Matrilineal Kinship and Spousal Cooperation: Evidence from the Matrilineal Belt *

Sara Lowes†

Bocconi University and CIFAR

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Abstract: I examine how matrilineal relative to patrilineal kinship systems affect spousal cooperation. In matrilineal kinship systems, lineage and inheritance are traced through women. The structure of matrilineal kinship systems implies that, relative to patrilineal kinship systems, women have greater support from their own kin groups, and husbands have less authority over their wives. I use experimental and physiological measures and a geographic regression discontinuity design along the matrilineal belt in Africa to test how kinship systems affect spousal cooperation. Men and women from matrilineal ethnic groups cooperate less with their spouses in a lab experiment. This is not the case when paired with a stranger of the opposite sex. I examine the implications of matrilineal kinship for the well-being of women and children. Children of matrilineal women are healthier and better educated, and matrilineal women experience less domestic violence. The results highlight how household outcomes are tied to broader social structures.

Keywords: Kinship systems, matrilineality, cooperation, culture, gender, domestic violence.

JEL Classification: Z13, D13, N47, J16.

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†Bocconi University, Department of Economics and CIFAR. Email: sara.lowes@unibocconi.it. Website: www.saralowes.com.

1. Introduction

Kinship systems and marriage are fundamental social institutions for many societies. They are key to organizing production, the distribution of resources, and for determining obligations to family members. However, economists have yet to understand the relationship between kinship systems and spousal relations. Economists tend to focus on the nuclear household as an integral unit of production in isolation from broader social structures. The structure of kinship systems may have important implications for the household. In this paper I provide evidence on how variation in kinship structure affects spousal cooperation and the well-being of women and children.

Kinship systems determine the set of people to whom an individual is considered related and their social obligations to this group (Radcliffe-Brown, 1950). Kinship systems are believed to sustain cooperation within a group. Thus, an important element of a kinship system is the determination of group membership. In *matrilineal* kinship systems, which are prevalent in Central Africa, group membership and inheritance are traced through female members. Individuals are part of their mother's kinship group and inheritance is restricted to the children of the female group members. In contrast, in *patrilineal* systems individuals are part of their father's kinship group, and inheritance can only be passed on to children of male group members.[1] See Figure A1 for the global distribution of matrilineal societies (Giuliano and Nunn, 2018).

This paper examines how matrilineal kinship systems affect spousal cooperation relative to patrilineal kinship systems. Anthropologists have long puzzled over the stability of matrilineal systems, arguing that matrilineal systems create "conflicting allegiances" within the household (Fox, 1934). A large literature in anthropology suggests that matrilineal systems reduce spousal cooperation (Radcliffe-Brown, 1950; Gluckman, 1963; Richards, 1950; Douglas, 1969), an hypothesis which I test formally and has yet to be examined quantitatively.

Matrilineal systems are not symmetric with patrilineal systems. First, in both matrilineal and patrilineal kinship systems, men often retain positions of power and authority within the kin group. This is commonly known as patriarchy. Thus, in a patrilineal society, there is concordance between who determines group membership and who holds political authority,

[1]Matrilineal and patrilineal kinship systems are examples of *unilineal descent*, in which kin are defined using only one of the two parents (Fox, 1934). Most Western societies practice *cognatic* descent, in which kinship ties are traced through both parents. An individual considers people related through their mother and through their father to be kin.

while in a matrilineal society there is not.[2] Second, in matrilineal systems, husbands and wives maintain strong allegiances with their own kin group. In patrilineal systems, a wife is effectively incorporated into the lineage of her husband because she is not relevant to her kin group for determination of lineage or inheritance, reducing her ability to rely on her own kin group in the case of separation or conflict.

The asymmetries between matrilineal and patrilineal kinship systems highlight how men and women in matrilineal groups have different roles and obligations to their spouses and to their broader kin group relative to patrilineal societies. Specifically, the role of women is altered in matrilineal societies. Although matrilineal societies are not matriarchal, women are key for determining descent and have greater support from their kin network relative to patrilineal women. Therefore, they may have an improved outside option relative to patrilineal women. Additionally, the obligations men and women have to their extended kin network differ across matrilineal and patrilineal societies. A husband in a matrilineal society has allegiances to his sisters, whose children he must support because they are his heirs; likewise, a wife has allegiances to her brother, who provides her and her children with support. These relative differences in roles and obligations may have important implications for spousal cooperation (Radcliffe-Brown, 1950; Gluckman, 1963; Richards, 1950; Douglas, 1969).

To examine how kinship systems affect spousal cooperation, I collected data from 320 matrilineal and patrilineal couples in the Democratic Republic of Congo (DRC). The DRC is an ideal place to examine the effects of matrilineal kinship because it is intersected by the "matrilineal belt," which describes the distribution of matrilineal ethnic groups across the center of Africa (see Figure 1). The data were collected in a major city in the south of the DRC, where there are many matrilineal and patrilineal ethnic groups. The individuals in the sample come from villages along the border of the matrilineal belt, but they share a common institutional setting presently. Approximately 40% of the sample are from a matrilineal ethnic group, and 28 ethnic groups are represented in the sample.

I use laboratory experiments to measure cooperation within the household. I find that matrilineal individuals – both men and women – cooperate less with their spouses in a household public goods game. To overcome the challenge posed by a non-anonymous public goods game, the experiment is designed so that there is variation in how easy it is to hide income from

[2] Matrilineal kinship is not synonymous with *matriarchy*, in which women have political authority.

Figure 1: Ethnic Group Boundaries and Matrilineal Belt

the other player. Differential matrilineal cooperation is driven by these opportunities to hide income. When partnered with a stranger of the opposite sex, matrilineal individuals no longer differentially respond to opportunities to hide income, suggesting that the differential cooperation by matrilineal couples is behavior specific to being paired with a spouse and not more general to cooperation with a stranger of the opposite sex. These results are robust to clustering standard errors at the ethnic group level and wild bootstrapping the standard errors to address the small number of ethnic groups (Abadie et al., 2017).

As with any study examining the effects of culture, reverse causality and omitted variable bias are a concern. Specifically, the omitted variable bias concern is that some unobserved variable both determines the adoption of matrilineal kinship and spousal cooperation. The reverse causality concern is that in societies where women had more authority, they were more likely to adopt matrilineal kinship systems. I leverage the matrilineal belt border and a geographic regression discontinuity design to help mitigate these concerns. The geographic RD results are consistent with the OLS results: matrilineal individuals cooperate less with their spouse when it is easier to hide their income. The RD results are robust to a variety of RD specifications, bandwidths, and to the inclusion of geographic controls.

The benefit of the RD estimates over the OLS estimates is that the RD helps account for any omitted factors that vary smoothly over space. Specifically, it alleviates concerns about any spatially continuous variable either affecting the adoption of matrilineal kinship or affecting the outcomes of interest. For example, the RD helps account for any spatially continuous historical, geographic, or climatic variables. However, the RD strategy is ineffective if there are omitted factors that vary discontinuously at the border – e.g. if there are systematic differences between ethnic groups along the matrilineal belt border other than the practice of matrilineal kinship.

I present evidence that the RD assumptions are reasonable by showing balance along the matrilineal belt border for a wide variety of geographic and cultural characteristics. Though I find balance on a wide variety of geographic and cultural characteristics, the RD design has it's limitations when studying cultural practices. Generally, cultural practices are bundled together. In this case, there are other cultural practices that may vary systematically with the practice of matrilineal kinship, such as the practice of matrilocal residence after marriage and historical transfers to the groom's family upon marriage. While the focus on the paper is on matrilineal kinship, I am unable to decompose the "matrilineal treatment" bundle. The interpretation of the analysis should be that matrilineal kinship is capturing this bundled treatment which will vary from ethnic group to ethnic group in its specificities. I am unable to separate out the elements of this bundle; for example, I cannot separate the effect of tracing lineage through women from the effect of passing land to men related through a common female relative, both of which are features of matrilineal kinship systems.

Additionally, by implementing a stranger counter-factual, in which individuals are paired with a stranger of the opposite sex in addition to their spouse for the various lab experiments, I can demonstrate that the matrilineal result is not a general orientation toward individuals of the opposite sex, but rather specific to being paired with spouse. The logic is similar to a placebo test. This helps mitigate concerns about reverse causality, e.g. that the effects are driven by groups that favor women generally.

I also collect physiological data during game play to provide insight into the decision making process. Generally, researchers only observe a choice in a lab experiment; physiological data offers a novel source of information on the state of mind of participants. A key benefit of physiological data is that it is not subject to experimental demand effects, as it is an involuntary response. *A priori*, it is not clear how observed game play should map onto physiological indicators. A random subset of respondents completed ultimatum games with their spouse and with a stranger of the opposite sex while wearing equipment designed to monitor electrodermal activity (EDA). I find that when matrilineal individuals are paired with their spouses they experience a greater increase in skin conductance, a physiological response associated with stress, than patrilineal individuals. Matrilineal individuals do not exhibit a greater increase in skin conductance when they are paired with strangers of the opposite sex. These results provide some of the first evidence on the physiological effects of spousal bargaining and suggest that there is greater tension between matrilineal spouses during the bargaining task.

Though matrilineal kinship systems seem to decrease spousal cooperation, they may still have important benefits for women and children. Anthropologists note that husbands are less able to mistreat their spouses in matrilineal systems and that wives have greater support from their kin groups. Additionally, children represent part of women's outside option in matrilineal systems, as their kin group has an interest in the well-being of the children. In fact, in matrilineal systems, children may not be viewed as a public good within the household, as is commonly assumed to be the case, but rather a public good within the kin group. Appendix B presents more formally how matrilineal kinship may matter for cooperation with a modified version of a principal agent model with coercion (as in Acemoglu and Wolitzky (2011)). In this model, a wife's "cooperation" is increasing in the husband's ability to use coercion. Differences in cost of domestic violence, a woman's outside option, and incentives to invest in children are key to determining cooperation. Therefore, I examine the relationship between matrilineal kinship, domestic violence, women's well-being, and investment in children.

I present evidence that the structure of matrilineal kinship systems affects domestic violence, women's outside option, and investment in children using data from my sample and from the Demographic and Health Surveys (DHS) for DRC. First, matrilineal kinship may increase the cost of domestic violence because a wife has support from her brothers and can more easily leave an abusive husband. Consistent with this, matrilineal women in my sample are less likely to believe domestic violence is justified, and in the DHS, matrilineal women are both less likely to agree domestic violence is justified and less likely to have experienced domestic violence. This effect is most pronounced for women who have above median number of brothers, suggesting that support of the kin network is particularly important for the reduction in domestic violence.

Matrilineal kinship may also improve a woman's outside option either directly or indirectly through her children. Consistent with a better outside option, matrilineal women in my sample are happier and have views more consistent with female autonomy. Similarly, matrilineal women in the DHS report greater autonomy in decision making. Finally, in the event of a separation between husband and wife, a woman and her children return to her kin group. Investments in the children may therefore improve a wife's outside option since her kin group values these investments more than a patrilineal woman's kin group. I find that children of matrilineal women in my sample are less likely to have been sick in the last month and are better educated relative to children of patrilineal women. In the DHS, matrilineal women have fewer children that have died and their children have more years of education. These results suggest that the structure of the kin network has important implications for the well-being of women and children.

This paper is related to several literatures in economics. It is most closely related to a growing literature on understanding the importance of social structures for economic development (Greif, 1994, 2006). For example, recent work has explored the role of the clan family structure in sustaining cooperation (Greif and Tabellini, 2017), the link between family ties and economic attitudes (Alesina and Giuliano, 2014), how segmentary lineages affect incidence of conflict in Africa (Moscana et al., 2017), the link between kinship systems, cooperation, and norm enforcement (Enke, 2017), and how cousin marriages affect democracy (Schulz, 2017) and corruption (Akbari et al., 2016). Research also suggests kinship networks provide insurance (La Ferrara, 2003; Baland et al., 2016), but may also affect incentives for investment (Baland et al., 2011; Jakiela and Ozier, 2016). Thus, there is important evidence that kinship systems affect the scope and extent of cooperation and have an important evolutionary role of sustaining cooperation at the group level (Richerson et al., 2003; Henrich, 2015; McNamara and Henrich, 2017).

Despite the mounting evidence on how kin networks and other social structures have important implications for economic development, we have little evidence on how kinship systems affect outcomes in the household, an integral unit for cooperation and the unit that is generally the focus for economists. I contribute to this literature by showing that the structure of the kinship system, e.g. matrilineal relative to patrilineal kinship, affects spousal cooperation and outcomes for women and children.

The paper is also related to a large literature on the determinants of the status of women (see e.g. Giuliano (2017) for a review). Large gaps in outcomes between men and women exist in many developing countries. Women often have less education, poorer health, limited autonomy (Bertrand, 2010; Jayachandran, 2015; Anderson, Forthcoming), and are subjected to physical and emotional violence (Alesina et al., 2016; Bloch and Rao, 2002; Bobonis et al., 2013). In a recent review article, Jayachandran (2015) suggests a variety of cultural practices may affect outcomes for women, such as patrilocality (the practice of living near the groom's parents after marriage), payment of bride price or dowry, and patrilineality. There is a literature that examines the effects of some of these specific cultural practices for women's well-being (Alesina et al., 2013, 2016; Ashraf et al., 2016; Bau, 2016; Gottlieb and Robinson, 2016; La Ferrara, 2006; La Ferrara and Milazzo, 2017; Brule and Gaikwad, 2017) and the origins of these practices (BenYishay et al., 2017; Becker, 2018).

Anthropologists have long studied the variation in kinship systems and the implications of these systems for societal outcomes, but economists are just beginning to understand how kinship structure affects outcomes for women (Alesina et al., 2016; La Ferrara and Milazzo, 2017; Gneezy et al., 2009; Lowes, 2018) and children (Jayachandran and Pande, 2017).[3] I contribute to this literature by focusing on a region where many different ethnic groups share a similar geographic setting and history. By comparing individuals along the matrilineal belt, I am better able to isolate the effect of matrilineal kinship on spousal cooperation using both OLS and a geographic regression discontinuity design. This paper provides evidence that matrilineal kinship systems benefit women and children, despite undermining spousal cooperation. Additionally, I find that broader social structures such as kinship systems may not only affect the provision of public goods, but whether children are considered a public good within the household.

The paper builds on a large literature on observed inefficiencies in the household in agricultural production and lab settings (e.g Udry (1996); Ashraf (2009)).[4] I find that the structure of kinship systems affects intra-household cooperation and that observing more efficient outcomes in the household may not be synonymous with improved outcomes for women. The paper also builds on the tools often used in the experimental literature by providing the first physiological evidence from spouses and by implementing a stranger counterfactual.

[3]In work from India, Jayachandran and Pande (2017) find that the height differential between first sons and other children is mitigated in matrilineal societies.

[4]For example, Udry (1996) finds that household agricultural production does not meet the Pareto-efficient assumption of collective models of the household. Guirkinger et al. (2015) examine the efficiency of collectively owned relatively to individually owned plots, Kazianga and Wahhaj (2016) examine plot productivity of nuclear relative to extended families, Walther (2016) examines labor choices of matrilineal and patrilineal spouses in Malawi, and Barr et al. (2017) examine how polygyny affects cooperation in a lab setting. Recent lab experiments have also rejected productive efficiency in a variety of settings including the Philippines, Ethiopia, Uganda, Kenya, and India (Ashraf, 2009; Kebede et al., 2013; Iversen et al., 2011; Mani, 2011; Hoel, 2015; Castilla, 2013), as well as linked behavior in the lab to productivity outside of a lab setting (Hoel et al., 2017).

Finally, this paper relates to the literature on the relationship between economic development and outcomes for women (Duflo, 2012; Doepke and Tertilt, 2014), by providing evidence that increasing women's bargaining power may decrease spousal "cooperation," but has positive benefits for investment in children. This has implications for policy, as it suggests that observing cooperation in a setting with domestic violence should not necessarily be interpreted as greater empowerment for women.

The remainder of the paper is organized as follows. Section 2 defines matrilineal kinship and describes its origins and practice. Section 3 describes the data collection process and the experimental design and Section 4 describes the empirical strategy. Sections 5 presents the OLS and geographic RD results, and Section 6 presents the physiological results. Section 7 explores the implications of matrilineal kinship for women and children, and Section 8 concludes.

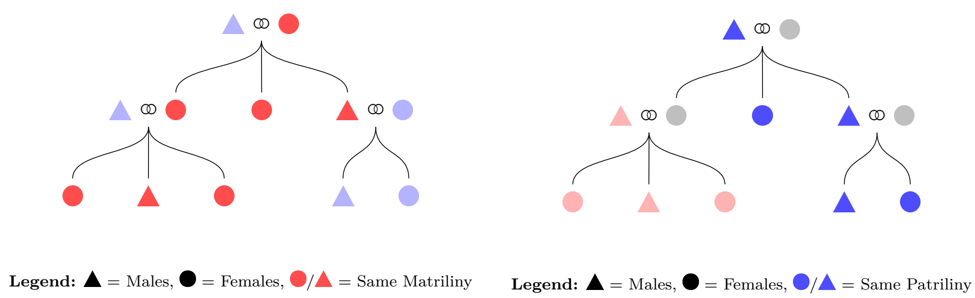
2. Matrilineal Kinship

2.1. *Overview of Matrilineal Kinship Systems*

In matrilineal kinship systems, individuals trace lineage and descent through women. Biologically, of course, an individual is related to family on both the mother's side and the father's side; however, in matrilineal systems individuals are considered kin only if they share a common female ancestor. Figure 2a illustrates the structure of matrilineal kinship systems. In the diagram, men are represented by triangles and women are represented by circles. Membership in the same matrilineal group is denoted with red. Children are in the same matrilineal group as their mothers. Likewise, a mother is in the same matrilineal group as her male and female siblings. In many matrilineal societies, the mother's brother has an important role relative to his sister's children. His inheritance and lineage will be traced through his sister's children, and he has obligations to financially support her children. Importantly, husband and wife do not share the same lineage – for all married couples one spouse is red and the other spouse is blue.

Figure 2b presents the structure of patrilineal kinship. Children are in the same group as their father, as denoted in blue. In a patrilineal society, rather than maintaining strong ties with her own lineage, a woman is effectively incorporated into the lineage of her husband upon marriage. This is because once she is married, she is not relevant for determining descent and inheritance for her lineage. This is illustrated in the patrilineal kinship diagram by the married women denoted in grey, while the unmarried daughter shares the same color as her father.

Figure 2: Diagram of Kinship Systems



(a) Matrilineal Kinship

(b) Patrilineal Kinship

The kinship groups defined by matrilineal or patrilineal systems are often important in sub-Saharan Africa. They form a basic political unit in which members recognize each other as kin and often have certain obligations toward each other (Fox, 1934). For example, members of the same matrilineal group may share land and may contribute to bride price payments for lineage members. They may also provide financial support in the form of school fees or burial payments. Thus, membership in a matrilineal or patrilineal society determines your obligations and privileges relative to your kin group.

Work in anthropology has highlighted that matrilineal systems create "conflicting allegiances" within the household (Fox, 1934). This is because a husband in a matrilineal society supports his sisters, and a wife receives support from her brothers. Additionally, matrilineal lsystems reduce men's authority over their spouses, because a woman's children belong to her lineage and it is therefore easier to leave a husband that is mistreating them. Children in a matrilineal society may increase the value of her outside option and increase her relative bargaining power. A large literature on the "matrilineal puzzle" argues that it is puzzling that matrilineal systems continue to exist because they undermine spousal cooperation (Radcliffe-Brown, 1950; Gluckman, 1963; Richards, 1950; Douglas, 1969).

Of the 1267 societies in the Ethnographic Atlas, 12 percent are matrilineal (while 46 percent are patrilineal).[5] Within sub-Saharan Africa, 15 percent of the 527 societies in the Ethnographic Atlas are matrilineal and 70 percent are patrilineal. The vast majority of these matrilineal societies are

[5]The Ethnographic Atlas is a data set compiled by George Murdock that documents the practices and customs of various societies across the world.

distributed across the center of Africa in the so called "matrilineal belt" (Richards, 1950, p.207). The matrilineal belt intersects present day Angola, Republic of Congo, DRC, Gabon, Malawi, Mozambique, Namibia, Tanzania and Zambia. Figure 1 illustrates the matrilineal belt across Africa, with matrilineal groups denoted in blue, patrilineal groups denoted in green, and bilateral and other groups in beige. For more information on the historical development and spread of matrilineal kinship systems in sub-Saharan Africa, see Appendix A.

Historically, matrilineal kinship systems are correlated with other cultural traits. Table 1 shows some of the traits that are correlated with matrilineality within Africa in the Ethnographic Atlas. The table presents traits that other work in economics has shown to be important for development, including: bride price, residence after marriage, jurisdictional hierarchy, plough use, and presence of animal husbandry (Ashraf et al., 2016; Bau, 2016; Michalopoulos and Papaioannou, 2013a; Michalopoulos et al., 2016; Alesina et al., 2013, 2016; Alsan, 2015). Not surprisingly, matrilineality is highly correlated with *matrilocal* residence patterns, which is when a couple lives in the same village as the bride's mother's kin group.[6] Historically, matrilineal groups are less likely to pay bride price, to use the plough, or to rely on animal husbandry. There is no difference in levels of jurisdictional hierarchy between matrilineal groups and other groups.

To motivate the study of matrilineal and patrilineal ethnic groups near the border of the matrilineal belt, Panel B of Table 1 presents the same historical correlates of matrilineality restricting the Ethnographic Atlas observations to those ethnic groups that can be matched to groups in the study sample.[7] In the restricted sample many of the differences observed in Panel A are no longer statistically significant, though the sample size is also quite a bit smaller. Reassuringly, the magnitudes on the coefficients are also small. Although, matrilineal ethnic groups are still more likely to be matrilocal historically, this is less relevant for individuals in the study sample, since all of the respondents now live in a common urban environment away from their villages of origin and did not practice matrilocality. Survey data confirm that most individuals in the sample practiced *neolocal* residence after marriage, moving to a location different than that of

[6]There are many potential living arrangements after marriage. In *matrilocal* (or *uxorilocal*) groups, couples live in the same village as the bride's mother's group. A type of uxorilocal residence pattern is *avunculocal* residence, in which the couple lives in the village of the bride's maternal uncle. In *patrilocal* (or *virilocal*) groups, couples live in the same village as the groom's father's group. In *natolocal* groups couples stay in their natal homes on marriage, and in *neolocal* groups they establish a new residence upon marriage (Fox, 1934).

[7]Not all ethnic groups in my sample can be matched to an observation in the Ethnographic Atlas. This is for two reasons. First, the Ethnographic Atlas sometimes aggregates smaller groups into a larger ethnic group. Additionally, some groups in my sample are just not represented in the Ethnographic Atlas.

