in Mali: the Scope of Cash Transfers Targeted to Men to Reduce Intimate Partner Violence.

Mani, Anandi, Mullainathan, Sendhil, Shafir, Eldar, Zhao, Jiaying, 2013. Poverty impedes cognitive function. Science 341, 976–980.

Matz, Julia Anna, 2016. Productivity, rank, and returns in polygamy. Demography 53 (5), 1319–1350.

McCloskey, Laura Ann, Williams, Corrine, Larsen, Ulla, 2005. Gender inequality and intimate partner violence among women in moshi, Tanzania. Int. Fam. Plan. Perspect. 31 (03), 124–130. https://doi.org/10.1363/3112405.

McKenzie, D., 2012. Beyond baseline and follow-up: The case for more T in experiments. J. Dev. Econ. 99 (2), 210–221. https://doi.org/10.1016/j.jdeveco.2012.01.002.

Munro, Alistair, Kebede, Bereket, Tarazona-Gómez, Marcela, Verschoor, Arjan, 2010. The Lion's Share: an Experimental Analysis of Polygamy in Northern Nigeria. *GRIPS Discussion Papers*.

OECD Development Centre. Social institutions & gender index: Mali. https://www.genderindex.org/country/mali/.

Perova, Elizaveta, Vakis, Renos, 2013. Improving Gender and Development Outcomes through Agency: Policy Lessons from Three Peruvian Experiences. The World Bank.

Peterman, Amber, Valli, Elsa, Palermo, Tia, 2019. Government Anti-poverty Programming and Intimate Partner Violence in Ghana.

Rani, Manju, Bonu, Sekhar, Diop-Sidibe, Nafissatou, 2004. An empirical investigation of attitudes towards wife-beating among men and women in seven sub-saharan african countries. Afr. J. Reprod. Health 8 (3), 116. https://doi.org/10.2307/3583398.

Rosenberg, M., 1965. Society and the Adolescent Self-Image. Princeton University Press, Princeton.

Rossi, Pauline, 2016. Strategic choices in polygamous households: theory and evidence from Senegal. PSE Working *Paper* Rev. Econ. Stat. 2016 (14).

Roy, S., Hidrobo, M., Hoddinott, J., Ahmed, A., 2018. Transfers, Behavior Change Communication, and Intimate Partner Violence: Post-Program Evidence from Rural Bangladesh. In: Review of Economics and Statistics. In press.

Roy, S., Jinnat, A., Narayan, D., Agnes, Q., 2015. "Flypaper effects" in transfers targeted to women: Evidence from BRAC's "Targeting the Ultra Poor" program in Bangladesh. Journal of Development Economics 117, 1–19.

Slegh, Henny, Barker, Gary, 2013. Men , Gender Equality and Gender Relations in Mali: Findings from the International Men and Gender Summary Report no. May.

Social Institutions, Gender Index, 2014. Social Institutions and Gender Index 2014. Synthesis Report, p. 68.

Tauchen, H.V., Witte, A.D., Long, S.K., 1991. Domestic violence: a nonrandom affair. Int. Econ. Rev. 32 (2), 491–511.

Tertilt, Michèle, 2005. Polygyny, fertility, and savings. J. Political Econ. 113 (6), 1341–1371.

Westfall, P., Young, S., 1993. Resampling-Based Multiple Testing. Wiley, New York.

WHO, 2013. Global and Regional Estimates of Violence against Women Prevalence and Health Effects of Intimate Partner Violence and Non-partner Sexual Violence. World Health Organlization, Geneva.

WHO, 2016. Ethical and Safety Recommendations for Intervention Research on Violence against Women. Building on Lessons from the WHO Publication Putting Women First: Ethical and Safety Recommendations for Research on Domestic Violence against Women. World Health Organization, Geneva.

World Bank, 2015. The State of Social Safety Nets 2015. World Bank, Washington, D.C.

Zongrone, Amanda, Hidrobo, Melissa, Roy, Shalini, Huybregts, Lieven, Sessou, Eric, Diatta, Ampa Dogui, Njee-Bugha, Leila, Turowska, Zuzanna, 2018. Filets Sociaux (Jigisémèjiri) program: process evaluation report.