Table 1: Historical Correlates of Matrilineality

	Matrilocal Residence	Bride Price	Jurisdictional Hierarchy	Plough Use	Animal Husbandry
	Panel A: All of Africa				
	(1)	(2)	(3)	(4)	(5)
Matrilineal	0.643***	-0.228***	-0.172	-0.0578***	-0.831***
	(0.054)	(0.056)	(0.110)	(0.022)	(0.192)
Observations	527	527	472	527	500
Mean Dep. Var.	0.104	0.831	2.201	0.074	2.516
	Panel B: Sample Ethnic Groups				
	Matrilocal Residence	Bride Price	Jurisdictional Hierarchy	Plough Use	Animal Husbandry
	(1)	(2)	(3)	(4)	(5)
Matrilineal	0.900***	-0.200	-0.375	0	0.125
	(0.102)	(0.136)	(0.837)	(0)	(0.127)
Observations	15	15	10	15	13
Mean Dep. Var.	0.600	0.867	2.700	0	1.077

Notes: Robust standard errors are in parentheses. The data are from the Ethnographic Atlas and are restricted to groups in Africa in Panel A and to ethnic groups in my sample in Panel B. Matrilineal is an indicator variable equal to 1 if the society has inheritance and descent traced through women. The other types of descent systems include patrilineal, bilateral, duolateral, ambilineal, quasi-lineages and mixed. *Matrilocal Residence* is an indicator variable equal to 1 if the society has avunculocal, uxorilocal or matrilocal residence patterns. *Bride price* is an indicator variable equal to 1 if the society has bride price. This does not include token bride price or bride service. *Jurisdictional hierarchy* is coded from 0 to 4, with 0 being no levels of political hierarchy to 4 being a large state. *Plough use* is an indicator variable equal to 1 if the society had the plough prior to colonialism or adopted it subsequently. *Animal husbandry* is coded from 0 to 9, corresponding with percentage dependence on animal husbandry. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

either spouses' families. Finally, while matrilineal groups were less likely to pay bride price historically, it is now the custom for all ethnic groups in the study area to pay bride price. There are no significant differences in amount of bride price paid between matrilineal and patrilineal individuals in my sample.[8]

2.2. *Model*

To demonstrate how matrilineal kinship may affect spousal cooperation, Appendix B presents a modified version of the principal-agent model in Acemoglu and Wolitzky (2011), who model the economics of labor coercion. In this framework, the husband is the principal and the wife is the agent. The husband uses coercion, e.g. domestic violence or the threat of domestic violence, to

[8] The survey data confirm that the payment of brideprice is a common practice for all ethnic groups. In the survey, men report whether they paid brideprice and how much they paid. Almost all couples (99%) report having paid bride price.

incentivize effort from his wife in the production of a household good that the husband controls.[9] The model assumes a patriarchal household structure and that husbands can use violence against their wives.

I choose this modified principal-agent framework rather than the collective or non-cooperative models of household bargaining for several reasons (see Appendix B for a discussion of the predictions of these models). First, this framework may be a more realistic depiction of spousal "cooperation" in a setting where men dominate in household decision making (e.g. patriarchy). Second, it is difficult to reconcile the observance of domestic violence with collective or non-cooperative models of the household. In the DHS data for the DRC, approximately 20% of women report that their husbands have threatened them with violence, half of all women report experiencing some type of physical violence by their husband, and 15% report experiencing severe physical violence.

The model yields several important predictions. First, coercion and a wife's contributions are complements. This means that a wife is more "cooperative" when there are higher levels of coercion and when coercion is less costly for the husband. Second, coercion is decreasing in the outside option of the wife. As the outside option of the wife improves, the husband cannot use as much violence or the wife will leave the marriage. Third, wives will invest more in their children if that investment has a greater relative benefit to their outside option than to their productivity within the marriage. This directly relates to what happens to the children in the event of separation. This model suggests that we may observe differences in spousal "cooperation" across matrilineal and patrilineal individuals if matrilineal kinship systems affect: the cost of domestic violence, a wife's outside option, or how investment benefits the outside option.

3. Data Collection

Data for the project were collected between June and October of 2015 in Kananga, the capital of Kasai Central province in the DRC. Kananga is a city of over a million people. The most populous ethnic group in the city is the Luluwa, a patrilineal ethnic group. However dozens of other ethnic groups are represented in the city. By collecting data in the provincial capital, rather than in

[9] Also related is work by Bloch and Rao (2002) who show how violence can be used as a bargaining tool by husband's when negotiating dowry.

smaller villages, I can ensure that couples are in a similar institutional environment today (as suggested in Fernández (2011)). It also means I have access to a broader range of ethnic groups than in a rural setting, and that the analysis does not rely on comparing just one matrilineal group to one patrilineal group.

3.1. *Sampling*

Individuals were selected for participation in the study using both random and targeted sampling methods within the city of Kananga (see Appendix G for additional details on the sampling strategy). Individuals selected to participate in the study after an initial screening survey were revisited at their homes by a team consisting of one male and one female enumerator. The enumerators asked the husband and wife if they would like to participate in the study. Ultimately, 320 individuals from the screening survey were able to participate in the study, yielding a sample of 640 individuals.[10] The final sample consists of 28 ethnic groups, 13 of which are matrilineal. The largest patrilineal groups represented in the sample are the Luluwa, Luntu, Luba, Tetela, Songe, Bindi and Dekese. The largest matrilineal groups represented in the sample are the Kuba, Sala, Mbala, Kete, Lele, Chokwe and Kongo. Thirty nine percent of the sample reported being from a tribe identified as matrilineal. The remaining individuals are from patrilineal groups. In 47 percent of the sample, patrilineal individuals were married to other patrilineal individuals. Twenty-five percent of the sample was in a fully matrilineal marriage (where both partners are from a matrilineal society) and 28 percent were in a mixed marriage, where one partner was of matrilineal descent and the other of patrilineal descent.

Figure 3 presents a map of the locations of the villages of origin for the sample and the location of the field site, Kananga.[11] The villages of origin are coded in blue for those who identify as from a matrilineal ethnic group and in green for those who identify as from a patrilineal ethnic group. The map also includes the delineation of the matrilineal belt, a border that separates matrilineal groups, which are in blue, from patrilineal groups, which are in green, as well as ethnic group boundaries digitized from Vansina (1966). Note, I construct the matrilineal belt border by tracing

[10] Individuals were unable or ineligible to participate for a variety of reasons. The primary reason for not participating is that one spouse was traveling for an extended duration. Other reasons for not participating include: illness, death, a spouse who lives outside of Kananga, divorce, or inability to locate.

[11] Village of origin is a well understood concept in this context. It does not necessarily mean where an individual was born, but rather where an individual's family come from. It can be thought of as their ancestral village.

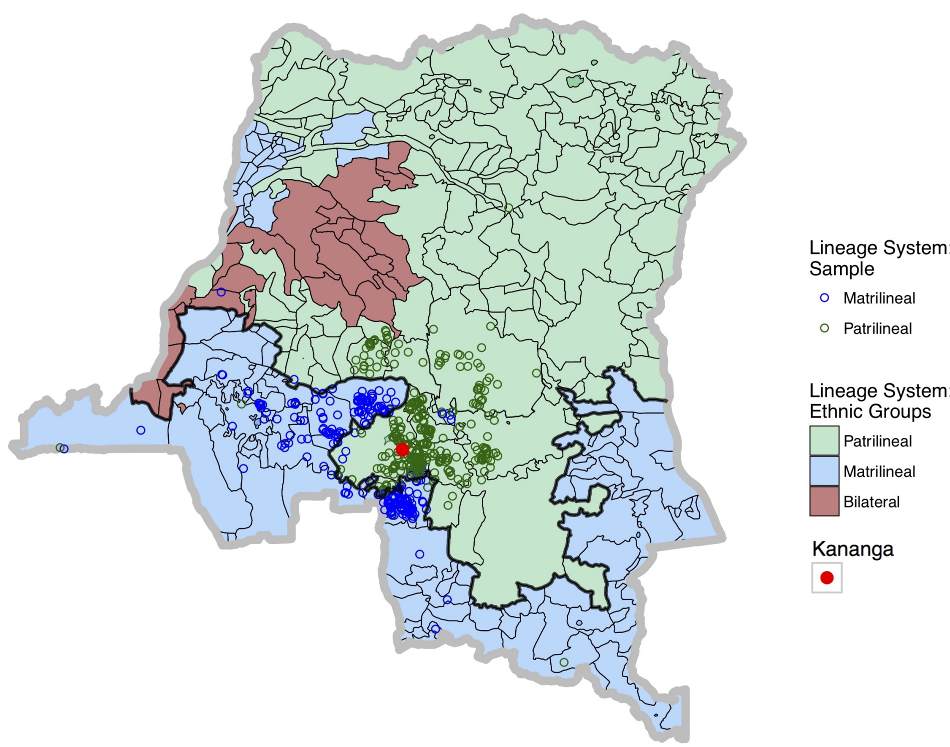
Table 2: Ethnic Groups in Sample

Matrilineal Groups		*Patrilineal Groups*	
Name	Count	Name	Count
Bunde	5	Bindi	37
Chokwe	18	Dekese	29
Kete	32	Kuchu	3
Kongo	18	Kusu	1
Kuba	52	Luba	44
Lele	28	Luba Katanga	1
Lualua	10	Luluwa	135
Lunda/Rund	3	Luntu	51
Mbala	35	Mfuya	4
Pende	6	Nyoka	2
Sala	38	Songe	37
Yansi	4	Tetela	40
Suku	1	Other	6
Total	250	**Total**	390

Notes: The "Other" patrilineal tribes not listed in the table are: Angola, Mongo, Nyambi, Nyoka, and Orendo.

the boundary between matrilineal and patrilineal ethnic groups, but this is not an actual physical boundary.

Figure 3: Matrilineal Belt, Ethnic Group Boundaries, and Villages of Origin for Sample



3.2. *Experimental Visits*

Couples were visited at their homes three different times by a team of enumerators. Each team of enumerators comprised one male enumerator and one female enumerator. In the first visit, participants completed a long survey. This survey had questions on demographics, economic activities, land ownership, family history, and a child roster. During the second visit, individuals played two versions of the dictator game (DG), three versions of a household public goods game (PG), and completed a second shorter survey. The wife and husband completed the second visit simultaneously, with a female enumerator meeting with the wife and a male enumerator meeting with the husband. This helped ensure the privacy of the respondent and prevent coordination in game play. The order of DG and PG game play was randomized across participants, as was the order of the versions of each game. The randomization of game order was stratified on gender and on matrilineal status. All questions pertaining to views on marriage and gender were asked in the second survey after participants had completed the experiments to avoid priming game play with the survey questions. The surveys and activities were administered in either French or Tshiluba, the languages spoken in this area of DRC.

In the final visit, individuals completed two versions of the ultimatum game (UG), a gender Implicit Association Test (IAT), incentivized risk and time preference questions, and a third short survey module. The majority of the sample completed the third visit at their homes, as they had done for the previous two visits. However, a subset of the sample was invited to a laboratory to complete the third visit. The lab was an office space in the center of the city of Kananga, which was was set up to allow for the collection of physiological data during game play. Participants wore devices designed to record physiological responses while making their experimental decisions. Of the 614 individuals that completed the third visit, 172 completed the third visit in the lab. The remaining 442 individuals completed the third visit in the field. Of the initial sample of 640 individuals, 26 people (or 13 couples) did not complete the third visit for various reasons (primarily traveling outside of Kananga during this round of data collection).[12]

[12]For a table summarizing the timing of visits, the activities and surveys done in each visit, and the timing of the payments, see Appendix G Table G29.

3.3. *Summary Statistics*

Individuals from matrilineal and patrilineal ethnic groups may vary on important dimensions. Therefore, Table 3 presents basic summary statistics on the sample respondents broken down by matrilineal and patrilineal and by sex. On average, the patrilineal sample is slightly older than the matrilineal sample. Patrilineal individuals have been married slightly more times, though there is no difference in the number of current wives across matrilineal and patrilineal individuals.[13] Though brideprice is traditionally associated with patrilineal ethnic groups, today most ethnic groups pay bride price. Virtually everyone in the sample reports having paid a bride price for their wife. One of the primary differences between matrilineal and patrilineal individuals in the sample is years of education. Matrilineal individuals have on average 11 years of education relative to 9 years of education for patrilineal individuals. Because there are significant differences in education, I will show that the results are robust to controlling for education and understanding of the rules of the experiment. There are no significant differences in age at which they married their spouse, current employment status, or weekly income.

Additionally, I examine migration characteristics for individuals in the sample. Matrilineal individuals are less likely to have been born in Kananga and have lived more years in their village of birth. They are more likely to have migrated to Kananga because of education opportunities, rather than other reasons for migration. Importantly, they are no more likely to have migrated to Kananga because they are an outcast, because of a disagreement, or to be with family, reasons that could feasibly be correlated with spousal cooperation (see Table G28 in Appendix G for more details on reasons for migration).

3.4. *Experimental Design*

Respondents participated in three types of experiments: a dictator game (DG), a public goods game (PG), and an ultimatum game (UG). The public goods game is meant to be a measure of respondent's intuition or heuristic about the "right way" to behave in an interaction with their spouse. Given that this a non-anonymous setting, behavior in the lab experiment will almost certainly be part of a broader "game" that an individual has with a spouse. For example, if women

[13]Polygamy, a practice where men have multiple wives, is common in this area. I specifically recruited monogamous couples, but ended up with several polygamous couples in the sample because women generally report they are in a monogamous relationship, even if their husband has multiple wives. A total of 13 couples are in a polygamous marriage. See Appendix D.4 for robustness checks controlling for polygamy.

Table 3: Sample Summary Statistics

Panel A: All of Sample

	Matrilineal	**Patrilineal**	SE	(p-value)
Age	39.5	41.6	1.192	0.088
Age Married	23.2	22.9	0.566	0.606
Age Lived with Spouse	23.3	22.9	0.545	0.517
Number of Marriages	1.11	1.18	0.036	0.044
Number of Wives	1.016	1.041	0.016	0.118
Matrilocal	0.060	0.051	0.018	0.651
Left Spouse	0.289	0.337	0.038	0.216
Years Education	11.1	9.4	0.334	0.000
Employed	0.705	0.686	0.037	0.615
Weekly Income	30.7	26.3	3.083	0.151
Savings	0.414	0.341	0.039	0.061
Obs.	640			

Panel B: Men Only

	Matrilineal	**Patrilineal**	SE	(p-value)
Age	42.7	45.9	1.63	0.054
Age Married	26.9	26.8	0.781	0.845
Age Lived with Spouse	26.9	26.7	0.752	0.717
Number of Marriages	1.18	1.29	0.065	0.085
Number of Wives	1.03	1.08	0.032	0.101
Matrilocal	0.039	0.047	0.023	0.739
Paid Bride Price	0.992	1.00	0.006	0.218
Left Spouse	0.352	0.356	0.055	0.935
Years Education	13.2	10.7	0.444	0.000
Employed	0.922	0.891	0.034	0.356
Weekly Income	37.2	31.9	5.32	0.327
Savings	0.375	0.351	0.055	0.660
Obs.	320			

Panel C: Women Only

	Matrilineal	**Patrilineal**	SE	(p-value)
Age	36.2	37.4	1.63	0.474
Age Married	19.3	19.1	0.541	0.736
Age Lived with Spouse	19.4	19.2	0.506	0.711
Number of Marriages	1.03	1.07	0.026	0.146
Matrilocal	0.081	0.056	0.029	0.372
Left Spouse	0.219	0.317	0.054	0.070
Years Education	8.98	8.13	0.420	0.044
Employed	0.480	0.487	0.058	0.895
Weekly Income	24.1	20.8	2.97	0.275
Savings	0.455	0.332	0.056	0.027
Obs.	320			

Notes: *Age* is the individuals current age. *Age Married* is the individual's age at marriage. *Age Lived with Spouse* is age at which the individual first began living with their spouse. *Number of Marriages* is the number of times the individual has been married. *Number of Wives* is the number of wives a man has currently (if polygamous). *Matrilocal* is whether the individual reports having lived with the wife's family after marriage. *Bride Price Paid* is whether the individual reports a bride price was paid at the time of marriage. *Left Spouse* is whether the individual reports having ever left their spouse for an extended period of time. *Years Education* is the number of years of education the individual has completed. *Employed* is a indicator variable equal to 1 if the individual is currently employed. *Weekly Income* is the individual's personal weekly income in dollars. *Savings* is an indicator variable equal to 1 if the individual has a savings account of some sort (formal or informal).

are not cooperative in the experiment, this could lead to retaliation by the husband outside of the experiment. In a setting with domestic violence, it is nearly impossible to have a lab experiment that reflects the incentives faced in reality. Thus, we should consider the decisions made in this public goods game as measuring an individual's sense of how to act with a spouse.

The PG is similar to a standard public goods game, but with some modifications meant to reflect the cooperation problem that couples face on a daily basis. In the most basic variation of the PG, couples met with an enumerator of the same sex and were separated from each other physically. The enumerator then explained the rules of the game in either French or Tshiluba and asked a series of test questions to ensure that the respondent understood the game. Respondents were given an initial endowment of 1,000 CF, which is equivalent to approximately one US dollar.[14]

Unlike a standard public goods game, the other player is not anonymous. Thus, I modify the structure of the public goods game to decrease the ease with which exact game play can be inferred. This was also important for human subjects reasons. Participants were given the opportunity to roll a die with three black sides and three white sides. They were told if they rolled the die and saw the black side, they would receive a "bonus" of 500 CF. Thus, those who rolled the die and saw a black side received a total endowment of 1,500 CF to use in the game. The rest received the standard endowment of 1,000 CF. The outcome of the die roll was private knowledge, i.e. the respondent's spouse would not know whether the respondent received an initial endowment of 1,000 CF or 1,500 CF. The spouses did know that their partners were given the opportunity to roll the die however, and so they know that with 50% probability their partner received 1,500 CF. The endowment was given in increments of 100 CF bills (so either 10 bills or 15 bills depending on the outcome of the die roll).

The respondent was then told to allocate their endowment across two envelopes: an envelope for themselves and a "shared" envelope. They were told that the amount they contribute to the shared envelope would be combined with the amount their spouse contributed to the shared envelope. This amount would then be increased by 1.5 by the researchers and divided evenly between the couple. The total amount of money each respondent received would thus be the sum of what they put in the envelope for themselves plus half of the increased amount in the shared envelope. To assist with understanding the payoffs associated with various allocation decisions,

[14]For the English translation of the protocols, see Appendix H.

respondents were given a table that showed them how much money they would make for various allocations. The respondent made their allocation to the two envelopes in the privacy of a tent using actual money. The enumerator then collected the two envelopes and brought them back to the study office. The money allocated to the envelopes was counted in the office, and the total amount of money each respondent earned was calculated and returned to the respondent within one week.[15]

Respondents also played an additional version of the game in which the amount contributed to the shared envelope was increased by 2, rather than by 1.5. This means that regardless of what the respondent's partner contributes to the shared envelope, the respondent will at least receive as much as they put in. This treatment makes it more costly to not cooperate with the other player.

The household public goods game combines several key features of interactions between couples. First, there is some chance of getting additional income that is unobserved by the spouse. Individuals must then decide how much of their money to keep for themselves and how much to contribute to the household. Contributions made to the household have a positive return, but there is some chance your partner may free ride and not make contributions. To maximize household income, each partner would need to contribute their entire endowment to the shared envelope. Any deviations from this strategy results in an income loss at the household level.

Qualitative evidence collected after game play suggests that the respondents understood the key tradeoffs in the game. For example, one woman said "I put money in the common pot because it is increased," while another woman said, "the husband has a monopoly on the common pot, and he can take decisions without asking me, therefore I also need to have money in my own pot". Another woman said, "I put a lot in the [shared pot] because women shouldn't have their own money". A man said, "Despite that the money in the common pot is increased, I kept a lot of money in my own pot because you never know...". These quotes highlight that the set up captures a choice the individuals are familiar with, that individuals understood the key trade offs, and that they face real tensions organizing household expenses. For additional examples of quotes from respondents, see Appendix D.1.

[15]The payouts for all versions of the DG and PG were paid approximately one week later. The payments were delivered to respondents in an envelope with the lump sum of the payments for the games. This design was required by the IRB to protect respondents from their spouses having too much of an ability to infer game play from payments.

4. Empirical Strategy

4.1. OLS

To examine the impacts of matrilineal kinships systems on the outcomes of interest, I estimate two specifications. First, I estimate a parsimonious OLS specification with a matrilineal indicator. The specification is as follows:

$$y_{i,e} = \alpha + \gamma Matrilineal_{i,e} + \mathbf{X}_i \beta + \varepsilon_{i,e} \tag{1}$$

where $y_{i,e}$ is the outcome of interest for individual i from ethnic group e; $Matrilineal_e$ is an indicator equal to 1 if ethnic group e practices matrilineal descent systems; $\mathbf{X}_i$ is a vector of covariates for individual i such as age, age squared and sex. Additional specifications include a matrilineal and female interaction term and a matrilineal and won bonus interaction term. Standard errors are clustered at the individual level. Additionally, I cluster standard errors at the ethnic group level. The tables present in square brackets the p-values resulting from clustering at the ethnic group level and wild boot-strapping the standard errors to address that there are 28 clusters.

One concern with specification (1) is that the matrilineal indicator variable is capturing the effect of something other than the practice of matrilineal kinship. Causal identification in this context is complex. From the perspective of the individual, assignment to "treatment" is exogenous in the sense that individuals do not choose their ethnic group affiliation. Rather, they are assigned an ethnicity based on their parents' ethnic group membership. However, this does not mean a matrilineal indicator variable allows for the identification of the causal effect of membership in a matrilineal ethnic group on behavior in the household for several reasons. First, omitted variable bias may be an issue. A matrilineal kinship system may be correlated both historically and currently with many traits. For example, matrilineal systems may be more likely in certain ecological environments. Second, reverse causality may also be an issue if groups that were initially more "pro-women" became more likely to adopt matrilineal kinship systems. In that case, a matrilineal indicator is capturing the effect of having this initially more favorable view toward women.[16]

[16]However, this concern may be mitigated if we believe that the initial adoption of matrilineal systems in antiquity is effectively exogenous to outcomes today.

4.2. *Geographic Regression Discontinuity*

To address identification concerns, I estimate a geographic regression discontinuity specification using the border of the matrilineal belt and the location of an individual's village of origin, v. The matrilineal belt is the delineation created by the borders of ethnic groups that practice matrilineal descent alongside groups that practice patrilineal descent. I create this border in ArcGIS after digitizing granular ethnic group borders for the DRC with data from Vansina (1966). This process is described in greater detail below.

The intuition behind the geographic RD specification is that the matrilineal belt border is determined by the borders of multiple matrilineal and patrilineal ethnic groups. The boundaries between these multiple ethnic groups are arbitrary, and along the border these areas are quite similar (note that the matrilineal belt does not coincide with any actual border). This allows me to estimate the causal effect of matrilineal institutions on my outcomes of interest using the following regression discontinuity specification:

$$y_{i,v} = \alpha + \gamma Matrilineal_{i,v} + f(location_v) + \mathbf{X}_i\beta + \varepsilon_{i,v} \tag{2}$$

where $y_{i,v}$ is the outcome of interest for individual i from a village of origin v; $Matrilineal_{i,v}$ is an indicator equal to 1 if the village of origin v is on the matrilineal side of the matrilineal belt and equal to 0 otherwise; $\mathbf{X}_i$ is a vector of covariates for individual i; and $f(location_v)$ is the RD polynomial, which controls for smooth functions of geographic location for village v.

For the baseline RD results I use a linear polynomial in latitude and longitude following recent work by Gelman and Imbens (2016), and I limit the analysis to observations within 100 kilometers of the matrilineal belt, as this restricts the range in which unobservable parameters can vary around the border of the matrilineal belt. In Appendix C I present the results for 200 kilometers and 50 kilometer bandwidths and for a variety of alternative RD specifications.[17] Additionally, Appendix C presents results with and without a series of geographic controls. The coefficient of interest is γ: the effect of originating from a village just inside the matrilineal belt on the outcome of interest. Standard errors are clustered at the village of origin level because matrilineal status is determined based on an individual's village of origin's location relative to the matrilineal belt.

The RD approach presented in equation (2) requires two identifying assumptions. The first assumption is that all relevant factors vary smoothly at the matrilineal belt border except treatment.

[17] I also calculate the Imbens-Kalyanaraman optimal bandwidth with the running variable as distance to matrilineal belt border. Depending on the outcome of interest, the optimal bandwidth is generally between 75 and 125 kilometers.

This assumption is needed to ensure that individuals located on one side of the matrilineal belt are a reasonable counterfactual for those located on the other side of the matrilineal belt. To assess the plausibility of this assumption, I estimate equation (2) using geographic characteristics as an outcome variable. The identification assumption requires that $\gamma = 0$ for exogenous geographic characteristics that might affect the outcome of interest.

The second important assumption for this regression discontinuity approach is that there was no selective sorting across the RD threshold. The assumption would be violated if, for example, more cooperative individuals sorted from the matrilineal side of the border to the patrilineal side of the border. Given that an individual's location relative to the RD border is determined by their village of origin and that village of origin is determined by where their ancestors are from, the sorting would have had to occur generations ago. Additionally, rural to rural migration in this context is difficult because access to land is often determined through the kinship group. This mitigates some concerns about selective migration along the matrilineal belt boundary. Appendix Table G28 presents reason for migration by matrilineal and patrilineal. Importantly, there does not appear to be differential selection based on how cooperative individuals are.

As highlighted in Section 2, data collection in Kananga also offers certain advantages for addressing identification concerns. By collecting data from an urban sample, individuals share a common institutional and ecological environment currently. Additionally, I am able to hold many other factors constant, making groups more comparable. For example, access to agricultural land and residence patterns after marriage are less important in this urban context. This helps address concerns about the particular bundle of goods that a matrilineal indicator captures. However, as noted in the introduction, I am unable to decompose the various components of the matrilineal treatment, and thus the results should be interpreted as the effect of the matrilineal bundle.

To generate the matrilineal belt border used in the RD, I digitize maps from Vansina (1966) that provide detailed ethnic group boundaries for over 350 ethnic groups in the DRC, improving upon the boundaries delineated by Murdock.[18] This allows me to create a more granular matrilineal belt border for the DRC than would be possible using the Murdock map, which aggregates

[18] In their work on the role of pre-colonial institutions on present day development, Michalopoulos and Papaioannou (2013b) use the ethnic group boundaries delineated by Murdock. However, they note that doing an RD along these boundaries is problematic for several reasons. First, there is drawing error in the Murdock map. Second, each polygon delineated by Murdock is assigned to a single ethnic group, while in practice groups likely overlap. Using the Vansina borders addresses these two concerns, as the Vansina maps are more detailed and represent more ethnic groups in DRC. Additionally, he assigns multiple ethnic groups to certain polygon boundaries when substantial minority groups are present.

many groups. Figure 3 is a map of the ethnic group borders as delineated by Vansina. Again, matrilineal groups are in blue and patrilineal groups are in green. Groups that Vansina identifies as bilateral are in red. Generally, only one ethnic group is assigned to a polygon, though for some polygons, multiple ethnic groups are denoted as living there. Using the Vansina ethnic group boundaries in this figure, I construct a matrilineal border, as seen in Figure 3. In the RD specification, individuals are assigned matrilineal status based on the location of their village of origin relative the matrilineal belt border. Importantly, villages of origin, self reported ethnicities, and the Vansina boundaries align for most of the individuals in my sample, suggesting that the Vansina boundaries are actually reasonable approximations of ethnic group homelands.

4.3. *Balance on Geographic and Cultural Characteristics*

To test for balance on geographic characteristics, I estimate equation 2 where the outcome is a series of geographic characteristics including elevation, precipitation, soil suitability, temperature, plough suitability and Tsetse fly suitability. I present the results in Table 4 for three bandwidths: 200 kms, 100 kms, and 50 kms. Conley standard errors are presented in brackets to account for spatial auto-correlation, and robust standard errors, clustered at the village and ethnicity levels, are in parentheses. While areas around the matrilineal border appear to be balanced on elevation, precipitation, soil suitability and plough suitability, they are not balanced on temperature or Tsetse fly suitability. However, the estimated differences are quite small relative to the means. For example, matrilineal areas are 1% colder than patrilineal areas and 1% less suitable for Tsetse fly relative to patrilineal areas. The Tsetse fly finding, that areas with matrilineal kinship are less Tsetse fly suitable, is surprising given that one of the hypotheses about the origins of matrilineal kinship is that matrilineal areas are *more* Tsetse fly suitable and therefore have fewer cattle (the presence of cattle is often correlated with patrilineal kinship). In fact, the opposite seems to be the case: matrilineal areas along the border are less Tsetse fly suitable and thus, in theory, could support more cattle (however, the effect size is quite small). Finally, I test for balance on important current cultural practices in Panel C, including whether bride price was paid, amount of bride price payment, and practice of matrilocality within my sample. I do not find any differences across these practices. Because there are no substantive differences in observables across the matrilineal belt border, this suggests that the geographic RD is a reasonable approach in this setting, with the caveat that matrilineal kinship is a treatment bundle. However, Appendix C presents the main results controlling for geographic variables.

5. Examining Spousal Cooperation

5.1. Cooperation with Spouse

I first test whether matrilineal individuals cooperate less with their spouse by examining contributions in the public goods game. More cooperative individuals contribute more to the shared envelope. Panel A of Table 5 presents the OLS results for contributions to the public good, and Panel B presents the RD results for the baseline RD specification (linear in latitude and longitude) and for a 100km bandwidth. Tables demonstrating robustness to alternative bandwidths, RD specifications (with either distance as the running variable or latitude and longitude as the running variables), and inclusion of a wide variety of geographic controls are in Appendix C. In columns 1 to 3, I stack the versions of the game with the spouse in which contributions to the shared envelope are increased by 1.5 and the version in which contributions are increased by 2. Therefore, there are two observations per individual. Standard errors for clustering at the individual level are in parentheses, and the p-values from clustering at the ethnicity level and wild bootstrapping the standard errors are in square brackets.

A first order observation is that, in general, both matrilineal and patrilineal individuals do not cooperate with their spouses - i.e. the average amount contributed to the shared pot is approximately 525 CF, which is well below the full endowment of either 1,000 CF or 1,500 CF. Second, matrilineal individuals contribute less than their patrilineal counterparts. Column 1 shows that matrilineal individuals contribute approximately 50 CF less to the shared envelope. Column 2 includes an interaction term for matrilineal and female. Both matrilineal men and matrilineal women are contributing less to the shared envelope.

Column 3 presents results with a won bonus indicator, which is equal to one if the individual won the bonus for that particular version of the game and an interaction term for matrilineal and won bonus. The coefficient for the won bonus indicator variables suggests that when individuals win the bonus, their contribution to the shared envelope increases by approximately 90 CF, which is much less than the 500 CF increase in their endowment size. The matrilineal indicator variable is no longer significant and the matrilineal and won bonus interaction term has a large negative and significant coefficient. Matrilineal individuals behave differently than

Table 4: Balance on Geographic and Cultural Characteristics

Panel A

	Elevation			*Precipitation*			*Soil Suitability*		
Sample Within:	200 kms	100 kms	50 kms	200 kms	100 kms	50 kms	200 kms	100 kms	50 kms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
In Belt	18.812	18.242	14.750	-1.565	-0.248	-0.086	0.039	0.020	0.021
	(19.213)	(13.274)	(9.619)	(1.240)	(0.513)	(0.390)	(0.028)	(0.025)	(0.025)
	[16.086]	[11.205]	[8.269]	[1.152]	[0.475]	[384]	[0.023]	[0.020]	[0.021]
Observations	614	509	330	614	509	330	555	479	319
Village Clusters	494	418	286	494	418	286	447	392	277
Ethnicities	28	25	19	28	25	19	28	25	19
Mean Dep. Var.	650.4	657.7	677.6	134.7	135.2	134.8	0.168	0.166	0.165

Panel B

	Temperature			*Plough Suitability*			*TseTse Fly Suitability*		
Sample Within:	200 kms	100 kms	50 kms	200 kms	100 kms	50 kms	200 kms	100 kms	50 kms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
In Belt	-0.285**	-0.286***	-0.240***	0.001	-0.001	-0.001	-0.010***	-0.007***	-0.004**
	(0.141)	(0.099)	(0.072)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)
	[0.123]	[0.090]	[0.065]	[0.001]	[0.001]	[0.001]	[0.003]	[0.002]	[0.002]
Observations	614	509	330	614	509	330	614	509	330
Village Clusters	494	418	286	494	418	286	494	418	286
Ethnicities	28	25	19	28	25	19	28	25	19
Mean Dep. Var.	24.35	24.31	24.20	0.126	0.125	0.125	0.632	0.634	0.632

Panel C

	Paid Bride Price			*Bride Price Amount*			*Matrilocal*		
Sample Within:	200 kms	100 kms	50 kms	200 kms	100 kms	50 kms	200 kms	100 kms	50 kms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Matrilineal	-0.005	-0.006	0.003	0.066	-0.038	-0.031	-0.023	-0.029	-0.048
	(0.004)	(0.004)	(0.005)	(0.212)	(0.165)	(0.156)	(0.028)	(0.033)	(0.036)
	[0.005]	[0.005]	[0.005]	[0.209]	[0.185]	[0.205]	[0.046]	[0.049]	[0.053]
Observations	614	509	330	614	509	330	306	257	173
Village Clusters	494	418	286	494	418	286	267	225	155
Ethnicities	28	25	19	28	25	19	28	25	19
Mean Dep. Var.	0.993	0.992	0.991	5.628	5.690	5.800	0.0588	0.0584	0.0809

Notes: The estimated regressions use a linear polynomial in latitude and longitude as the RD polynomial. I include province fixed effects. Elevation, precipitation and temperature come from the Global Climate Database created by Hijmans et al. (2005). This data provides monthly average rainfall in millimeters and elevation measures in meters. *Elevation* calculates the average elevation in meters for each village of origin. *Precipitation* is a measure of the average yearly precipitation (in millimeters of rainfall per year) for each village of origin. *Temperature* is a measure of the average yearly temperature (in degrees Celsius) for each village of origin. *Soil Suitability* is from Ramankutty et al. (2002) and Michalopoulos (2012). It is an index from 0-1, with higher values indicating higher soil suitability for agriculture. *Plough suitability* is the sum of the FAO crop suitability measures for wheat, barley and rye normalized by the share of land suitable for agriculture within a 50 km buffer around each village of origin. *TseTse Fly Suitability* is the estimated tsetse fly suitability measure from Alsan (2015) for each village of origin. *Paid Bride Price* is an indicator variable equal to 1 if individuals in my sample report that bride price was paid at time of marriage. *Bride Price Amount* is the amount of bride price paid at the time of marriage, with response options from 0 to 5, with larger values indicating larger amounts. *Matrilocal* is whether the individual reports matrilocal residence after marriage. To account for spatial autocorrelation, I present Conley standard errors in [ ] (assuming a cut-off window of 50 kms) and two-way clustered standard errors, clustered at the village of origin level and ethnicity level, in ( ). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 5: Contributions in Public Goods Games

	Dep. Var.: Amount Contributed to Shared Pot						
	Panel A: Baseline OLS						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Matrilineal	-49.549**	-59.558*	3.317	-65.984**	-83.029**	-90.519**	-84.487**
	(24.067)	(35.506)	(35.519)	(26.250)	(37.588)	(42.179)	(39.961)
	[0.1247]	[0.1113]	[0.9592]	[0.0096]	[0.0193]	[0.0355]	[0.0485]
Female	-31.188	-39.267	-32.718	2.447	-11.312	-10.293	-25.197
	(25.426)	(33.611)	(33.264)	(26.589)	(34.151)	(34.235)	(29.470)
	[0.1142]	[0.0619]	[0.0889]	[0.8946]	[0.6856]	[0.7234]	[0.1493]
Matrilineal*Female		20.124	14.135		34.271	31.624	19.819
		(48.599)	(48.417)		(52.018)	(52.141)	(44.028)
		[0.6005]	[0.7201]		[0.5427]	[0.5724]	[0.6054]
Won Bonus			87.165***			18.517	19.418
			(24.812)			(33.377)	(33.453)
			[0.0224]			[0.5981]	[0.6233]
Matrilineal*Won Bonus			-105.027***			16.048	20.140
			(37.843)			(51.752)	(51.725)
			[0.0340]			[0.6928]	[0.6154]
Matrilineal*Won Bonus*Spouse							-124.274*
							(64.930)
							[0.1146]
Observations	1,280	1,280	1,280	640	640	640	1,920
Clusters	640	640	640	-	-	-	640
Mean Dep. Var.	525.9	525.9	525.9	448.1	448.1	448.1	499.9
	Panel B: Linear Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Matrilineal	-68.858**	-88.042*	-34.392	-82.188**	-88.732*	-100.063*	-108.507**
	(33.329)	(46.020)	(45.655)	(36.399)	(48.534)	(53.283)	(49.054)
Female	-19.347	-35.303	-42.590	21.475	16.031	17.544	-13.928
	(28.502)	(39.815)	(37.208)	(29.350)	(39.965)	(40.115)	(34.745)
Matrilineal*Female		35.491	36.453		12.108	9.069	23.086
		(54.401)	(53.609)		(57.902)	(57.889)	(48.706)
Won Bonus			78.919***			40.759	41.646
			(28.750)			(39.112)	(39.234)
Matrilineal*Won Bonus			-95.601**			28.681	35.861
			(42.885)			(56.689)	(56.521)
Matrilineal*Won Bonus*Spouse							-130.639*
							(72.922)
Observations	1,018	1,018	1,018	503	509	509	1,527
Clusters	418	418	418	418	418	418	418
Mean Dep. Var.	515.6	515.6	515.6	447.3	447.3	447.3	492.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the individual level in the OLS and at the village of origin level in the RD. Additionally, p-values for clustering standard errors at the ethnic group level (28 clusters) and wild bootstrapping the standard errors are presented in []. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal in Panel A, and in Panel B it is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to Shared Pot* is the quantity of money the respondent contributed to the shared envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

their patrilineal counterparts, but only when they win the bonus. When they win the bonus, they contribute over 100 CF fewer to the shared envelope relative to patrilineal individuals who win the bonus. These results suggest that the plausible deniability about the initial endowment size is important for determining the contribution of matrilineal individuals. The unobservable income shock results in a sizable decrease in the amount contributed to the shared envelope relative to patrilineal individuals who win the bonus, resulting in greater monetary losses at the household level. It is worth noting that couples in general are failing to maximize generated income (as is consistent with previous literature), but that matrilineal coupes experience even larger monetary losses.

Panel B of Table 5 presents the results from the RD specification for individuals with villages of origin within 100 kilometers of the matrilineal belt border. Thus, the sample size decreases relative to the OLS specification, as individuals from villages over 100 kilometers from the border are dropped. However, the results are quite consistent with the OLS specification in magnitude and significance. The running variables in the baseline RD specification are latitude and longitude, rather than distance to the matrilineal belt border; for this reason, I do not present the standard 2D-RD plots in the text. However, they are available in Appendix C, as are tables demonstrating robustness to many alternative RD specifications, RD bandwidths, and the inclusion of geographic controls.

5.2. *Cooperation with Stranger*

It is possible that matrilineal individuals just behave differently than patrilineal individuals, and that the behavior observed in the public goods game with a spouse is not specific to the spouse. Thus, individuals played another version of the PG game in which the other player is a random individual from Kananga of the opposite sex. This allows me to examine whether game play is specific to the spouse or if the individual treats all members of the opposite sex in the same way. Given that spouses know each other and are involved in repeated interactions, the expectation is that they should be better able to capture the gains from cooperation.[19]

[19]Models of household interactions often assume that the Folk theorem of noncooperative game theory applies, which states that Pareto optimal outcomes can be achieved in repeated games if players are sufficiently patient (Fudenberg and Tirole, 1991). The folk theorem might reasonably apply to spousal interactions, since spouses have long term repeated interactions and good information about each other, while this is likely not the case for strangers.

Columns (4) to (6) of Table 5 present the results from the PG game in which the other player is a stranger of the opposite sex. Reassuringly, the average contribution when the other player is a stranger is lower than when it is the spouse. Now, matrilineal individuals contribute less when they do not win the bonus (this is consistent with results from a dictator game, where matrilineal individuals are on average less generous, see Appendix E). Importantly, winning the bonus has no differential effect on matrilineal individuals when their partner is a stranger of the opposite sex. Thus, while matrilineal individuals are willing to cooperate less with their spouses when they have plausible deniability about the size of their initial endowment, they do not act any differently from patrilineal individuals when they win the bonus and the partner is a stranger. This suggests that plausible deniability is no longer important to matrilineal individuals when their partner is a stranger. Finally, Column (7) stacks the three versions of the game. The matrilineal, spouse, and won bonus interaction term is negative and significant (note that the p-value for the boot strapped standard errors clustered at the ethnicity level is .11, slightly above standard significance levels). Matrilineal individuals contribute less to the public good than patrilineal individuals when they play with their spouses and win the bonus. The results from the RD specification in Panel B are consistent with the results from the OLS specification.

5.3. *Rule Breaking*

An additional way to be non-cooperative in the PG game is to break the rules of the game. I define "rule breaking" in the PG as taking the money directly (e.g. to put the money in a pocket) rather than allocating it to the envelope for self or the shared envelope. This is possible because the allocation decisions are made privately in a tent using real money. The money is put into envelopes, and then the envelopes are sealed and returned to the enumerator. By putting the money in their pocket, rather than into one of the two envelopes, the respondent ensures that they receive the money with the benefit of plausible deniability (e.g. "I did not win the bonus") when the payouts from the game are given.

Table 6 presents results on rule breaking. In Columns (1) and (2) there is no difference in rule breaking between matrilineal and patrilineal individuals when they play with their spouse. However, in Column (3), once we control for whether the individual won the bonus and add a matrilineal and won bonus interaction term, matrilineal individuals are more likely to break the rules. When matrilineal individuals win the bonus, they are 17 percentage points more likely to take money directly rather than allocating it to their envelopes when they play with their spouse. Columns (4) to (6) present results of game play with the stranger of the opposite sex. As seen in column (6), the matrilineal and won bonus interaction term is not significant when the other player is a stranger of the opposite sex. Finally, Column (7) stacks game play from the stranger and spouse versions of the game. The matrilineal, spouse, won bonus indicator is significant and large at 14.6 percentage points (note, the p-value from the wild boot strapped standard errors is .11, slightly above standard significance levels). Thus, it is only when matrilineal individuals win the bonus playing with their spouse that they are more likely to break the rules. Again, the RD results in Panel B are consistent with the OLS results. Across these two measures of cooperation in the public goods game, matrilineal individuals consistently cooperate less when they are paired with a spouse. They contribute less to the public good, particularly when they win the bonus and are more likely to break the rules of the game. Given the design of the experiment, this translates into monetary losses at the household level.

Appendix D explores alternative explanations for PG contributions, including differences in education levels, understanding the rules, trust in researchers, polygamy, time and risk preferences, and altruism. Controlling for these variables does affect the estimated results.

5.4. *Heterogeneity by Couple Type*

My sample comprises fully patrilineal couples, in which both partners are from a patrilineal ethnic group, fully matrilineal couples, in which both partners are from a matrilineal ethnic group, and mixed couples, in which one of the two spouses is from a matrilineal group and the other is from a patrilineal group. Table 7 presents results on contributions in the PG by couple type to explore if it matters which partner in the couple is matrilineal or if both partners in the couple must be matrilineal to observe differences in cooperation. Couple types include having a matrilineal woman and a patrilineal man, a matrilineal man and a patrilineal woman, and both spouses matrilineal.[20]

The results from the two versions of the PG played with the spouse are stacked. The regressions are at the individual level, but the standard errors are clustered at the couple level since the independent variable of interest - couple type - is defined at the couple level. Column (1)

[20]A common question is what kinship rule "dominates" in the case of a mixed marriage. From my data I am unable to discern which system dominates. From interviews, it seems that the system that dominates is a product of household negotiation and becomes most relevant when there is conflict between the spouses.

Table 6: Rule Breaking in Public Goods Games

	Dep. Var.: Broke Rules in Public Goods Game						
	Panel A: Baseline OLS						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Matrilineal	0.006	0.028	-0.034	0.025	0.045	0.043	0.043
	(0.030)	(0.042)	(0.038)	(0.040)	(0.057)	(0.057)	(0.050)
	[0.8580]	[0.6024]	[0.3932]	[0.6453]	[0.5100]	[0.5341]	[0.4869]
Female	-0.007	0.010	0.038	-0.044	-0.028	-0.002	0.025
	(0.031)	(0.040)	(0.037)	(0.041)	(0.052)	(0.045)	(0.032)
	[0.7084]	[0.6167]	[0.1552]	[0.4181]	[0.7226]	[0.9561]	[0.5138]
Matrilineal*Female		-0.043	-0.082		-0.041	-0.091	-0.085*
		(0.060)	(0.050)		(0.081)	(0.067)	(0.044)
		[0.4247]	[0.1285]		[0.7235]	[0.2764]	[0.1350]
Won Bonus			0.471***			0.517***	0.517***
			(0.032)			(0.042)	(0.043)
			[0.0002]			[0.0004]	[0.0002]
Matrilineal*Won Bonus			0.177***			0.039	0.032
			(0.045)			(0.067)	(0.067)
			[0.0025]			[0.6415]	[0.7094]
Matrilineal*Won Bonus*Spouse							0.146*
							(0.077)
							[0.1167]
Observations	1,280	1,280	1,280	640	640	640	1,920
Clusters	640	640	640	-	-	-	640
Mean Dep. Var.	0.445	0.445	0.445	0.436	0.436	0.436	0.442

	Panel B: Linear Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Matrilineal	-0.010	0.002	-0.047	-0.005	0.028	0.100	0.066
	(0.046)	(0.059)	(0.051)	(0.059)	(0.078)	(0.074)	(0.062)
Female	-0.006	0.004	0.032	-0.062	-0.035	-0.016	0.016
	(0.034)	(0.046)	(0.042)	(0.047)	(0.063)	(0.052)	(0.036)
Matrilineal*Female		-0.021	-0.071		-0.061	-0.091	-0.078
		(0.067)	(0.057)		(0.091)	(0.076)	(0.050)
Won Bonus			0.484***			0.564***	0.558***
			(0.038)			(0.049)	(0.049)
Matrilineal*Won Bonus			0.149***			-0.059	-0.058
			(0.052)			(0.075)	(0.075)
Matrilineal*Won Bonus*Spouse							0.208**
							(0.088)
Observations	1,018	1,018	1,018	509	509	509	1,527
Clusters	418	418	418	418	418	418	418
Mean Dep. Var.	0.453	0.453	0.453	0.438	0.438	0.438	0.448

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the individual level in the OLS and at the village of origin level in the RD. Additionally, p-values for clustering standard errors at the ethnic group level (28 clusters) and wild bootstrapping the standard errors are presented in []. Regressions control for age and age squared. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal in Panel A, and in Panel B it is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. *Spouse* is an indicator variable equal to 1 if the game is with the respondent's spouse, rather than with a stranger. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Broke Rules in Public Goods Game* is an indicator variable equal to 1 if the amount of money in the individual and shared envelope for an individual does not equal the endowment of 1,000 when they don't win the bonus or 1,500 CF when they do win the bonus. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

presents the results of a regression controlling for two variables: "one matrilineal", an indicator variable equal to 1 if either the individual themselves is matrilineal or their spouse is matrilineal, and "both matrilineal," an indicator variable equal to 1 if both the individual and their spouse are from a matrilineal ethnic group. The coefficient when both spouses are matrilineal is sizable and significant. While the coefficient on one of the spouses being matrilineal is not significant, the coefficient size is still quite large. Columns (2) through (5) present the results from separate regressions, each controlling for other variations on couple type, including: having a matrilineal woman in the couple, having a matrilineal man in the couple, having at least one matrilineal person in the couple and having exactly two matrilineal people in the couple. The coefficients across the four regressions are consistent in magnitude and direction: having one or two matrilineal people of either sex leads to lower contributions to the public good at the individual level. These results suggest that matrilineality matters when both spouses are matrilineal, but may still matter even if just one spouse is matrilineal. This analysis complements the heuristic interpretation of public goods game play, as the structural incentives will vary across couple type, and yet matrilineal individuals consistently exhibit a practice of contributing less to the household envelope.

Table 7: PG Contributions by Couple Type

	Dep. Var.: Amount Contributed to Shared Pot				
		Woman Matrilineal	**Man Matrilineal**	**Any Matrilineal**	**Both Matrilineal**
	(1)	(2)	(3)	(4)	(5)
One Matrilineal	-35.850				
	(33.848)				
Both Matrilineal	-67.014*				
	(34.167)				
		-43.913	-52.505*	-51.178*	-54.496*
		(28.860)	(28.330)	(28.466)	(31.358)
Observations	1,280	1,280	1,280	1,280	1,280
Clusters	320	320	320	320	320
Mean	525.9	525.9	525.9	525.9	525.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG played with the spouse. Standard errors clustered at the couple level. Regressions control for female, age and age squared. *One Matrilineal* is an indicator variable equal to one if there is only one matrilineal person in the couple. *Both Matrilineal* is an indicator variable equal to one if both the husband and wife are matrilineal. *Woman Matrilineal* is an indicator variable equal to 1 if the woman in the couple is from a matrilineal ethnic group. *Man Matrilineal* is an indicator variable equal to 1 if the man in the couple is from a matrilineal ethnic group. *Any Matrilineal* is an indicator variable equal to 1 if there is at least one matrilineal person in the couple. *Amount Contributed to Shared Pot* is the quantity of money the respondent contributed to the shared envelope. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

6. Physiological Evidence on Spousal Interactions

In an attempt to better understand the emotional states of individuals during game play, a subset of respondents were asked to complete the ultimatum game (UG) in a laboratory setting while wearing a device designed to monitor electrodermal activity (EDA). EDA describes the autonomic, or involuntary, changes in the electrical properties of the skin. Skin conductance describes how well the skin conducts electricity. With increased arousal, the body increases sweat activity and the skin is better able to conduct electricity. Skin conductance can be measured by applying electric potential between two points of skin contact and measuring the current flow between them. Greater skin conductance is generally associated with increased stress. The benefit of examining physiological responses to game play is that these are automatic responses that individuals cannot control. Thus, they are unlikely to be affected by experimenter demand effects. They also provide insight into how an individual is responding internally to various stimuli. Finally, models of household cooperation rarely address the psychological costs that individuals may experience during household negotiations. These effects may be non-negligible, particularly in resource constrained environments where spouses have different priorities and where domestic violence is common.

6.1. Data Collection

The lab space consisted of four rooms, two rooms in one building and two rooms in a neighboring building. Two couples were invited to the lab at a time, with the women assigned to rooms in one building and the men assigned to the rooms in the other building. This was to ensure each respondent sufficient privacy from their spouse. Respondents were asked their consent to wear devices that they were told would measure their emotional responses to the activities. These devices look similar to watches and are worn around the wrist. They were also asked their permission to have the session video recorded. For more details on the lab set up, see Appendix J. The enumerator would then begin the assigned activities with the respondent. In this case, the activities were an ultimatum game with a spouse and with a stranger. Given the set up in the lab, participants were assigned only the role of a player 1 or a player 2, rather than participating in the activities as both a player 1 and a player 2 as participants in the field did. The order of game play and assignment of player 1 or player 2 was randomized and stratified along gender and couple type.

In order to analyze a respondent's reaction to a particular stimuli, I asked enumerators to record the time of particular pre-specified events in the UG. This allowed me to sync the events with the EDA data recorded by the watch. For respondents assigned to be a player 1, these events were: (1) when the respondent announced the offer he would send to the other player and (2) when the respondent received the player 2's response to his offer. If the respondent was a player 2, the events of interest were: (1) when the respondent received the offer from the player 1 and (2) when the respondent announced whether he would accept or reject the offer from player 1. In order to make these events well defined, enumerators were given specific scripts to read for each of the above events. Thus for each respondent, I have four event times: two for the UG with the spouse and two for the UG with a stranger of the opposite sex. Given the sensitivity of EDA analysis to the exact event timing, I also precisely coded up the event time by watching the video data and noting when the particular scripts for each event were read.[21]

6.2. *Electrodermal Activity Data*

Lab participants wore Empatica E4 Wristbands that allowed for the collection of real-time physiological data. These are wearable devices that collect the following types of data: (1) electrodermal activity, (2) skin temperature, (3) blood volume pulse, (4) heart rate inter-beat interval and (5) movement (6) time.[22] For the analysis in the paper, I use the electrodermal activity (EDA) data generated by the Empatica E4 Wristbands.

Times series data of skin conductance is composed of two types of activity. The first type of activity is called *tonic* activity, which varies slowly and is captured by the *skin conductance level* (SCL). The second type of activity is the fast varying *phasic* activity and is captured by the *skin conductance response* (SCR). A SCR occurs when the sympathetic nervous system, which is responsible for the body's "fight or flight" response, sends a signal to the fibers that control the sweat glands.[23] The amplitude of the SCR is a linear function of the number of activated sweat

[21]The event times recorded by the enumerator were used as a guide while watching the video, but by reviewing the video myself, I was able to ensure that the times used in the analysis were as accurate as possible, given that the relevant response window is within 1 to 5 seconds of the stimulus.

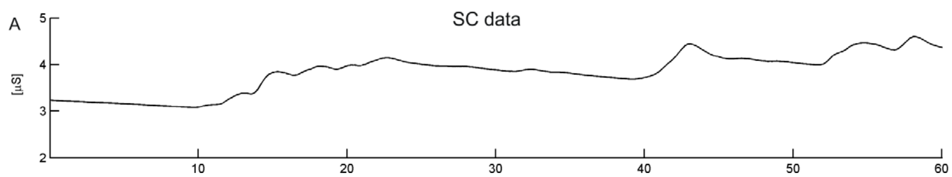
[22]For more information on the E4 Wristband, see https://www.empatica.com/e4-wristband.

[23]The activity of sweat glands is regulated by sudomotor fibers. A sympathetic nervous system response affects the firing rates of sudomotor fibers, which in turn trigger changes in the activity of sweat glands. A sudomotor nerve burst, i.e. activity in the sympathetic nervous system, is the concurrence of multiple sudomotor fibers firing. Thus, sudomotor nerve bursts are associated with observable skin conductance responses (Benedek and Kaernbach, 2010).

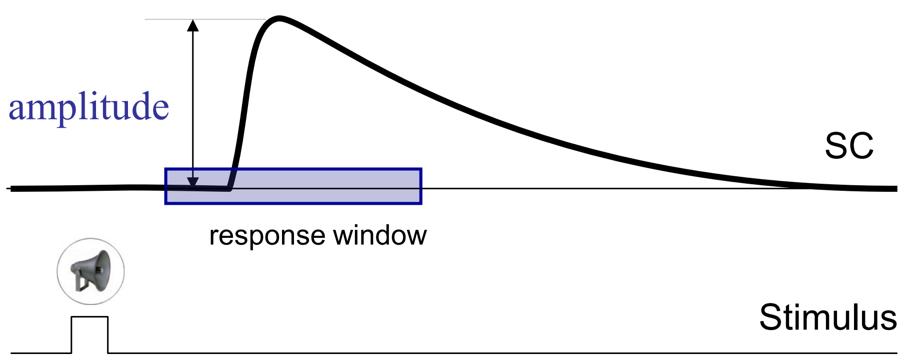
glands, and is thus considered a measure of sympathetic activity. SCRs can be stimuli-specific or they can be non-event related. A SCR is characterized by a steep incline in skin conductance followed by a slower decline in skin conductance. EDA is measured in microSiemens, denoted μS. See Figure 4a for an example of skin conductance data over time.

Figure 4: Examples of Skin Conductance Data

(a) Skin Conductance Over Time



(b) Example of TTP Measurement

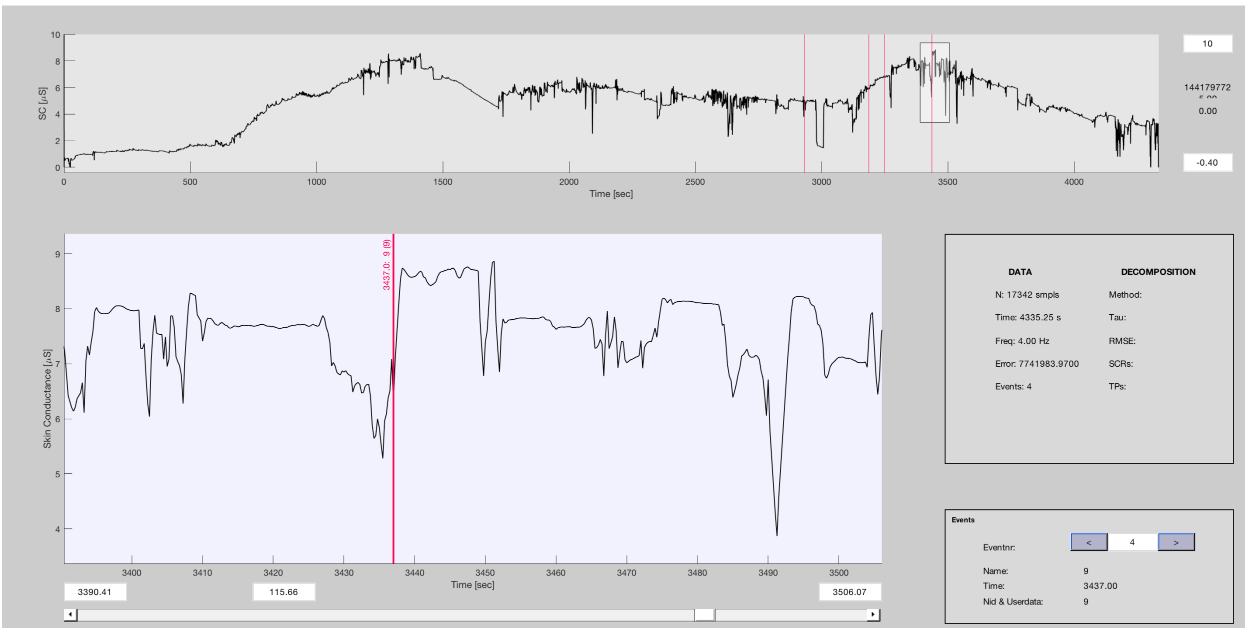


These figures are from Benedek (2016).

Importantly, a SCR is involuntary and occurs shortly after arousal of the sympathetic nervous system. Given that EDA is easily measured, cannot be consciously controlled, and captures changes in sympathetic activity, it can be used to measure changes in emotional states. Research across various fields have confirmed that EDA can be used as a measure of emotional arousal (Boucsein, 1992). In the present setting, it can provide evidence on the experience of the decision making process itself, rather than just observing the outcome of the lab experiment. The typical way to quantify SCRs is with trough-to-peak (TTP) analysis. The SCR amplitude is measured as the difference in the skin conductance values at the peak and the preceding trough within a particular time window, as in Figure 4b.

The data was analyzed using Ledalab (version 3.4.9), a MatLab based program.[24] I imported the raw data produced by the Empatica E4 Wristbands as well as text files with the event time markers into Ledalab. The resulting files thus had the skin conductance data for an individual for the duration of the experiment with markers denoting when a particular event of interest occurred. For an example of what the data looks like, see Figure 5. At the top of the figure is all of the skin conductance data over the course of the lab session. The lower panel is a zoomed in version of a portion of the top panel. The event times of interest are denoted by red lines.

Figure 5: Example of Data Analysis in Ledalab



The data was analyzed to detect event-related SCRs.[25] SCRs of a pre-specified minimum amplitude that occur within several seconds of a particular stimulus can be attributed to that stimulus. A response window of 1 to 4 seconds after the event was used with a minimum amplitude threshold criterion of 0.01 μS. The resulting variable of interest for the TTP analysis is the sum of the SCR-amplitudes of significant SCR responses during the 1 to 4 second window.

Table 8 presents the results from the analysis of the EDA data, in which all events are stacked and the outcome of interest is the SCR amplitude. As seen in column (1), matrilineal individuals have a larger SCR amplitude when they are paired with their spouse relative to a patrilineal individual. Column (2) controls for the amount that the player 1 sent to the player 2, and Column (3) includes session fixed effects, to control for the time of day that the participant did

[24]For more information on Ledalab, visit http://www.ledalab.de/.

[25]There are also non-specific SCRs, which occur in the absence of identifiable stimuli.

the experiment. In terms of standardized effects, being matrilineal and playing the UG with a spouse is associated with a 0.289 standard deviation increase in the TTP measure, regardless of the amount of money offered by the player 1. Column (4) presents SCR amplitude when paired with a stranger in the UG. The coefficient on matrilineal is negative and small in magnitude. Finally, columns (6) to (9) present the results from stacking the event responses in game play with spouse and with stranger. The interaction term of matrilineal and spouse is positive and significant, suggesting that when a matrilineal individual is paired with their spouse they have a larger physiological response during UG game play.

I also present the results for player 1s only in Panel B of Table 8. The results are consistent with Panel A Table 8. Regardless of the amount offered to the player 2, matrilineal individuals experience more stress when paired with their spouse relative to patrilineal individuals. Finally, Panel C of Table 8 presents a slightly different analysis for the player 2s. Before receiving the offer from a player 1, the player 2 was asked to report how much they expected to receive from the other player. The variable "Difference" is the amount they expected to receive as an offer minus the amount they were actually offered. Thus, a positive value denotes that an individual received less money from the player 2 than they expected to receive. Column (1) shows that matrilineal individuals exhibit larger EDA responses the larger the difference in their expectation from reality, but that is not the case in Column (4) when the partner is a stranger. Column (7) presents the stacked results and suggests that when matrilineal individuals play with their spouses and receive less than expected, they have larger skin conductance responses. This does not seem to be driven by differences in ability to predict offers sent by a player 1 (both matrilineal individuals and patrilineal individuals are equally bad at guessing what their spouse will send). In general, individuals over estimate how much they will receive from a spouse.

These EDA results provide evidence insight into how kinship systems affects the internal experience of individuals during a bargaining task with spouse: matrilineal individuals physically experience greater stress when playing a simple bargaining game with their spouses. While usually in experimental data we only observe the choices of the participants, in this case I have evidence that regardless of the outcome of the game, the experience of the decision making process itself is different for matrilineal individuals.

Table 8: Skin Conductance Responses in Ultimatum Game

	Panel A: Player 1s and 2s								
	Dep. Var.: TTP Analysis of SCR Amplitude (in μS)								
	With Spouse			With Stranger			All		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Matrilineal	0.116*	0.121*	0.130*	-0.013	-0.011	-0.007	-0.013	-0.011	-0.004
	(0.067)	(0.073)	(0.074)	(0.047)	(0.048)	(0.049)	(0.047)	(0.048)	(0.049)
Amount Sent		-0.013	-0.011		-0.012	-0.017		-0.013	-0.013
		(0.022)	(0.022)		(0.015)	(0.012)		(0.013)	(0.013)
Spouse							-0.036	-0.017	-0.016
							(0.038)	(0.047)	(0.046)
Matrilineal*Spouse							0.129**	0.132**	0.132**
							(0.062)	(0.062)	(0.063)
Session FE	N	N	Y	N	N	Y	N	N	Y
Observations	320	320	320	320	320	320	640	640	640
Mean Dep. Var.	0.159	0.159	0.159	0.138	0.138	0.138	0.148	0.148	0.148
	Panel B: Player 1s								
	Dep. Var.: TTP Analysis of SCR Amplitude (in μS)								
	With Spouse			With Stranger			All		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Matrilineal	0.211*	0.220*	0.250*	0.014	0.012	0.038	0.013	0.009	0.037
	(0.122)	(0.132)	(0.134)	(0.083)	(0.081)	(0.073)	(0.084)	(0.081)	(0.077)
Amount Sent		-0.027	-0.026		-0.015	-0.025		-0.021	-0.026
		(0.045)	(0.041)		(0.027)	(0.024)		(0.028)	(0.026)
Spouse							-0.039	-0.021	-0.018
							(0.068)	(0.078)	(0.077)
Matrilineal*Spouse							0.199*	0.211*	0.213*
							(0.112)	(0.116)	(0.117)
Session FE	N	N	Y	N	N	Y	N	N	Y
Observations	160	160	160	160	160	160	320	320	320
Mean	0.211	0.211	0.211	0.160	0.160	0.160	0.186	0.186	0.186
	Panel C: Player 2s								
	Dep. Var.: TTP Analysis of SCR Amplitude (in μS)								
	With Spouse			With Stranger			All		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Matrilineal	-0.007	0.004	0.006	-0.009	-0.008	-0.005	-0.009	-0.008	-0.006
	(0.047)	(0.053)	(0.051)	(0.050)	(0.050)	(0.052)	(0.050)	(0.050)	(0.051)
Difference	-0.026***	-0.037**	-0.036**	0.014	0.009	0.008	0.014	0.007	0.007
	(0.009)	(0.015)	(0.017)	(0.015)	(0.017)	(0.017)	(0.015)	(0.017)	(0.017)
Matrilineal*Diff.	0.026**	0.027**	0.026*	-0.010	-0.009	-0.011	-0.010	-0.009	-0.010
	(0.012)	(0.012)	(0.013)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Amount Sent		-0.022	-0.022		-0.013	-0.015		-0.018	-0.018
		(0.022)	(0.023)		(0.015)	(0.015)		(0.015)	(0.016)
Matrilineal*Spouse*Diff.							0.035*	0.035*	0.034*
							(0.020)	(0.020)	(0.020)
Session FE	N	N	Y	N	N	Y	N	N	Y
Observations	160	160	160	158	158	158	318	318	318
Mean Dep. Var.	0.159	0.159	0.159	0.138	0.138	0.138	0.148	0.148	0.148

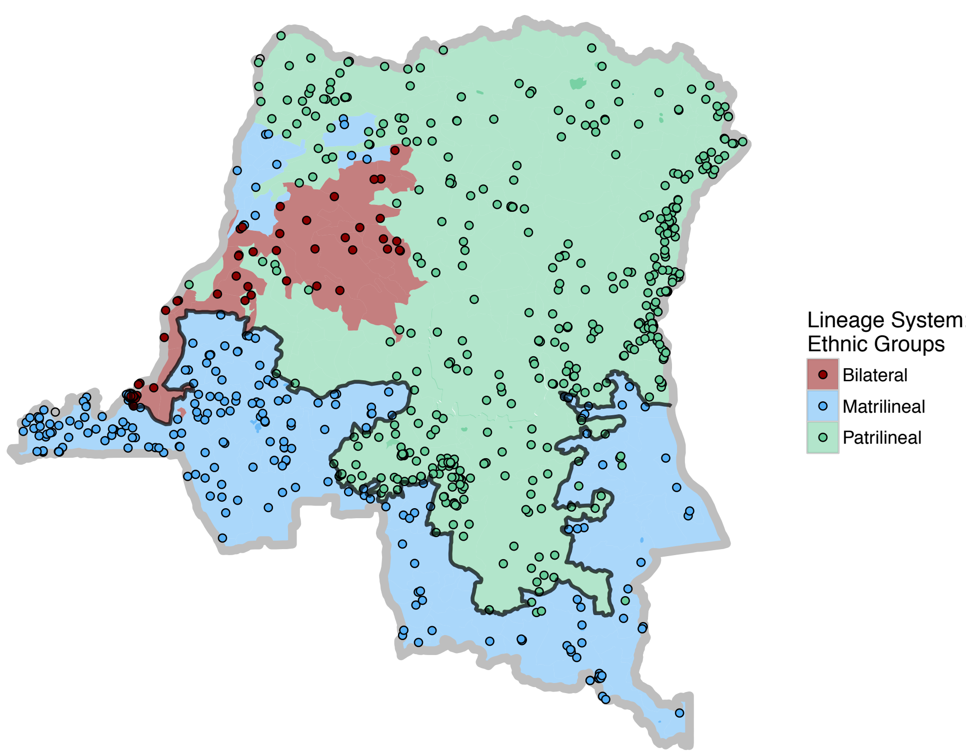
Notes: The data are SCR responses to two events in ultimatum game play with spouse in columns (1) and a stranger in columns (2). The data are stacked SCR responses in column (3). Standard errors are clustered at the individual level. Regressions control for female. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal. *Spouse* is a indicator variable equal to one if the partner is the spouse and 0 if the partner is a stranger. *Difference* is the difference between what Player 2 expected to receive and what Player 2 actually received from Player 1. *SCR Amplitude* is the sum of the SCR amplitudes of significant SCRs during the 1 to 4 second response window after the event. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

7. Implications of Matrilineal Kinship for the Well-Being of Women and Children

Matrilineal individuals appear to cooperate less with their spouses, resulting in greater inefficiencies at the household level in a public goods game. However, if kinship systems affect the cost of violence, a woman's outside option, or her incentives to invest in her children, then matrilineal kinship may also have important implications for the well-being of women and children. It is therefore natural to examine whether matrilineal women and children fare better. To examine these various outcomes, I use my survey data and outcomes in the Demographic and Health Surveys for DRC from 2007 and 2014.

I estimate an OLS with my own survey data and the RD specification described in equation 2 for the DHS (see Appendix F for robustness to alternative RD specifications). I use the geo-referenced DHS clusters for the geographic RD. I assign individuals the status of matrilineal or patrilineal based on the DHS cluster location in relation to the matrilineal belt.[26] This matching strategy means that all individuals in the same cluster receive the same ethnic affiliation. See Figure 6 for the distribution of DHS clusters and the matrilineal belt border.

Figure 6: DHS Clusters and Matrilineal Belt



[26]The DHS for DRC does not report an individual's self-reported ethnic group. This data is only reported at very aggregated ethnic affiliations.

7.1. Domestic Violence

First, I examine whether matrilineal women appear to face less threat of domestic violence. In my survey data, I asked respondents a series of questions on when domestic violence is justified. The analysis is disaggregated by gender, which means I am comparing matrilineal women to patrilineal women and matrilineal men to patrilineal men. My survey included DHS questions on support for domestic violence, in which women are asked the same series of questions on when domestic violence is justified. I present average effect size (AES) estimates of questions related to domestic violence to avoid concerns with multiple hypothesis testing. AES coefficients standardize the effect size to a mean of 0 and a standard deviation of 1. All of the regressions control for age and age squared, and robust standard errors are presented in parentheses.

Columns (1) and (2) of Table 9 present results on views on domestic violence. Women from matrilineal ethnic groups are 15 percentage points less likely to agree that domestic violence is justifiable in various situations. Matrilineal men, however, are no less likely than patrilineal men to believe domestic violence is appropriate.

I can also examine analogous questions in the DHS. The DHS asks questions on views of domestic violence and actual domestic violence experienced. Columns (3) to (8) of Table 9 reports the AES coefficients for matrilineal on views of domestic violence and actual domestic violence for three RD bandwidths. Women assigned matrilineal status are less supportive of domestic violence. They are also less likely to have experienced actual domestic violence. If matrilineal women face less threat of domestic violence, then it may be easier for them to "cooperate" less with their spouse, and they may face less fear of reprisal for keeping money for themselves.

7.2. Outside Option and Women's Well-Being

I focus on several potential indicators of women's outside option and well-being in Table 10 . First, I use survey data to examine views on gender equality and self-reported happiness. The measure of gender equality aggregates a series of questions on the appropriate role of women. Matrilineal women have views that are more favorable toward equality for women (Column (2)). While not a standard measure of women's empowerment, Table 10 Column (4) also presents results on self-reported happiness levels. Matrilineal women report being quite a bit happier than patrilineal women (they are also happier than men). I also conducted a gender Implicit

Table 9: Domestic Violence

	Survey Data: OLS		*DHS: Linear Polynomial in Latitude and Longitude*					
	Views of Domestic Violence (AES Coefficients)		*Views of Domestic Violence (AES Coefficients)*			*Actual Domestic Violence (AES Coefficients)*		
			Sample Within:			Sample Within:		
	Men	Women	200 kms	100 kms	50 kms	200 kms	100 kms	50 kms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Matrilineal	-0.015	-0.157*	-0.191***	-0.130**	-0.041	-0.149**	-0.111*	-0.145*
	(0.098)	(0.086)	(0.047)	(0.051)	(0.070)	(0.059)	(0.066)	(0.084)
Observations	319	319	11,921	7,819	3,831	2,668	1,828	920
Clusters			396	261	128	247	167	82

Notes: For columns (1)-(2), robust standard errors in parentheses. Regressions control for age and age squared. For columns (3)-(8), controls include DHS year, age, age squared, years of education and wealth. DHS clusters within ethnic group boundaries coded as bilateral are excluded from the analysis. Kinshasa and Lubumbashi are also excluded. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal. *Views of Domestic Violence* presents Average Effect Size estimates for the following questions: Domestic violence is justified if wife (1) goes out without husband's permission (2) neglects children (3) argues with husband (4) refuses sex (5) burns food. In survey data all questions answered with 1 Strongly Disagree to 5 Strongly Agree; in DHS questions are yes-no. *Actual Domestic Violence* presents Average Effect Size estimates for the following questions: (1) experienced control issues (2) experienced emotional violence (3) experienced less severe violence (5) experienced severe violence (6) experienced any sexual violence (7) experienced injuries. The response options are rescaled so that higher numbers indicate more domestic violence, with 0 for never, 1 for sometimes, and 2 for often. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Association Test (IAT) with participants. A detailed description of the IAT and the results are provided in Appendix I. The results suggest that matrilineal women have a more positive implicit association with women than any other group.

I examine similar questions on autonomy in decision making in the DHS. The DHS asks questions on control in decision making. Columns (5) to (7) of Table 10 reports the AES coefficients for matrilineal on control in decision making for the three RD bandwidths. Women assigned matrilineal status report more autonomy in decision making relative to patrilineal women. The survey and DHS results suggest that matrilineal women may have a better outside option than patrilineal women.

One implication of matrilineal kinship is that access to the extended kin network may be important for the outside option of women. Using the DHS data, I can look at heterogeneity in responses to the decision making and domestic violence questions by number of siblings. I construct an indicator variable for above median number of brothers, which is equal to one if a woman has more than two brothers. I then re-estimate equation 2, splitting the sample into women with below or equal to median number of brothers and those above the median number of brothers. The matrilineal coefficient is similar across the two samples for the decision making questions. However, matrilineal women with more brothers are much less supportive of domestic

Table 10: Women's Well-Being

	Survey Data: OLS				*DHS: Linear Polynomial in Latitude and Longitude*		
	Views of Gender Equality (AES Coefficients)		*Happiness Levels*		*Autonomy of Decision Making (AES Coefficients)*		
					Sample Within:		
	Men	Women	Men	Women	200 kms	100 kms	50 kms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Matrilineal	0.059	0.093*	0.041	0.361***	0.178***	0.147**	0.124
	(0.044)	(0.052)	(0.102)	(0.099)	(0.062)	(0.072)	(0.103)
Observations	320	320	319	319	1,027	667	294
Mean	-	-	2.69	2.69	-	-	
Clusters					281	188	88

Notes: For columns (1)-(4), robust standard errors in parentheses. Regressions control for age and age squared. For columns (5)-(7), controls include DHS year, age, age squared, years of education and wealth. DHS clusters within ethnic group boundaries coded as bilateral are excluded from the analysis. Kinshasa and Lubumbashi are also excluded. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal.*Views on Gender Equality* presents Average Effect Size estimates for the following questions: how strongly do you agree that (1) mother responsible for child care, (2) man should have final say, (3) can divorce wife if infertile, (4) man decides when have sex, (5) women have same right to work and study as men, (6) women should tolerate beating, (7) only real woman once have child, (8) couple should decide number of children together, (9) women can suggest use condom, (10) men should help with household tasks, (11) as important for girls to go to school as boys, (12) better to have more sons, (13) men should eat first if limited food, (14) woman can go to health center without husband's permission, (15) woman can use family planning without husband's permission, (16) women should look at floor when talking to husband, (17) wife and husband are equal partners, (18) boys should receive education before girls if limited funds; all questions answered on a scale from (1) Strongly Agree to (5) Strongly Disagree. Response options adjusted so that more positive value means more woman friendly. *Happiness* presents estimates for the question: How happy are you where on a scale of (1) Very Unappy to (5) Very Happy. *Autonomy of Decision Making* presents Average Effect Size estimates for the following questions: Who is the person who usually decides on (1) using contraception, (2) how to spend respondent's earnings, (3) respondent's healthcare, (4) large household purchases, (5) visits to relatives, (6) how to spend husband's earnings ; all questions answered as a 1 to 3 categorical variable where 1 is Partner/Other Person, 2 is Respondent and Partner, and 3 is Respondent. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

violence. Additionally, women with more brothers are much less likely to have experienced domestic violence. This is consistent with the matrilineal kinship structure affecting a husband's ability to threaten and implement violence, and suggests that male siblings may be important for women's well being in matrilineal kinship systems.

7.3. *Investment in Children*

Finally, matrilineal kinship may affect investment in children, particularly if children benefit a woman's outside option more in matrilineal systems. To examine whether children in matrilineal groups have improved outcomes, I use my survey data and the DHS. In my survey, respondents completed a household roster, with information on: the number of children in the household, their education levels, and whether each child had been sick in the last month. Panel A of Table 12

Table 11: DHS Result Heterogeneity by Number of Brothers

	Linear Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt					
	Decision Making (AES Coefficients)		*Views of Domestic Violence (AES Coefficients)*		*Actual Domestic Violence (AES Coefficients)*	
	Below Median Num. of Bros	Above Median Num. of Bros	Below Median Num. of Bros	Above Median Num. of Bros	Below Median Num. of Bros	Above Median Num. of Bros
Matrilineal	0.159	0.155*	-0.065	-0.198***	-0.039	-0.159**
	(0.100)	(0.082)	(0.056)	(0.052)	(0.081)	(0.073)
Observations	323	327	3,936	3,557	918	830
Clusters	141	149	261	261	167	164

Notes: Standard errors in parentheses clustered at the DHS cluster level. The data are for women only. Below median number of brothers is 2 or fewer brothers.*Matrilineal* is an indicator variable equal to 1 if the respondent is from a DHS cluster in the matrilineal belt. *Decision Making* presents Average Effect Size estimates for the following questions: Who is the person who usually decides on (1) using contraception, (2) how to spend respondent's earnings, (3) respondent's healthcare, (4) large household purchases, (5) visits to relatives, (6) how to spend husband's earnings ; all questions answered as a 1 to 3 categorical variable where 1 is Respondent, 2 is Respondent and Partner, and 3 is Partner. *Views of Domestic Violence* presents Average Effect Size estimates for the following questions: is beating justified if wife (1) goes out without telling the husband (2) neglects the children (3) argues with husband (4) refuses to have sex with husband (5) burns the food. *Actual Domestic Violence* presents Average Effect Size estimates for the following questions: (1) experienced control issues (2) experienced emotional violence (3) experienced less severe violence (5) experienced severe violence (6) experienced any sexual violence (7) experienced injuries. Controls include DHS year, age, age squared, years of education and wealth. DHS clusters within ethnic group boundaries coded as bilateral are excluded from the analysis. Kinshasa and Lubumbashi are also excluded. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

presents the results of having a matrilineal mother on child outcomes using the RD specification. Consistent with matrilineal women having greater incentive to invest in their children, children of matrilineal women are significantly less likely to have been sick in the last month. The effect size is quite large at 8 to 10 percentage points.[27] The results are robust to the inclusion of controls for the mother's education, the number of children in the household, and weekly income. Additionally, children of matrilineal women have .6 more years of education. Columns (2) and (5) control for characteristics of the mother, including her years of education, age and age squared and columns (3) and (6) include controls for number of children in the household and weekly income.

I examine health and education outcomes for matrilineal children in the DHS as well in Panel B of Table 12. Women are asked to report the number of children they have had who have died. Women who are matrilineal have fewer children who have died. I can also look at years of education for school age children in the households of DHS respondents. I define school age children as children between the ages of 6 and 18. The coefficient on matrilineal is positive and significant, suggesting children in matrilineal areas are better educated. The results from the DHS data are consistent with the results observed in my sample. Despite that matrilineal individuals are less cooperative with their spouses in the experimental setting, matrilineal women

[27]This analysis restricts to households that currently have children in the household. Standard errors are clustered at the village of origin level.

Table 12: Child Health and Education Results

	Panel A: Child Health and Education in Sample					
	Linear Polynomial in Latitude and Longitude Within 100 kms of Matrilineal Belt					
	Child Sick in Last Month All Ages			Years of Education Age>5		
	(1)	(2)	(3)	(4)	(5)	(6)
Matrilineal	-0.079*	-0.093**	-0.083*	0.607***	0.462***	0.447***
	(0.045)	(0.044)	(0.043)	(0.186)	(0.160)	(0.160)
Mother's Char.	N	Y	Y	N	Y	Y
HH Char.	N	N	Y	N	N	Y
Observations	831	831	831	503	503	503
Clusters	196	196	196	166	166	166
Mean	0.280	0.280	0.280	2.803	2.803	2.803
	Panel B: Child Health and Education in DHS					
	Linear Polynomial in Latitude and Longitude					
	Num. Children Died Women Respondents			Years of Education Children Ages 6 to 18		
Sample Within:	200 kms (1)	100 kms (2)	50 kms (3)	200 kms (4)	100 kms (5)	50 kms (6)
Matrilineal	-0.155***	-0.138***	-0.120*	0.120*	0.144**	0.151*
	(0.044)	(0.049)	(0.072)	(0.066)	(0.067)	(0.089)
Observations	13,915	9,291	4,727	23,513	15,456	7,712
Clusters	399	264	131	414	273	137
Mean	0.553	0.577	0.633	2.698	2.674	2.508

Notes: Panel A: Standard errors are clustered at the village of origin level. Regressions control for age and age squared of child and province fixed effects. *Mother's characteristics* include controls for the mother's education level, age and age squared. *HH characteristics* includes controls for estimated weekly income and for the number of children in the house. *Matrilineal* is an indicator variable equal to 1 if the mother of the child is matrilineal. *Child Sick in Last Month* is whether the child has been sick in the last month; the response options were 0 for No and 1 for Yes. *Years of Education* is number of years of education completed by the child. Panel B: Standard errors in parentheses clustered at the DHS cluster level. Columns (1) to (3) are women only. Columns (4) to (6) are all children in households of any respondent. *Matrilineal* is an indicator variable equal to 1 if the respondent is from a DHS cluster in the matrilineal belt. *Num. of Children Died* is the number of the respondent's children that have died if the respondent has had any children. *Years of Education* is the number of years of education completed by members of the household between ages 6 and 18. *Controls* include age, age squared and a rural indicator for all columns. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

have greater incentive to invest in their children, and this has important effects for the well-being of their children.

8. Conclusion

Kinship systems and marriage are integral social structures for society. A growing literature in economics and other fields suggest that kinship systems have important effects for the scope of cooperation and economic growth. This paper tests the hypothesis from anthropology that matrilineal kinship systems undermine spousal cooperation. It provides evidence on how variation in the kinship structure affects cooperation within the household and outcomes for women and children.

I examine cooperation in an experimental setting using a public goods game, which is meant to capture an individual's heuristic for how to cooperate with a spouse. I use a geographic regression discontinuity design to estimate the effect of matrilineal kinship systems on spousal cooperation. The RD strategy allows me to account for any omitted factors that vary smoothly over space, such as geography, historical experiences, of ecology. I find that matrilineal men and women contribute less to a household public good relative to patrilineal individuals. This is particularly the case when they realize an unobserved income shock and it becomes more feasible to hide income. I show that the results are specific to being paired with a spouse, and that being able to hide income is not important when playing with a stranger of the opposite sex. I use physiological data to provide complementary evidence of greater discord in matrilineal households. Matrilineal individuals experience greater stress during game play with their spouse relative to patrilineal individuals, even controlling for game play decisions, but do not experience differential stress when paired with a stranger.

I then examine outcomes for matrilineal women and children using survey data on my sample and data from the Demographic and Health Surveys. I find that matrilineal women are less likely to believe domestic violence is justified and to experience domestic violence. They also report greater autonomy in decision making. Additionally, children of matrilineal women have significantly more years of education and have better health outcomes. Thus, despite that I find evidence of less cooperation between matrilineal spouses, I also find that there may be particular benefits of kinship systems that result in greater autonomy for women. This speaks partially to the matrilineal puzzle, which suggested that the existence of matrilineal kinship systems is puzzling if they undermine an integral unit of cooperation. This highlights how kinship systems may both affect the provision of public goods, but also the extent to which children are considered public goods.

Though my analysis has focused on the Central African context, the results have broader implications. First, they highlight that greater "cooperation" is not necessarily synonymous with greater women's empowerment, particularly in settings with domestic violence. Additionally, they suggest a need to account for broader social structures such as kinship systems when understanding household outcomes.

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Web Appendix for

Matrilineal Kinship and Spousal Cooperation: Evidence from the Matrilineal Belt

Sara Lowes

Bocconi University

14 December 2018

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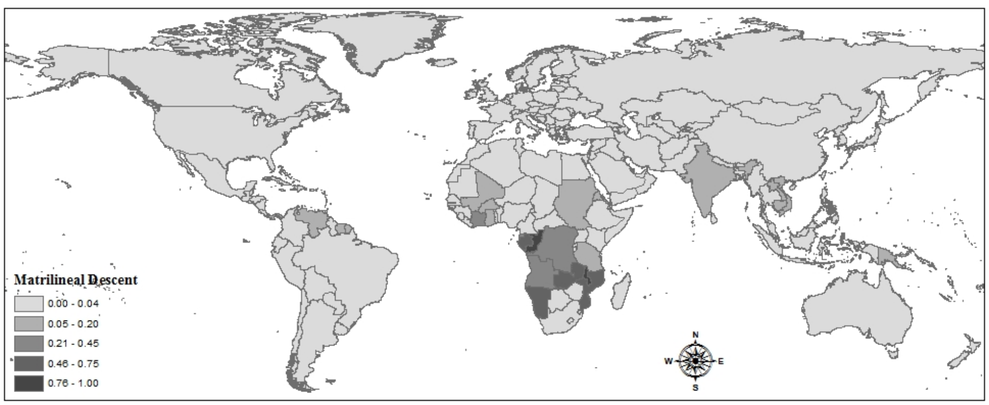
Appendix A. Background on Matrilineal Kinship Systems

A.1. Origins of Matrilineal Kinship Systems

There are many views on the origins of the matrilineal kinship system. Early work in anthropology posited that matrilineality was the most archaic of kinship systems. Lewis Morgan popularized this hypothesis with his work on the Iroquois and other Native Americans who practice matrilineal kinship (Morgan, 1907; Knight, 2008). His work on kinship was motivated by an evolutionary perspective that all societies went through certain identifiable stages of kinship structures, of which, one of the earliest was matrilineality. Morgan argued that the advent of alienable property lead to the demise of matrilineality and to the adoption of patrilineality. Engels incorporated this argument into his book, *The Origin of the Family, Private Property and the State* (1972). This lead to a backlash against the matrilineality thesis because of Engel's association with communist ideology. This hypothesis that matrilineal systems represent the earliest of the evolution of human kinship systems still has support today, for example the work by Knight (2008).

Figure A1: Global Distribution of Matrilineal Kinship Groups



Notes: From Giuliano and Nunn (2018).

Recent work in genetics offers mixed evidence on whether early kinship systems were matrilineal or patrilineal. A paper by Seielstad et al. (1998) is one of the initial studies that examines the relationship between social structure and genetic variation of unilinearly transmitted polymorphisms. The paper leverages the fact that Mitochondrial DNA (mtDNA) is transmitted exclusively by females and the Y chromosome is passed only by males. They infer that differences in the relative genetic diversity of the Y chromosomes and mtDNA can be explained by differential migration rates of men and women. They find that Y chromosome variants tend to be more localized geographically than those of mtDNA and conclude that this suggests a higher female to male migration rate. This is consistent with patrilocal systems because women would relocate more than men under this system. A subsequent study by Hammer et al. (2001) also uses genetic data from sub-Saharan Africa, but finds evidence of greater mobility of males, rather than females (as would be consistent with matrilocal systems). Interestingly, the genetic data used in the Seielstad et al. (1998) study is from groups that are primarily food producing populations (e.g. engaged in agriculture) while the Hammer et al. (2001) study obtains samples from hunter gatherer populations. A third paper by Destro-Bisol et al. (2004) attempts to rectify these findings. They find that the relative diversity of mtDNA and Y chromosomes is greater among food producers than for hunter gathers. The authors argue that their results are consistent with more matrilocal arrangements among hunter gather populations (as suggested in the Hammer et al. (2001) paper) and with more patrilocal arrangements for food producing groups in East and Central Africa (as is suggested by the Seielstad et al. (1998) paper). These papers suggest that social structure is linked to the relative genetic diversity of mtDNA and Y chromosomes, but does not necessarily address whether early kinship systems were matrilineal or patrilineal.

Anthropologist Jan Vansina argues that matrilineality is not a vestige of "antiquity", but rather that it was invented (perhaps more than once) and spread across central Africa. Proposed centers of invention include in southern Angola by the Kongo of Mayombe, in western Cameroon, and in Northern Congo (by the Doko) (Vansina, 1990, p.152). He links the invention and spread of matrilineality to the adoption of agriculture and sedentary villages. In this environment, there arose a need for institutions that spanned across villages. Unilineal descent systems allowed for linkages across villages and also limited the number of claimants in succession and inheritance issues. Vansina argues that matrilineality was invented to meet these various needs. Unlike patrilineal systems, matrilineal systems could incorporate unaffiliated men into the matrilineal group, which is more difficult in patrilineal societies where male membership is established through birth (Vansina, 1990). Douglas makes a similar observation: "If there is any advantage in a descent system which overrides exclusive, local loyalties, matriliny has it. Furthermore, matrilineality, by its ambiguities, gives scope to the enterprising individual to override ascribed roles" (1969).

Evolutionary anthropologists explain the existence of matrilineal societies as the result of an evolutionary process that created institutions suitable for the ecological and social environment. They identify several factors that contribute to the adoption of matrilineality. Matrilineal societies are argued to be more beneficial with certain types of production, such as hoe agriculture. In contrast hunting, which requires skill development and male cooperation, is argued to be more compatible with patrilineality (Aberle, 1961). Additionally, matrilineality may be advantageous in environments with low paternal certainty. While it is difficult to confirm paternity, maternity is easily observable. Thus, an inheritance system in which property passes from the mother's brother to her sons may be optimal since the brother knows he is related to his sister, but cannot verify that he is related to his children (Fortunato, 2012). However, this model alone would require that paternity certainty be below .268, a value that is unrealistically low even for matrilineal societies. A more sophisticated model argues that daughter-biased investment may be adaptive when the marginal benefit of investing in sons (relative to daughters) is not sufficient to offset by the risk of non-paternity of the son's children (Holden et al., 2003). These authors argue that with the rise of moveable heritable wealth, such as cows, the marginal benefits of investing in sons increases, leading to the demise of matrilineal societies. The authors thus posit that "cows are the enemy of matriliny" (Holden and Mace, 2003). In more recent work, BenYishay et al. (2017) present evidence that reef density predicts the adoption of matrilineal inheritance in the Soloman islands.

Recent work in anthropology uses methods from evolutionary biology to determine the history of Bantu kinship patterns. The Bantu migrated from their ancestral homeland in Eastern Nigeria between 3,000-5,000 BP. Though the exact route is contested, they likely migrated through the Cameroon rainforest. Note that it is in Cameroon where Vansina suggests matrilineal kinship was once invented. During the neolithic period they undertook the adoption of farming. Opie et al. (2014) use linguistic data from 542 Bantu languages to construct a Bantu phylogenetic tree, which represents how these societies are related to each other historically. They combine this data on current kinship patterns across these groups. Using Bayesian models, it is possible to assign probabilistic assessments of the historical residence and inheritance patterns of these groups. They find strong evidence that the initial descent system at the root of the phylogeny was patrilineal and that the form of residence was patrilocal. Furthermore, they find evidence of various switches from patriliny to matriliny as the Bantu expanded across Africa, but that unilineal systems were retained through the expansion of the Bantu. Finally, their results suggest that when groups adopt matrilineal systems, they then subsequently adopt matrilocal practices (rather than first becoming matrilocal and then adopting matrilineal inheritance). Conversely, as groups move away from matrifocal practices to patrifocal practices, they first adopt patrilocal residence patterns and then adopt patrilineal inheritance. In sum, while the origins of matrilineal kinship systems is contested, the most recent work does not lend support for the hypothesis that initial kinship systems, at least in Sub-Saharan Africa, were matrilineal (and matrilocal). The work by Opie et al. (2014) and Vansina (1990) suggest that the Bantu expansion across Africa was associated with the spread and adoption of matrilineal systems.

A.2. Matrilineality and Women's Empowerment

Matrilineal societies may empower women because of structural elements of the society or because they intrinsically value women more. Examples of structural elements of matrilineality include matrilocality, which is the practice of living close to the wife's relatives, and women's inheritance of land. Living closer to relatives may enable women to better implement their preferences and ownership of land may increase their outside option in a bargaining framework. However, neither of these features is universally present in all matrilineal systems, nor will they be relevant in the present context. An alternative explanation is that matrilineal societies inherently value women more. This may be an internalized social norm that resulted from the structural factors discussed above, and thus persists even when these structural elements are no longer present.

Fox (1934, p. 113) presents three types of matrilineal kinship systems, with varying levels of women's empowerment. The first type of matrilineal society is based on mother-daughter-sister roles and has matrilocal residence. In this case, women control the continuity of the matrilineage and resources, and thus tend to have relatively higher status. In the second type of matrilineal society, the emphasis is on the brother-sister-nephew roles. They often practice avunculocal residence and political power is generally monopolized by men. This results in relatively lower status of women. Finally, a third type emphasizes all of the above relationships. In this type men remain in control, but the status of women is not as low as in the second type. In the DRC, the matrilineal groups are primarily of the second type, where men retain much of the authority and control of resources, and the emphasis is on the brother-sister-nephew roles.

A.3. The Matrilineal Puzzle

Much of the early anthropological scholarship on matrilineality focused on the so called "matrilineal puzzle". The matrilineal puzzle is the hypothesis that matrilineal kinship systems decrease spousal cooperation, and therefore it is puzzling to observe them as a kinship system. Anthropologists note that matrilineal systems (1) split an individual's allegiance between their spouse and their lineage and (2) undermine male authority. First, in patrilineal systems, women effectively relinquish membership in their own lineage to be *de facto* members of their husband's lineage. However, in matrilineal systems both partners retain strong ties with their own lineages. This leads to split allegiances within a matrilineal household. Second, given requirements of *exogamy*, or marrying outside of the kinship group, a woman produces children with a man outside of her group, but these children are to belong to her lineage, rather than her husband's lineage. Thus, a husband in a matrilineal society does not have the same authority and control over his wife or children as a husband in a patrilineal society, in which the children are members of the husband's group. As Richard's writes in her work on matrilineality among the Central Bantu, "the matrilineal system makes for certain elements of conflict for which some kind of solution has to be found. The problem...is the difficulty of combining recognition of descent through the woman with the rule of exogamous marriage" (1950).

The notion that a system that undermines a man's authority over his wife is puzzling requires both the assumption of male dominance and the assumption that the nuclear family is the elementary unit of the household. Richards writes:

> "There is the further difficulty that in most societies, authority over a household...is usually in the hands of men, not women, as are also the most important political offices. Thus any form of [marriage in which the husband lives with wife's family] means that an individual of the dominant sex is...in a position of subjugation in his spouse's village, and this is a situation which he tends to find irksome and tries to escape from." (Richards, 1950, p.246)

In this example, the husband, the presumed dominant partner in the household, would find it distasteful to live with the wife's extended family and therefore would not want to do it. Without the assumption of male dominance, matrilineal kinship systems are no more puzzling than patrilineal kinship systems, where women generally live with the family of their husband and are effectively incorporated into their husband's lineage. Additionally, Mary Douglas writes,

> "Underlying [analyses of matrilineality] is the implicit assumption that the elementary family is the basic, universal unit of society. If matriliny divides the elementary family, and if the latter is taken to be the most viable unit of kinship in the modern world, the outlook for matriliny may indeed by dim." (1969, p. 125)

challenging the assumption that the integral unit of the family is a husband, a wife and their children. This argument highlights that in matrilineal systems, the roles of brother, uncle, sister, and aunt may be relatively more important than in patrilineal societies.

The matrilineal puzzle captures several important features of matrilineality. First, the allegiances of both husband and wife are split between the marriage and natal kin. Though a wife and husband share a bond and children, they must rely on their natal kin for their lineage and inheritance. These conflicting allegiances can lead to tensions within the marriage. Gluckman writes:

> "Hence in matrilineal societies where [a wife] bears children mainly for her own blood-kin, her wifely bond is weak. Divorce is frequent; women are liable to side with their brothers against their husbands. A man trusts his sister, and not his wife: Your sister is always your sister; tomorrow your wife may be another man's wife." (Gluckman, 1963, p.74)

According to this argument, matrilineal systems may lead to weaker bonds between husband and wife than in patrilineal systems, but to stronger bonds between brother and sister.

Second, matrilineality undermines a man's authority over his wife and children relative to patrilineality. As Gluckman writes,

> "what happens in a matrilineal society is that [the rights to a woman as a wife and the rights to a woman as a child-bearer] are held by different sets of men. The woman's kin transfer to the husband, often in return for gifts, rights in her as a wife...they also retain in her rights a child-bearer" (1963, p.73).

A man's children do not belong to him, but to his wife's lineage. He therefore faces competition from his wife's brothers and parents for control over the wife and the children. Relative to a patrilineal man, he has less control over his wife and children. The anthropological literature on the matrilineal puzzle highlights that particular structural features of matrilineal kinship systems undermine cooperation between spouses. I test empirically whether matrilineal individuals cooperate less with their spouses and what the implications of this are for children in the context of the DRC.

A.4. Matrilineality in Congo

Richards (1950) describes in detail the structure of matrilineal groups in present day DRC. She identifies key variations in the way matrilineality is practiced across several domains including the type of marriage contract, the distribution of domestic authority, residential patterns, and primary kinship alignments. The first group she identifies is the "Mayombe-Kongo" group, which includes the Kongo and Yansi ethnic groups. The patterns described in this group most closely resemble the practices of the ethnic groups in my sample. Within these groups, they practice matrilineal descent, inheritance and succession, but also give high marriage payments for the right of removal of the bride. Property, such as land, is administered by a group of brothers and sisters. Women who leave the village to marry may keep their possessions distinct from their husband, and remit some payments to their senior brothers. Marriage means that men acquire sex access to their wives, but never acquire full authority over his wife or children. A young man may pay some of his earnings to his father but the children of the marriage return to the mother's brother's village upon puberty and marriage (Richards, 1950, pp. 212-213). If the father is dictatorial, then "the mother reminds him that the children do not belong to him, and that they will leave him at once for their maternal uncle if they are badly treated." (Richards, 1950, p. 217). This suggests that in this type of matrilineal practice, a woman retain some bargaining power by being able to leave a husband who treats her poorly.

The second group she discusses is the "Bemba-Bisa-Lamba" group, which includes the Lunda ethnic group. This group practices matrilineal descent and succession. Unlike the Mayombe-Kongo group, bride price is only a service or token payment, with the ultimate removal of the bride from her parent's home after some time. Among this group, inheritance of personal property is not as important, as many possessions are perishable. Richards argues that fathers in this group appear to have greater authority over their children relative to other groups. In addition, a father can maintain this authority if he is a man of high status.

In the third type, the "Yao-Cewa", the avunculate is more strongly developed. In this case, men may not always remove their wife to the groom's village. Women in these societies seem to have a lot of authority. They are seen as the head of the household, though are still under the authority of their brother. Additionally, the son-in-law is not as well incorporated into his wife's family as in the previous types, and in fact, husband's are sometimes referred to as the "current husband" (Richards, 1950, p. 222). Among, the "Yao-Cewa", women may be relatively more empowered. The final type is the "Ila" type, which Richards writes includes the Sala ethnic group. Among the Ila, the avunculate is strong, but the father's lineage is recognized in the lives of the children. Bride prices are substantial, so husbands are able to remove their wives from their villages. Succession is traced through the matrilineal line, however inheritance can happen through both sides of the family. Unlike in other groups, women in this group can directly inherit land. Women can become so wealthy they can actually be chosen as chief.

Appendix B. Model

B.1. Overview of Models of Household

Broadly, there are three classes of household decision making models: the unitary model, collective models, and non-cooperative models. In the unitary model of the household, families maximize a single utility function. This can either be justified with an "altruistic dictator" as in Becker (1974; 1981) or a consensus model as in Samuelson (1956). One of the key empirical implications of the unitary model is that the family pools income and uses that income to maximize the objective function. Collective models of bargaining recognize that there are two agents making decisions in the household. The models assume Pareto efficiency, and use Nash bargaining to determine the allocation of resources within the marriage. Greater bargaining weights within the marriage yield resource allocations more favorable to that individual. Individuals' threat points are determined by their outside option or by their non-cooperative solution within the marriage (as in Lundberg and Pollak (1993); Browning and Chiappori (1998)). Finally, in non-cooperative models, agents take the actions of their spouse as given and have a strategy profile such that their strategy is the best response to the other player's strategy. Non-cooperative solutions often lead to multiple equilibria and do not shed light on the particular equilibria that might arise. Lundberg and Pollak (1994, p.134) suggest that social conventions might be used to determine equilibrium choice.

There is a large literature building extensions of basic non-cooperative models of household bargaining. For example, Doepke and Tertilt (2011) develop a non-cooperative model of the household with a continuum of public goods. In one version of this model, women and men differ in their relative appreciation of the different public goods. Interestingly, this model predicts that public goods provision in the household is minimized when the husband and wife each have one-half of the household income and is maximized when one of the two spouses controls the household income. Malapit (2012) develops a non-cooperative model of the household in which individuals choose a budget share to allocate to personal consumption and a budget share to allocate to household cooperation. The model predicts that as women have higher bargaining weights, the effect on equilibrium contributions depends on the relative trade off between the wife's valuation of getting a larger share of the public good and the offsetting response of the husband, or his elasticity benefit, from his decreased share of the public good. This model therefore allows for a potential trade off between women's empowerment and total contributions to the public good. Ziparo (2014) builds on standard non-cooperative models to examine incentives for communication when income is not observable.

B.2. Principal-Agent Framework

To model spousal cooperation in the context of patriarchy and prevalent domestic violence, I present a principal-agent model that allows the principal to use violence. This is a modified version of Acemoglu and Wolitzky (2011), who model the economics of labor coercion. In this model, the producer (principal) uses coercion to incentivize effort by the worker (agent). Coercion and effort are complements, and coercion allows the principal to extract rents from the agent. However, this is socially inefficient. Improving an agent's outside option, decreases the the amount of violence and the amount of effort on the part of the agent.

I present a modified version of Acemoglu and Wolitzky (2011), where a husband and a wife form a household. In the context of patriarchy, we can think of their relationship as a principal-agent problem, where the husband wants the wife to perform various tasks in the household, and the husband can use domestic violence to incentivize his preferred behavior. This modeling choice has very different implications for observing "cooperation" in the household than a standard collective model of the household, where increased contributions to a public good is evidence of an improved bargaining weight. In this model, cooperation may in fact be evidence of coercion on the part of the husband. This approach is similar in spirit to work by Bloch and Rao (2002), who use a non-cooperative framework to model how the threat of violence is used to extract additional resources from family members in the context of dowry in rural India and Guirkinger and Platteau (2013) who use a principal-agent framework to model land allocation decisions by a patriarch.

B.3. Model Setup

Husband and wives can undertake projects that yield $x > 0$ output when successful and 0 when unsuccessful. The husband chooses the level of coercion to invest in, v at a cost $\eta\chi(v)$. This can either be the threat of violence or actual violence. He offers his wife a "contract" specifying an output dependent wage (w^y) for $y \in h{,}l$, corresponding to high (x) and low (0) output. Agents have no wealth, and wages have to be nonnegative. The parameter η represents the cost of using violence against a wife.

If the wife rejects the contract she gets her reservation utility, $\bar{u}$, minus the level of violence, v. This is synonymous with leaving the marriage and returning to her family. If the wife accepts the offer, she chooses a level of effort, $a \in [0{,}1]$ at a cost, $c(a)$. Thus, a is the probability that the housework is performed as desired and leads to output x. The wife's effort has some positive return for for the husband, P.

When a wife accepts the husband's contract, the husband's payoff is the amount gained from the household project minus the wage given to the wife and the cost of violence:

$$Py - w^y - \eta\chi(v)$$

and a wife's payoff is the wage she earns minus the cost of effort:

$$w^y - c(a)$$

.

An equilibrium contract for a given benefit to the household (P) and outside option $(\bar{u})$ is the subgame perfect equilibrium of the game between the husband and wife. The equilibrium contract is a solution to the maximization problem:

$$\max_{(a,v,w^h,w^l)} a(Px - w^h) + (1-a)(-w^l) - \eta\chi(v) \tag{A1}$$

subject to

$$(IR)\ a(w^h) + (1-a)(w^l) - c(a) \geq \bar{u} - v$$

and

$$(IC)\ a \in \arg\max_{(\tilde{a},v)}\ \tilde{a}(w^h) + (1-\tilde{a})(w^l) - c(\tilde{a})$$

.

An equilibrium contract is characterized by the following:

$$(a^*, v^*) \in \arg\max_{(a,v)}\ Pxa - a[(1-a)c'(a) + c(a) + \bar{u} - g] - (1-a)[-ac'(a) + c(a) + \bar{u} - v] - \eta\chi(v)$$

with $w^l = 0$ and $w^h = (1-a^*)c'(a^*) + \bar{u} - v^* \geq 0$.

This can also be written as:

$$Pxa - a(1-a)c'(a) + ac(a) + a\bar{u} + ag - \eta\chi(g).$$

There is a unique equilibrium contract (a^*, v^*). Additionally, (a^*, v^*) is increasing in x and P, and decreasing in $\bar{u}$ and η. This means that as the value of the wife's effort increases, so does the level of coercion. As the wife's outside options increase or the cost of inflicting violence increases, the wife's effort decreases. Thus, if it is less costly for a husband to be violent with his wife, she will exert more effort. If we assume that men's contributions to productions are complements to a wife's contributions, then a husband's contributions will increase as the cost of violence decreases and as productivity increases.

	Contributions to Household Production			
	Cost of Violence η	Outside Option $\bar{u}$	Productivity of Wife x	Benefit to Effort P
Women	-	-	+	+
Men	-	-	+	+
	Effect of Kinship System			
	Cost of Violence η	Outside Option $\bar{u}$	Wife's Effort a	Investment in Children i
Matrilineal	+	+	-	+

B.4. Matrilineal Relative to Patrilineal Kinship

To model how matrilineal kinship differs from patrilineal kinship and the effect this has on spousal cooperation, I take two approaches. In the first approach, I assume that the cost of domestic violence is higher in matrilineal societies than in patrilineal societies. In the second approach, I add an intermediate stage in between household formation and the husband's investment in violence. In this stage, the wife can choose to make an investment in the children that both affects productivity within the relationship and the wife's outside option. We will consider investments in the health and education of children.

B.4.1. Assumption 1: Cost of Domestic Violence

This approach makes the key assumption that violence against women is more costly in matrilineal kinship relative to patrilineal kinship, e.g. $\eta_{mat} \geq \eta_{pat}$. This would suggest that matrilineal women would exert less effort a relative to patrilineal women. Likewise, we would expect that matrilineal women experience less domestic violence than patrilineal women. In a lab experiment setting, this suggests that since the husband reaps all of the benefits from the wife's contribution, his contributions are increasing in her contributions. This yields the following predictions: (1) matrilineal men and women will contribute less to the public goods game (2) matrilineal women will experience less domestic violence.

B.4.2. Assumption 2: Investment in Children

We can add an additional stage to the game, where wives are able to make investments, i, that improve both their productivity in the household, $x(i)$, and their outside option $\bar{u}(i)$. The cost of investment is $\beta(i)$. In this setting, investment will be considered an investment in the health and education of the children. This investment has implications for the productivity within the household and for the wife's outside option.

In a version with this intermediate stage, the wife is maximizing the following:

$$\max_i \bar{u}(i) - v(i) - \beta(i)$$

The key assumption is the following: the kin group of matrilineal women value the well-being of her children more than the kin group of patrilineal women because in the case of separation, the wife and her children return to her kin group in matrilineal societies. For matrilineal women, the marginal benefit of investment is higher for the outside option than for the household productivity, e.g. $Px'(i) - \bar{u}'(i) < 0$. This means that any investments the wife makes in her children improves her outside more than it improves her productivity in the household. In the extreme, in patrilineal kinship, investment only improves a wife's productivity within the household. This means that matrilineal women relative to patrilineal women will invest more in their children as this both increases their outside option $\bar{u}$ and also reduces violence v and effort a.

This yields the following additional prediction: (3) matrilineal women will investment more relative to patrilineal women in their children. This is because for matrilineal women, investment in children improves their outside option relatively more than for patrilineal women (e.g. $Px'(i) - \bar{u}(i) < 0$), whose children would stay with the husband's family in the case of separation or divorce.

Appendix C. Public Goods Game Results: Alternative RD Specifications and Bandwidths

C.1. RD Plots - Distance to Matrilineal Belt Border

Figure C2: Quantity Contribute to HH Pot – 100 kms

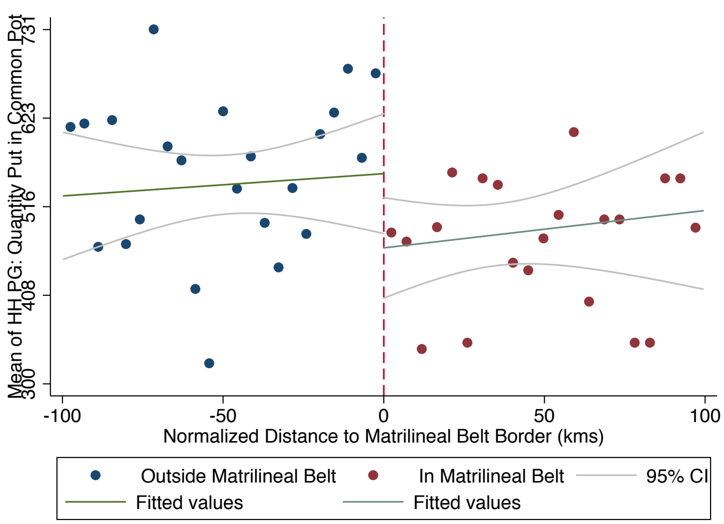


Figure C3: Quantity Contribute to HH Pot – No Bonus – 100 kms

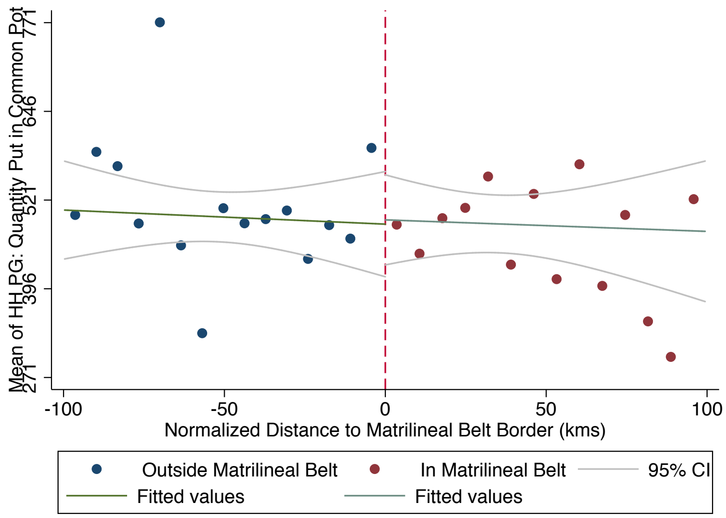
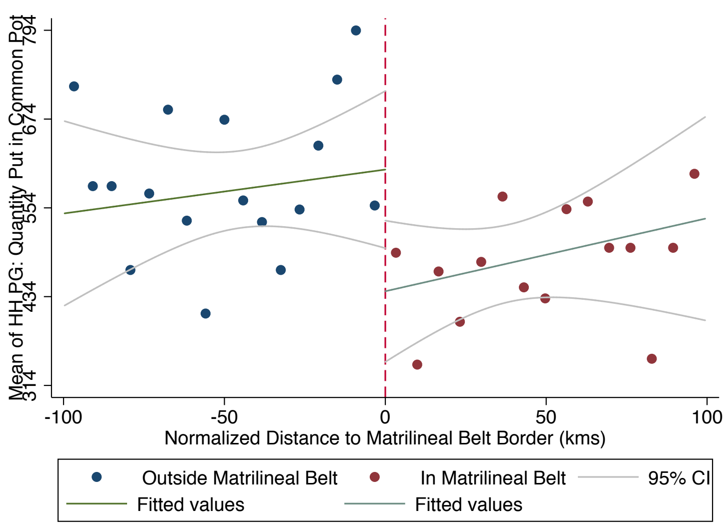


Figure C4: Quantity Contribute to HH Pot – Bonus – 100 kms



C.2. Distance Specifications for all Bandwidths – Without Geographic Controls

C.3. Alternative Latitude and Longitude Specifications for all Bandwidths – Without Geographic Controls

C.4. Distance Specifications for all Bandwidths – With Geographic Controls

C.5. Alternative Latitude and Longitude Specifications for all Bandwidths – With Geographic Controls

Table C1: Distance Specifications for RD Polynomial - 50 km Bandwidth

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Flexible Linear in Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-116.700*	-132.818	-62.501	75.705	82.724	60.411	-77.375
	(69.118)	(81.136)	(79.935)	(75.296)	(86.549)	(94.111)	(81.474)
Female	-13.700	-29.821	-36.106	36.978	43.999	42.416	-3.463
	(34.715)	(55.136)	(52.370)	(36.111)	(53.303)	(53.187)	(47.720)
Matrilineal*Female		28.890	32.031		-12.581	-13.639	12.901
		(68.987)	(67.697)		(69.921)	(69.650)	(60.915)
Won Bonus			94.930**			16.207	19.180
			(38.857)			(51.542)	(51.563)
Matrilineal*Won Bonus			-133.401**			51.294	46.503
			(51.959)			(69.472)	(69.187)
Matrilineal*Won Bonus*Spouse							-176.896*
							(90.275)
	Panel B: Flexible Quadratic in Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-264.940***	-278.101***	-209.762*	-44.575	-37.001	-52.766	-214.374**
	(98.701)	(106.462)	(106.699)	(114.896)	(120.830)	(124.223)	(103.329)
Female	-11.391	-24.416	-27.913	39.437	46.934	45.522	1.368
	(34.333)	(53.798)	(51.052)	(35.950)	(52.925)	(52.791)	(46.544)
Matrilineal*Female		23.391	24.703		-13.462	-15.048	8.420
		(68.057)	(66.801)		(69.369)	(69.115)	(60.010)
Won Bonus			98.056**			11.743	13.079
			(38.912)			(51.074)	(51.163)
Matrilineal*Won Bonus			-134.755**			52.870	50.370
			(52.251)			(69.479)	(69.096)
Matrilineal*Won Bonus*Spouse							-181.396**
							(90.382)
	Panel C: Linear Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-83.620**	-98.156*	-24.992	-76.474**	-72.806	-98.194	-101.647*
	(33.591)	(54.063)	(53.514)	(34.915)	(51.967)	(61.018)	(58.108)
Female	-13.853	-29.281	-34.513	37.684	41.577	40.066	-3.811
	(34.719)	(55.190)	(52.367)	(35.956)	(52.762)	(52.584)	(47.671)
Matrilineal*Female		27.640	30.059		-6.974	-8.000	13.754
		(69.025)	(67.690)		(70.182)	(69.854)	(60.921)
Won Bonus			93.445**			12.872	18.669
			(38.920)			(51.773)	(51.585)
Matrilineal*Won Bonus			-130.896**			52.481	46.688
			(51.798)			(69.783)	(69.265)
Matrilineal*Won Bonus*Spouse							-178.677**
							(90.197)
	Panel D: Quadratic Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-89.951***	-100.707*	-25.650	-78.743**	-73.765	-100.401	-105.941*
	(34.610)	(53.901)	(52.952)	(36.224)	(52.428)	(61.628)	(58.259)
Female	-14.742	-26.281	-30.973	37.365	42.705	41.362	-1.261
	(34.854)	(54.495)	(51.585)	(35.975)	(52.701)	(52.482)	(47.073)
Matrilineal*Female		20.705	22.557		-9.582	-11.069	7.853
		(68.630)	(67.343)		(70.034)	(69.671)	(60.537)
Won Bonus			94.446**			11.976	16.952
			(38.808)			(51.617)	(51.340)
Matrilineal*Won Bonus			-133.983**			54.684	50.923
			(51.723)			(69.949)	(69.252)
Matrilineal*Won Bonus*Spouse							-185.382**
							(90.347)
	Panel E: Cubic Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-89.762***	-100.831*	-24.964	-78.685**	-73.804	-100.384	-105.879*
	(34.408)	(53.754)	(52.869)	(36.191)	(52.548)	(61.693)	(58.163)
Female	-15.772	-27.650	-30.345	37.046	42.284	40.962	-2.306
	(35.097)	(54.407)	(51.096)	(36.051)	(52.762)	(52.551)	(46.929)
Matrilineal*Female		21.308	21.867		-9.397	-10.889	8.285
		(68.588)	(67.220)		(70.176)	(69.807)	(60.496)
Won Bonus			96.262**			11.979	16.960
			(38.571)			(51.687)	(51.330)
Matrilineal*Won Bonus			-133.666***			54.578	50.636
			(51.536)			(70.092)	(69.394)
Matrilineal*Won Bonus*Spouse							-184.819**
							(90.221)
Observations	660	660	660	330	330	330	990
Clusters	286	286	286	286	286	286	286
Mean Dep. Var.	516.1	516.1	516.1	429.1	429.1	429.1	487.1

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C2: Distance Specifications for RD Polynomial - 100 km Bandwidth

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Flexible Linear in Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-107.227**	-125.526**	-71.781	-20.261	-23.006	-23.348	-102.981*
	(49.218)	(59.110)	(60.265)	(55.215)	(63.711)	(66.736)	(59.184)
Female	-20.511	-35.793	-42.520	24.496	22.203	23.535	-12.244
	(28.447)	(40.184)	(37.508)	(29.378)	(39.830)	(39.933)	(34.860)
Matrilineal*Female		33.536	34.425		5.031	2.020	19.401
		(54.122)	(53.274)		(57.310)	(57.259)	(48.300)
Won Bonus			77.067***			47.139	43.248
			(28.730)			(39.133)	(39.098)
Matrilineal*Won Bonus			-87.585**			19.669	26.665
			(42.734)			(57.110)	(55.978)
Matrilineal*Won Bonus*Spouse							-116.579
							(72.391)
	Panel B: Flexible Quadratic in Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-174.864**	-194.224**	-144.972*	42.746	41.049	40.482	-132.403*
	(71.661)	(79.110)	(79.024)	(82.227)	(88.649)	(91.791)	(75.734)
Female	-20.153	-35.716	-43.238	25.538	24.174	25.528	-11.352
	(28.213)	(39.772)	(37.233)	(29.271)	(39.918)	(40.003)	(34.519)
Matrilineal*Female		34.143	35.004		2.992	0.139	18.994
		(53.816)	(52.968)		(56.907)	(56.867)	(47.909)
Won Bonus			83.974***			49.305	45.885
			(28.618)			(39.175)	(39.239)
Matrilineal*Won Bonus			-93.262**			12.861	21.533
			(42.643)			(56.782)	(55.824)
Matrilineal*Won Bonus*Spouse							-114.694
							(71.940)
	Panel C: Linear Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-53.490*	-68.943	-20.322	-57.709*	-61.315	-69.647	-84.024*
	(29.030)	(42.487)	(42.258)	(31.526)	(43.648)	(50.111)	(47.302)
Female	-21.388	-35.290	-41.321	25.107	21.863	23.091	-12.048
	(28.395)	(40.057)	(37.401)	(29.359)	(39.766)	(39.866)	(34.833)
Matrilineal*Female		30.467	31.186		7.109	4.767	18.290
		(54.126)	(53.242)		(57.383)	(57.344)	(48.233)
Won Bonus			78.136***			46.234	43.623
			(28.648)			(39.020)	(39.037)
Matrilineal*Won Bonus			-88.011**			15.840	28.188
			(42.523)			(56.785)	(56.016)
Matrilineal*Won Bonus*Spouse							-118.276
							(72.179)
	Panel D: Quadratic Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-49.704*	-64.385	-13.974	-53.091*	-55.725	-62.956	-77.809
	(28.974)	(42.292)	(41.859)	(31.612)	(43.541)	(50.058)	(47.369)
Female	-21.462	-34.648	-40.629	25.015	22.650	23.999	-11.064
	(28.272)	(39.723)	(37.160)	(29.156)	(39.743)	(39.849)	(34.521)
Matrilineal*Female		28.898	29.120		5.184	2.665	16.193
		(53.974)	(53.128)		(56.968)	(56.927)	(47.972)
Won Bonus			82.494***			49.172	46.284
			(28.625)			(39.164)	(39.130)
Matrilineal*Won Bonus			-90.467**			14.291	26.763
			(42.249)			(56.423)	(55.810)
Matrilineal*Won Bonus*Spouse							-119.786*
							(71.548)
	Panel E: Cubic Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-49.616*	-65.213	-15.261	-53.002*	-56.525	-62.637	-77.497
	(29.028)	(42.383)	(41.892)	(31.711)	(43.516)	(50.154)	(47.426)
Female	-21.224	-35.219	-41.157	25.260	22.098	23.513	-11.605
	(28.246)	(39.856)	(37.246)	(29.205)	(39.795)	(39.902)	(34.591)
Matrilineal*Female		30.713	30.918		6.938	4.305	17.938
		(54.111)	(53.160)		(56.984)	(56.949)	(48.004)
Won Bonus			82.653***			49.930	47.089
			(28.621)			(39.092)	(39.106)
Matrilineal*Won Bonus			-89.667**			12.332	24.682
			(42.277)			(56.275)	(55.724)
Matrilineal*Won Bonus*Spouse							-116.997
							(71.430)
Observations	1,018	1,018	1,018	509	509	509	1,527
Clusters	418	418	418	418	418	418	418
Mean Dep. Var.	515.6	515.6	515.6	447.3	447.3	447.3	492.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C3: Distance Specifications for RD Polynomial - 200 km Bandwidth

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Flexible Linear in Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-80.531*	-103.044*	-38.114	-45.812	-66.164	-78.445	-108.015**
	(42.722)	(53.334)	(54.428)	(46.217)	(55.073)	(56.935)	(52.580)
Female	-28.742	-45.142	-42.585	3.334	-11.491	-11.115	-29.470
	(27.066)	(36.073)	(33.339)	(27.848)	(36.197)	(36.290)	(32.008)
Matrilineal*Female		41.624	36.905		37.627	35.814	35.768
		(50.853)	(50.205)		(53.928)	(54.017)	(45.811)
Won Bonus			87.841***			16.417	15.772
			(24.280)			(32.987)	(33.062)
Matrilineal*Won Bonus			-109.367***			31.501	37.578
			(38.955)			(51.834)	(51.328)
Matrilineal*Won Bonus*Spouse							-147.560**
							(65.945)
	Panel B: Flexible Quadratic in Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-119.375**	-142.152**	-78.636	2.079	-18.311	-30.611	-116.958*
	(57.199)	(64.955)	(65.854)	(63.951)	(70.484)	(71.813)	(62.014)
Female	-29.114	-45.630	-42.868	3.641	-11.144	-10.771	-29.695
	(26.985)	(35.902)	(33.195)	(27.886)	(36.316)	(36.411)	(31.891)
Matrilineal*Female		41.916	37.171		37.524	35.648	35.892
		(50.830)	(50.174)		(53.865)	(53.969)	(45.768)
Won Bonus			86.899***			16.165	17.083
			(24.134)			(32.999)	(33.143)
Matrilineal*Won Bonus			-106.788***			34.040	37.424
			(39.008)			(51.982)	(51.350)
Matrilineal*Won Bonus*Spouse							-144.623**
							(65.941)
	Panel C: Linear Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-47.650*	-67.465*	-3.491	-60.669**	-80.248*	-95.578**	-91.677**
	(28.140)	(39.820)	(39.783)	(30.858)	(41.515)	(46.232)	(43.485)
Female	-29.773	-45.218	-41.893	3.800	-11.461	-11.075	-29.504
	(27.134)	(36.106)	(33.305)	(27.784)	(36.146)	(36.234)	(32.030)
Matrilineal*Female		39.095	34.158		38.628	37.145	34.527
		(50.787)	(50.091)		(53.822)	(53.912)	(45.619)
Won Bonus			87.967***			16.396	15.794
			(24.231)			(32.948)	(33.054)
Matrilineal*Won Bonus			-109.612***			29.701	39.269
			(38.791)			(51.452)	(51.093)
Matrilineal*Won Bonus*Spouse							-149.347**
							(65.381)
	Panel D: Quadratic Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-54.178*	-73.472*	-10.335	-62.144**	-81.571*	-97.314**	-96.362**
	(28.534)	(39.978)	(39.855)	(31.257)	(41.778)	(46.603)	(43.618)
Female	-30.486	-45.557	-41.731	3.639	-11.536	-11.157	-29.770
	(27.095)	(35.980)	(33.217)	(27.790)	(36.164)	(36.248)	(31.932)
Matrilineal*Female		38.160	33.071		38.422	36.867	33.820
		(50.928)	(50.239)		(53.828)	(53.913)	(45.637)
Won Bonus			87.383***			16.811	16.912
			(24.097)			(32.961)	(33.122)
Matrilineal*Won Bonus			-107.518***			29.921	39.845
			(38.662)			(51.521)	(51.116)
Matrilineal*Won Bonus*Spouse							-148.245**
							(65.184)
	Panel E: Cubic Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-53.056*	-72.258*	-8.683	-61.756**	-81.160*	-97.116**	-95.801**
	(28.608)	(40.023)	(39.873)	(31.340)	(41.784)	(46.603)	(43.665)
Female	-30.727	-45.712	-41.954	3.555	-11.588	-11.219	-29.892
	(27.147)	(36.039)	(33.270)	(27.832)	(36.230)	(36.317)	(31.985)
Matrilineal*Female		37.952	32.777		38.352	36.793	33.592
		(51.006)	(50.339)		(53.836)	(53.924)	(45.683)
Won Bonus			88.145***			16.571	16.283
			(24.172)			(33.059)	(33.192)
Matrilineal*Won Bonus			-107.979***			30.351	40.967
			(38.631)			(51.697)	(51.114)
Matrilineal*Won Bonus*Spouse							-149.815**
							(65.116)
Observations	1,228	1,228	1,228	614	614	614	1,842
Clusters	494	494	494	494	494	494	494
Mean Dep. Var.	526.8	526.8	526.8	447.6	447.6	447.6	500.4

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects.*Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C4: Latitude and Longitude Specifications for RD Polynomial - 50 km Bandwidth

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Linear Polynomial in Latitude and Longitude - 50 kms from Matrilineal Belt						
Matrilineal	-85.962**	-105.599*	-28.019	-82.970**	-79.394	-102.424	-111.228*
	(35.762)	(56.133)	(56.748)	(37.962)	(55.620)	(65.158)	(59.176)
Female	-12.358	-32.159	-38.401	38.983	42.588	40.971	-5.523
	(34.879)	(54.909)	(52.138)	(36.090)	(52.850)	(52.677)	(47.562)
Matrilineal*Female		35.778	38.879		-6.515	-7.678	19.574
		(68.924)	(67.728)		(70.831)	(70.612)	(60.954)
Won Bonus			92.460**			12.103	17.392
			(39.221)			(52.079)	(51.605)
Matrilineal*Won Bonus			-138.848***			51.539	51.913
			(52.075)			(70.422)	(69.943)
Matrilineal*Won Bonus*Spouse							-189.084**
							(91.046)
	Panel B: Quadratic Polynomial in Latitude and Longitude - 50 kms from Matrilineal Belt						
Matrilineal	s-102.421**	-116.691**	-38.583	-81.041**	-77.630	-101.463	-119.734*
	(41.688)	(58.466)	(59.281)	(40.830)	(55.678)	(66.435)	(61.412)
Female	-14.266	-29.624	-35.366	37.538	41.209	39.209	-4.393
	(35.286)	(55.669)	(52.624)	(36.434)	(53.948)	(53.893)	(48.369)
Matrilineal*Female		27.841	30.922		-6.656	-7.478	14.669
		(69.269)	(68.077)		(72.665)	(72.486)	(61.581)
Won Bonus			92.653**			10.478	14.570
			(39.210)			(53.163)	(52.179)
Matrilineal*Won Bonus			-140.091***			54.030	55.123
			(52.120)			(71.418)	(70.118)
Matrilineal*Won Bonus*Spouse							-192.776**
							(91.096)
	Panel C: Cubic Polynomial in Latitude and Longitude - 50 kms from Matrilineal Belt						
Matrilineal	-132.952***	-148.761**	-73.244	-60.165	-59.538	-82.005	-134.597**
	(50.243)	(64.305)	(65.757)	(54.191)	(67.473)	(74.525)	(66.522)
Female	-14.540	-32.470	-37.757	30.302	31.013	29.587	-9.462
	(35.052)	(55.460)	(52.031)	(36.831)	(54.333)	(54.165)	(48.063)
Matrilineal*Female		32.599	34.619		-1.292	-2.275	19.035
		(69.400)	(68.044)		(72.991)	(72.786)	(61.605)
Won Bonus			90.064**			9.293	20.090
			(39.113)			(52.267)	(50.702)
Matrilineal*Won Bonus			-140.195***			48.846	50.281
			(52.028)			(71.943)	(69.976)
Matrilineal*Won Bonus*Spouse							-186.985**
							(90.153)
Observations	660	660	660	330	330	330	990
Clusters	286	286	286	286	286	286	286
Mean Dep. Var.	516.1	516.1	516.1	429.1	429.1	429.1	487.1

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C5: Latitude and Longitude Specifications for RD Polynomial - 100 km Bandwidth

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Linear Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt						
Matrilineal	-68.858**	-88.042*	-34.392	-82.188**	-88.732*	-100.063*	-108.507**
	(33.329)	(46.020)	(45.655)	(36.399)	(48.534)	(53.283)	(49.054)
Female	-19.347	-35.303	-42.590	21.475	16.031	17.544	-13.928
	(28.502)	(39.815)	(37.208)	(29.350)	(39.965)	(40.115)	(34.745)
Matrilineal*Female		35.491	36.453		12.108	9.069	23.086
		(54.401)	(53.609)		(57.902)	(57.889)	(48.706)
Won Bonus			78.919***			40.759	41.646
			(28.750)			(39.112)	(39.234)
Matrilineal*Won Bonus			-95.601**			28.681	35.861
			(42.885)			(56.689)	(56.521)
Matrilineal*Won Bonus*Spouse							-130.639*
							(72.922)
	Panel B: Quadratic Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt						
Matrilineal	-75.614**	-95.110**	-42.939	-75.332**	-81.107	-89.147	-111.390**
	(35.174)	(47.333)	(47.029)	(36.990)	(49.294)	(54.670)	(50.697)
Female	-20.383	-36.729	-43.787	22.363	17.521	19.039	-14.551
	(28.433)	(39.956)	(37.320)	(29.396)	(40.211)	(40.343)	(34.853)
Matrilineal*Female		36.231	37.238		10.732	7.606	23.366
		(53.882)	(53.062)		(57.858)	(57.852)	(48.135)
Won Bonus			77.495***			42.168	39.740
			(28.624)			(39.409)	(39.322)
Matrilineal*Won Bonus			-95.255**			23.730	35.951
			(42.486)			(56.922)	(56.167)
Matrilineal*Won Bonus*Spouse							-129.231*
							(72.336)
	Panel C: Cubic Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt						
Matrilineal	-89.394**	-107.521**	-53.691	-76.357*	-81.667	-87.466	-120.628**
	(37.823)	(49.476)	(49.517)	(39.234)	(50.934)	(56.035)	(51.691)
Female	-20.438	-36.231	-43.141	21.742	17.116	18.413	-14.517
	(28.421)	(39.847)	(37.185)	(29.425)	(40.358)	(40.438)	(34.668)
Matrilineal*Female		34.913	36.001		10.227	7.307	22.446
		(53.761)	(52.936)		(58.057)	(58.010)	(47.954)
Won Bonus			78.415***			44.243	39.915
			(28.658)			(39.402)	(39.170)
Matrilineal*Won Bonus			-96.942**			20.884	37.768
			(42.648)			(57.725)	(56.244)
Matrilineal*Won Bonus*Spouse							-131.813*
							(72.597)
Observations	1,018	1,018	1,018	509	509	509	1,527
Clusters	418	418	418	418	418	418	418
Mean Dep. Var.	515.6	515.6	515.6	447.3	447.3	447.3	492.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects.*Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C6: Latitude and Longitude Specifications for RD Polynomial - 200 km Bandwidth

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Linear Polynomial in Latitude and Longitude - 200 kms from Matrilineal Belt						
Matrilineal	-56.308*	-80.241*	-14.470	-67.421*	-88.503*	-104.723**	-105.496**
	(31.846)	(43.307)	(43.232)	(34.942)	(45.789)	(49.604)	(45.650)
Female	-30.202	-47.795	-45.296	1.389	-14.108	-13.650	-32.101
	(26.844)	(35.729)	(32.841)	(27.672)	(36.131)	(36.236)	(31.725)
Matrilineal*Female		44.779	40.345		39.445	37.735	38.682
		(50.848)	(50.217)		(53.991)	(54.107)	(45.773)
Won Bonus			87.508***			15.040	14.843
			(24.369)			(32.985)	(33.078)
Matrilineal*Won Bonus			-113.774***			34.314	44.280
			(38.724)			(51.388)	(51.204)
Matrilineal*Won Bonus*Spouse							-157.250**
							(65.406)
	Panel B: Quadratic Polynomial in Latitude and Longitude - 200 kms from Matrilineal Belt						
Matrilineal	-69.619**	-93.342**	-26.767	-68.073*	-87.386*	-107.098**	-116.283**
	(32.589)	(43.584)	(43.535)	(35.368)	(46.542)	(50.078)	(46.013)
Female	-29.183	-46.453	-44.751	-0.689	-14.748	-14.414	-31.447
	(26.836)	(35.627)	(32.820)	(27.703)	(36.084)	(36.200)	(31.666)
Matrilineal*Female		44.188	40.172		35.973	34.186	37.211
		(50.627)	(50.010)		(53.966)	(54.045)	(45.507)
Won Bonus			87.041***			11.544	12.025
			(24.241)			(33.173)	(33.223)
Matrilineal*Won Bonus			-115.253***			41.060	48.514
			(38.701)			(51.682)	(51.323)
Matrilineal*Won Bonus*Spouse							-162.168**
							(65.277)
	Panel C: Cubic Polynomial in Latitude and Longitude - 200 kms from Matrilineal Belt						
Matrilineal	-79.942**	-104.183**	-38.906	-87.709**	-107.323**	-125.193**	-128.571***
	(34.123)	(44.680)	(44.583)	(36.357)	(47.086)	(50.600)	(46.350)
Female	-27.732	-45.384	-44.250	0.175	-14.107	-13.877	-30.628
	(26.992)	(35.729)	(32.880)	(27.677)	(36.025)	(36.140)	(31.640)
Matrilineal*Female		45.364	41.346		36.705	34.944	38.137
		(50.751)	(50.117)		(54.213)	(54.277)	(45.581)
Won Bonus			86.877***			11.321	11.166
			(24.322)			(33.250)	(33.169)
Matrilineal*Won Bonus			-112.597***			39.123	46.370
			(38.743)			(52.257)	(51.369)
Matrilineal*Won Bonus*Spouse							-157.070**
							(65.310)
Observations	1,228	1,228	1,228	614	614	614	1,842
Clusters	494	494	494	494	494	494	494
Mean Dep. Var.	526.8	526.8	526.8	447.6	447.6	447.6	500.4

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C7: Distance Specifications for RD Polynomial - 50 km Bandwidth - Geographic Controls

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Flexible Linear in Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-124.325*	-143.406*	-68.746	45.995	50.707	28.716	-97.332
	(70.015)	(80.678)	(79.438)	(79.127)	(89.112)	(94.485)	(79.571)
Female	-19.923	-38.832	-44.743	30.077	34.746	32.967	-13.193
	(34.590)	(53.757)	(50.861)	(36.251)	(53.026)	(53.101)	(46.321)
Matrilineal*Female		34.234	36.676		-8.454	-10.227	17.655
		(68.257)	(66.911)		(70.239)	(70.220)	(60.046)
Won Bonus			95.062**			17.358	27.016
			(38.965)			(51.110)	(49.937)
Matrilineal*Won Bonus			-148.197***			53.162	48.088
			(51.852)			(70.083)	(68.699)
Matrilineal*Won Bonus*Spouse							-190.754**
							(88.090)
	Panel B: Flexible Quadratic in Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-256.134***	-269.266***	-194.920*	-44.313	-38.295	-52.461	-206.328**
	(95.548)	(103.337)	(103.976)	(118.688)	(122.658)	(124.127)	(100.832)
Female	-17.191	-31.235	-34.289	32.136	38.573	36.796	-6.807
	(34.318)	(52.958)	(50.003)	(36.079)	(53.183)	(53.244)	(45.641)
Matrilineal*Female		25.408	25.955		-11.645	-13.587	10.473
		(67.701)	(66.281)		(70.169)	(70.185)	(59.485)
Won Bonus			95.968**			16.331	25.159
			(38.931)			(50.928)	(49.910)
Matrilineal*Won Bonus			-146.509***			51.729	47.523
			(51.923)			(70.286)	(68.808)
Matrilineal*Won Bonus*Spouse							-188.395**
							(88.424)
	Panel C: Linear Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-75.762*	-93.524	-17.043	-65.511	-62.481	-83.219	-98.972*
	(44.095)	(58.008)	(59.208)	(47.869)	(59.865)	(67.261)	(59.209)
Female	-20.119	-38.343	-43.177	30.527	33.636	31.856	-13.209
	(34.635)	(53.805)	(50.814)	(36.008)	(52.395)	(52.443)	(46.285)
Matrilineal*Female		32.988	34.791		-5.627	-7.236	17.697
		(68.248)	(66.896)		(70.229)	(70.209)	(59.984)
Won Bonus			93.646**			21.046	27.067
			(38.957)			(51.353)	(50.135)
Matrilineal*Won Bonus			-145.648***			46.106	47.988
			(51.636)			(70.187)	(69.040)
Matrilineal*Won Bonus*Spouse							-190.736**
							(88.107)
	Panel D: Quadratic Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-78.044*	-92.747	-15.302	-65.970	-62.307	-83.467	-99.573*
	(44.417)	(58.012)	(58.844)	(48.072)	(59.929)	(67.287)	(59.169)
Female	-20.374	-35.559	-39.766	30.476	34.258	32.678	-10.986
	(34.713)	(53.446)	(50.330)	(36.037)	(52.605)	(52.616)	(45.978)
Matrilineal*Female		27.510	28.700		-6.853	-8.882	13.305
		(68.199)	(66.832)		(70.339)	(70.335)	(59.854)
Won Bonus			93.926**			20.696	26.162
			(38.942)			(51.295)	(50.027)
Matrilineal*Won Bonus			-146.877***			46.993	50.319
			(51.428)			(70.279)	(69.097)
Matrilineal*Won Bonus*Spouse							-193.982**
							(88.207)
	Panel E: Cubic Distance to Matrilineal Belt - 50 kms from Matrilineal Belt						
Matrilineal	-79.001*	-93.726	-15.720	-66.079	-62.419	-83.559	-100.203*
	(44.540)	(58.097)	(58.866)	(48.129)	(60.060)	(67.426)	(59.196)
Female	-21.556	-36.763	-39.204	30.340	34.121	32.538	-11.843
	(35.001)	(53.397)	(49.935)	(36.028)	(52.655)	(52.668)	(45.858)
Matrilineal*Female		27.549	27.602		-6.848	-8.877	13.290
		(68.281)	(66.893)		(70.449)	(70.444)	(59.883)
Won Bonus			95.844**			20.728	26.348
			(38.707)			(51.353)	(50.025)
Matrilineal*Won Bonus			-147.055***			46.956	50.095
			(51.302)			(70.394)	(69.223)
Matrilineal*Won Bonus*Spouse							-193.813**
							(88.125)
Geographic Controls	Y	Y	Y	Y	Y	Y	Y
Observations	660	660	660	330	330	330	990
Clusters	286	286	286	286	286	286	286
Mean Dep. Var.	516.1	516.1	516.1	429.1	429.1	429.1	487.1

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. Geographic controls include: elevation, precipitation, land suitability, temperature, Tsetse fly suitability, and malaria suitability. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C8: Distance Specifications for RD Polynomial - 100 km Bandwidth - Geographic Controls

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Flexible Linear in Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-134.614**	-149.617**	-89.557	-54.704	-55.023	-55.283	-135.948**
	(52.763)	(61.136)	(62.164)	(59.954)	(67.135)	(69.289)	(59.863)
Female	-21.262	-33.958	-40.994	22.198	21.928	23.486	-10.782
	(28.212)	(39.192)	(36.460)	(29.306)	(39.366)	(39.519)	(33.831)
Matrilineal*Female		28.156	28.910		0.599	-3.233	13.830
		(53.555)	(52.738)		(57.246)	(57.324)	(47.652)
Won Bonus			81.301***			43.964	38.863
			(28.772)			(38.714)	(38.522)
Matrilineal*Won Bonus			-102.575**			23.376	36.939
			(42.867)			(57.830)	(56.209)
Matrilineal*Won Bonus*Spouse							-138.561*
							(73.007)
	Panel B: Flexible Quadratic in Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-164.092**	-176.826**	-120.473	27.832	31.965	30.482	-128.091*
	(71.558)	(78.719)	(79.091)	(84.156)	(89.557)	(91.488)	(74.662)
Female	-21.718	-32.026	-39.847	22.503	25.848	27.455	-7.976
	(28.031)	(38.893)	(36.298)	(29.164)	(39.453)	(39.599)	(33.606)
Matrilineal*Female		22.856	23.512		-7.417	-11.215	7.334
		(53.209)	(52.423)		(56.654)	(56.773)	(47.227)
Won Bonus			86.989***			46.832	43.676
			(28.691)			(38.664)	(38.662)
Matrilineal*Won Bonus			-107.303**			17.305	30.090
			(42.630)			(57.058)	(55.613)
Matrilineal*Won Bonus*Spouse							-135.048*
							(72.006)
	Panel C: Linear Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-72.407**	-86.240*	-29.779	-34.097	-34.153	-41.551	-91.937*
	(36.779)	(46.615)	(46.855)	(40.276)	(50.880)	(56.003)	(49.013)
Female	-21.869	-33.896	-40.293	21.997	21.949	23.507	-10.697
	(28.213)	(39.171)	(36.436)	(29.252)	(39.390)	(39.523)	(33.877)
Matrilineal*Female		26.664	27.057		0.107	-3.612	12.657
		(53.569)	(52.746)		(57.188)	(57.277)	(47.648)
Won Bonus			82.462***			44.126	39.372
			(28.664)			(38.721)	(38.628)
Matrilineal*Won Bonus			-102.178**			24.370	40.017
			(42.602)			(57.515)	(56.329)
Matrilineal*Won Bonus*Spouse							-141.382*
							(72.724)
	Panel D: Quadratic Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-71.821*	-83.687*	-25.636	-33.597	-31.948	-37.538	-87.697*
	(36.638)	(46.358)	(46.437)	(40.645)	(50.873)	(55.857)	(48.964)
Female	-22.485	-32.792	-39.291	21.470	22.902	24.660	-9.308
	(28.086)	(38.953)	(36.329)	(29.120)	(39.471)	(39.624)	(33.760)
Matrilineal*Female		22.863	22.711		-3.177	-7.317	8.431
		(53.366)	(52.595)		(56.900)	(57.025)	(47.441)
Won Bonus			86.964***			47.869	43.444
			(28.629)			(38.969)	(38.923)
Matrilineal*Won Bonus			-105.342**			21.922	37.335
			(42.307)			(57.135)	(56.082)
Matrilineal*Won Bonus*Spouse							-142.168**
							(72.060)
	Panel E: Cubic Distance to Matrilineal Belt - 100 kms from Matrilineal Belt						
Matrilineal	-79.001*	-93.726	-15.720	-66.079	-62.419	-83.559	-100.203*
	(44.540)	(58.097)	(58.866)	(48.129)	(60.060)	(67.426)	(59.196)
Female	-21.556	-36.763	-39.204	30.340	34.121	32.538	-11.843
	(35.001)	(53.397)	(49.935)	(36.028)	(52.655)	(52.668)	(45.858)
Matrilineal*Female		27.549	27.602		-6.848	-8.877	13.290
		(68.281)	(66.893)		(70.449)	(70.444)	(59.883)
Won Bonus			95.844**			20.728	26.348
			(38.707)			(51.353)	(50.025)
Matrilineal*Won Bonus			-147.055***			46.956	50.095
			(51.302)			(70.394)	(69.223)
Matrilineal*Won Bonus*Spouse							-193.813**
							(88.125)
Geographic Controls	Y	Y	Y	Y	Y	Y	Y
Observations	1,018	1,018	1,018	509	509	509	1,527
Clusters	418	418	418	418	418	418	418
Mean Dep. Var.	515.6	515.6	515.6	447.3	447.3	447.3	492.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. Geographic controls include: elevation, precipitation, land suitability, temperature, Tsetse fly suitability, and malaria suitability. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C9: Distance Specifications for RD Polynomial - 200 km Bandwidth - Geographic Controls

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Flexible Linear in Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-75.422*	-100.582*	-35.807	-51.319	-71.913	-86.251	-113.822**
	(44.933)	(53.851)	(54.281)	(48.745)	(57.369)	(59.663)	(52.870)
Female	-25.498	-43.314	-41.789	3.153	-11.430	-11.169	-28.214
	(26.621)	(35.315)	(32.672)	(27.575)	(35.901)	(36.035)	(31.283)
Matrilineal*Female		45.489	41.396		37.233	35.387	38.361
		(50.752)	(50.170)		(54.183)	(54.337)	(45.691)
Won Bonus			89.768***			13.042	11.953
			(24.399)			(33.071)	(32.879)
Matrilineal*Won Bonus			-114.217***			37.721	46.743
			(39.155)			(52.288)	(51.563)
Matrilineal*Won Bonus*Spouse							-159.937**
							(66.399)
	Panel B: Flexible Quadratic in Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-129.635**	-154.311**	-91.403	-31.422	-51.837	-66.012	-142.555**
	(60.385)	(67.357)	(67.631)	(68.262)	(74.200)	(75.129)	(63.470)
Female	-26.170	-43.868	-42.012	3.381	-11.261	-11.022	-28.512
	(26.572)	(35.198)	(32.570)	(27.639)	(36.001)	(36.136)	(31.197)
Matrilineal*Female		45.193	40.990		37.390	35.570	38.193
		(50.698)	(50.105)		(54.266)	(54.412)	(45.678)
Won Bonus			89.755***			12.374	13.294
			(24.284)			(33.076)	(32.937)
Matrilineal*Won Bonus			-114.458***			38.822	44.918
			(39.334)			(52.436)	(51.586)
Matrilineal*Won Bonus*Spouse							-158.081**
							(66.479)
	Panel C: Linear Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-73.345**	-96.698**	-31.775	-73.538*	-93.710*	-110.471**	-119.335**
	(34.120)	(43.493)	(43.353)	(37.611)	(47.976)	(52.840)	(46.800)
Female	-25.547	-43.278	-41.687	3.684	-11.632	-11.395	-28.266
	(26.624)	(35.284)	(32.592)	(27.516)	(35.893)	(36.027)	(31.272)
Matrilineal*Female		45.171	41.041		39.018	37.565	38.846
		(50.599)	(49.988)		(54.216)	(54.362)	(45.551)
Won Bonus			89.742***			13.368	12.026
			(24.382)			(33.015)	(32.872)
Matrilineal*Won Bonus			-114.201***			34.502	46.023
			(39.130)			(51.782)	(51.394)
Matrilineal*Won Bonus*Spouse							-159.237**
							(66.149)
	Panel D: Quadratic Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-71.821*	-83.687*	-25.636	-33.597	-31.948	-37.538	-87.697*
	(36.638)	(46.358)	(46.437)	(40.645)	(50.873)	(55.857)	(48.964)
Female	-22.485	-32.792	-39.291	21.470	22.902	24.660	-9.308
	(28.086)	(38.953)	(36.329)	(29.120)	(39.471)	(39.624)	(33.760)
Matrilineal*Female		22.863	22.711		-3.177	-7.317	8.431
		(53.366)	(52.595)		(56.900)	(57.025)	(47.441)
Won Bonus			86.964***			47.869	43.444
			(28.629)			(38.969)	(38.923)
Matrilineal*Won Bonus			-105.342**			21.922	37.335
			(42.307)			(57.135)	(56.082)
Matrilineal*Won Bonus*Spouse							-142.168**
							(72.060)
	Panel E: Cubic Distance to Matrilineal Belt - 200 kms from Matrilineal Belt						
Matrilineal	-69.812*	-82.495*	-24.760	-30.628	-30.245	-34.115	-84.994*
	(36.820)	(46.437)	(46.546)	(40.827)	(51.004)	(55.768)	(48.958)
Female	-22.239	-33.306	-39.760	21.835	22.169	23.980	-9.877
	(28.022)	(39.081)	(36.429)	(29.155)	(39.524)	(39.684)	(33.840)
Matrilineal*Female		24.569	24.377		-0.741	-4.899	10.369
		(53.482)	(52.622)		(56.862)	(56.989)	(47.420)
Won Bonus			87.287***			49.408	44.664
			(28.625)			(38.838)	(38.892)
Matrilineal*Won Bonus			-104.794**			18.803	34.856
			(42.337)			(56.954)	(56.047)
Matrilineal*Won Bonus*Spouse							-139.130*
							(71.976)
Geographic Controls	Y	Y	Y	Y	Y	Y	Y
Observations	1,228	1,228	1,228	614	614	614	1,842
Clusters	494	494	494	494	494	494	494
Mean Dep. Var.	526.8	526.8	526.8	447.6	447.6	447.6	500.4

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. Geographic controls include: elevation, precipitation, land suitability, temperature, Tsetse fly suitability, and malaria suitability. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C10: Latitude and Longitude Specifications for RD Polynomial - 50 km Bandwidth - Geographic Controls

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Linear Polynomial in Latitude and Longitude - 50 kms from Matrilineal Belt						
Matrilineal	-120.825**	-137.073**	-59.342	-121.300**	-116.507*	-132.484*	-145.093**
	(50.014)	(62.178)	(63.124)	(53.452)	(63.361)	(71.268)	(62.513)
Female	-18.414	-35.337	-40.261	32.554	37.547	35.833	-9.675
	(34.692)	(53.812)	(50.725)	(35.781)	(52.090)	(52.139)	(46.150)
Matrilineal*Female		30.598	32.538		-9.028	-10.454	15.007
		(68.039)	(66.571)		(69.959)	(70.011)	(59.659)
Won Bonus			95.175**			25.701	29.954
			(39.214)			(50.957)	(49.467)
Matrilineal*Won Bonus			-152.229***			38.508	43.848
			(51.847)			(69.726)	(68.303)
Matrilineal*Won Bonus*Spouse							-193.515**
							(87.802)
	Panel B: Quadratic Polynomial in Latitude and Longitude - 50 kms from Matrilineal Belt						
Matrilineal	-149.945***	-159.410**	-82.902	-119.586**	-116.903*	-140.104*	-166.366**
	(57.621)	(67.351)	(68.245)	(59.598)	(66.686)	(75.334)	(66.435)
Female	-22.178	-33.632	-36.659	24.856	28.105	27.103	-11.058
	(35.184)	(54.674)	(51.251)	(36.615)	(53.595)	(53.831)	(47.132)
Matrilineal*Female		20.875	20.817		-5.920	-7.802	8.739
		(68.609)	(67.148)		(71.801)	(71.771)	(60.342)
Won Bonus			97.110**			14.869	22.746
			(39.359)			(52.289)	(49.474)
Matrilineal*Won Bonus			-153.393***			47.889	52.553
			(51.955)			(70.176)	(67.617)
Matrilineal*Won Bonus*Spouse							-202.252**
							(87.543)
	Panel C: Cubic Polynomial in Latitude and Longitude - 50 kms from Matrilineal Belt						
Matrilineal	-174.666***	-184.776**	-102.802	-26.140	-21.282	-52.951	-154.393**
	(65.618)	(75.505)	(74.676)	(73.038)	(80.885)	(88.003)	(76.301)
Female	-23.423	-35.402	-40.354	22.040	27.795	27.106	-12.050
	(35.217)	(54.602)	(51.104)	(37.378)	(54.952)	(54.966)	(47.068)
Matrilineal*Female		21.713	22.309		-10.433	-13.201	7.172
		(69.073)	(67.555)		(72.410)	(72.294)	(60.840)
Won Bonus			97.085**			3.821	20.164
			(38.506)			(52.708)	(49.195)
Matrilineal*Won Bonus			-156.631***			61.562	59.835
			(51.193)			(70.944)	(67.803)
Matrilineal*Won Bonus*Spouse							-213.354**
							(87.290)
Geographic Controls	Y	Y	Y	Y	Y	Y	Y
Observations	660	660	660	330	330	330	990
Clusters	286	286	286	286	286	286	286
Mean Dep. Var.	516.1	516.1	516.1	429.1	429.1	429.1	487.1

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. Geographic controls include: elevation, precipitation, land suitability, temperature, Tsetse fly suitability, and malaria suitability. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C11: Latitude and Longitude Specifications for RD Polynomial - 100 km Bandwidth - Geographic Controls

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Linear Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt						
Matrilineal	-117.556***	-131.720**	-74.724	-106.232**	-106.634*	-116.625*	-149.800***
	(44.671)	(52.229)	(52.591)	(47.322)	(56.872)	(60.859)	(52.958)
Female	-23.739	-36.066	-42.709	18.210	17.859	19.131	-13.863
	(28.297)	(39.202)	(36.424)	(29.043)	(39.246)	(39.397)	(33.788)
Matrilineal*Female		27.314	27.938		0.776	-2.678	13.606
		(53.625)	(52.820)		(56.895)	(57.044)	(47.598)
Won Bonus			82.804***			39.829	36.477
			(28.625)			(38.328)	(38.320)
Matrilineal*Won Bonus			-105.809**			31.414	45.177
			(42.736)			(57.054)	(55.966)
Matrilineal*Won Bonus*Spouse							-149.449**
							(72.418)
	Panel B: Quadratic Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt						
Matrilineal	-110.880**	-124.813**	-68.110	-78.692	-80.436	-90.038	-136.539**
	(46.472)	(53.928)	(54.859)	(49.336)	(58.063)	(62.391)	(54.097)
Female	-23.803	-36.152	-42.211	19.203	17.657	19.035	-13.955
	(28.357)	(39.253)	(36.467)	(28.974)	(39.304)	(39.509)	(33.825)
Matrilineal*Female		27.446	27.756		3.437	-0.252	14.446
		(53.482)	(52.667)		(56.694)	(56.888)	(47.351)
Won Bonus			82.696***			40.471	37.125
			(28.716)			(38.952)	(38.588)
Matrilineal*Won Bonus			-104.633**			27.632	44.228
			(42.888)			(57.289)	(55.735)
Matrilineal*Won Bonus*Spouse							-146.847**
							(71.985)
	Panel C: Cubic Polynomial in Latitude and Longitude - 100 kms from Matrilineal Belt						
Matrilineal	-137.923**	-149.014**	-90.865	-78.171	-78.584	-91.474	-154.468**
	(56.371)	(62.194)	(62.902)	(59.613)	(65.174)	(70.465)	(62.178)
Female	-23.891	-34.540	-40.827	19.828	19.431	21.338	-11.991
	(28.266)	(38.923)	(36.191)	(29.034)	(39.349)	(39.503)	(33.434)
Matrilineal*Female		23.700	24.091		0.885	-3.900	10.446
		(53.295)	(52.421)		(57.242)	(57.478)	(47.278)
Won Bonus			82.922***			41.934	38.255
			(28.738)			(38.824)	(38.286)
Matrilineal*Won Bonus			-106.569**			29.119	46.313
			(43.007)			(57.972)	(56.004)
Matrilineal*Won Bonus*Spouse							-151.148**
							(72.564)
Geographic Controls	Y	Y	Y	Y	Y	Y	Y
Observations	1,018	1,018	1,018	509	509	509	1,527
Clusters	418	418	418	418	418	418	418
Mean Dep. Var.	515.6	515.6	515.6	447.3	447.3	447.3	492.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. Geographic controls include: elevation, precipitation, land suitability, temperature, Tsetse fly suitability, and malaria suitability. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C12: Latitude and Longitude Specifications for RD Polynomial - 200 km Bandwidth - Geographic Controls

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Linear Polynomial in Latitude and Longitude - 200 kms from Matrilineal Belt						
Matrilineal	-81.952**	-106.284**	-44.009	-91.692**	-113.156**	-130.649**	-135.590***
	(39.976)	(47.347)	(47.392)	(42.759)	(52.727)	(56.885)	(48.954)
Female	-27.093	-44.865	-43.688	1.753	-13.924	-13.654	-30.097
	(26.478)	(35.095)	(32.301)	(27.438)	(35.806)	(35.940)	(31.063)
Matrilineal*Female		45.280	41.406		39.943	38.511	39.326
		(50.611)	(49.991)		(54.113)	(54.269)	(45.532)
Won Bonus			89.856***			11.224	10.467
			(24.445)			(33.033)	(32.901)
Matrilineal*Won Bonus			-114.694***			36.597	49.453
			(39.168)			(51.840)	(51.318)
Matrilineal*Won Bonus*Spouse							-162.798**
							(66.194)
	Panel B: Quadratic Polynomial in Latitude and Longitude - 200 kms from Matrilineal Belt						
Matrilineal	-76.246*	-100.373**	-36.526	-77.687*	-97.273*	-116.970**	-125.854**
	(40.544)	(47.614)	(47.713)	(43.564)	(53.078)	(56.979)	(49.043)
Female	-27.266	-44.650	-43.283	-0.589	-14.702	-14.697	-30.304
	(26.612)	(35.118)	(32.280)	(27.416)	(35.645)	(35.785)	(30.969)
Matrilineal*Female		44.501	40.335		36.125	34.696	37.335
		(50.340)	(49.737)		(53.687)	(53.828)	(45.090)
Won Bonus			90.531***			8.595	9.748
			(24.481)			(33.231)	(32.991)
Matrilineal*Won Bonus			-115.364***			40.712	49.641
			(39.207)			(52.928)	(51.705)
Matrilineal*Won Bonus*Spouse							-164.203**
							(66.640)
	Panel C: Cubic Polynomial in Latitude and Longitude - 200 kms from Matrilineal Belt						
Matrilineal	-84.182*	-107.463**	-43.793	-71.305	-90.757	-111.510*	-128.934**
	(45.222)	(51.668)	(51.804)	(48.255)	(56.521)	(60.310)	(51.505)
Female	-27.137	-44.324	-42.339	0.794	-13.566	-13.552	-29.786
	(26.559)	(34.976)	(32.168)	(27.329)	(35.411)	(35.538)	(30.692)
Matrilineal*Female		44.153	39.749		36.891	35.381	37.331
		(50.279)	(49.676)		(53.675)	(53.803)	(45.040)
Won Bonus			90.940***			8.555	9.753
			(24.424)			(33.267)	(32.978)
Matrilineal*Won Bonus			-115.549***			41.912	49.541
			(39.064)			(52.871)	(51.725)
Matrilineal*Won Bonus*Spouse							-164.048**
							(66.373)
Geographic Controls	Y	Y	Y	Y	Y	Y	Y
Observations	1,228	1,228	1,228	614	614	614	1,842
Clusters	494	494	494	494	494	494	494
Mean Dep. Var.	526.8	526.8	526.8	447.6	447.6	447.6	500.4

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. Geographic controls include: elevation, precipitation, land suitability, temperature, Tsetse fly suitability, and malaria suitability. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix D. Alternative Explanations for Public Goods Contributions

There are several plausible alternative explanations for why matrilineal individuals behave differently than patrilineal individuals. Potential explanations they did not understand the rules of the game, that they had less trust in the researchers, and that they have different risk and time preferences. Additionally, because matrilineal individuals have more years of education, this may also affect choices in the experiment. Below I present evidence that these explanations are not substantiated in the data.

D.1. Understanding of Rules of Game and Education

Before participating in each experiment, respondents were asked a series of test questions to ensure their understanding of the rules of the experiment. Most individuals answer most of the test questions correctly. Matrilineal individuals are more likely to answer test questions correctly. This is not particularly surprising since matrilineal individuals are also more educated. However, the effect size isn't very large relative to the mean. Because matrilineal individuals may have a better understanding of the game, I examine amount contributed to household envelope controlling for years of education and number of test questions answered correctly in addition to female, age and age squared. The data is stacked so that there are two observations per individual and standard errors are clustered at the individual level. Panel A of Table D13 presents the results controlling for years of education and Panel B presents the results controlling for number of test questions correct. There is a positive correlation between answering more test questions correctly and contributing more to the household pot. This suggests that in general, a better understanding of the game leads to larger contributions to the shared envelope. Controlling for years of education and test questions correct does not affect the results.

An alternative approach to examining how participants understood the experiment is through their responses to exit questions that asked participants why they made the particular allocation that they made, if they played the same with with their spouse and with a stranger, and what this game reminded them of in their real life.

What motivated you to make your decision in this game?

- "I put money in the common pot because it is increased" (patrilineal woman)
- "I put money in the common pot to invest and to gain money soon" (patrilineal man)
- "My decision depended on my husband's choice but also on the opportunity to make some money" (patrilineal woman)
- "I can share some, but I also should have money in my own pot." (patrilineal man)
- "Despite that the money in the common pot is increased, I kept a lot of money in my own pot because you never know." (matrilineal man)

Do you think you should divide the money in the same way for each version? If yes, why? If no, why?

- "I divided the money intelligently because women spend money without control therefore it is necessary to give them only a small amount and to keep the rest." (patrilineal man)
- "No, because the husband has a monopoly on the common pot, and he can take decisions without asking me, therefore I also need to have money in my own pot." (matrilineal woman)

Table D13: PG Results with Controls for Education and Test Questions Correct

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Control for Education						
Education	-6.832**	-6.773**	-6.777**	-5.355	-5.205	-5.216	-6.257**
	(3.204)	(3.227)	(3.206)	(3.636)	(3.624)	(3.642)	(2.955)
Matrilineal	-38.668	-42.888	18.488	-55.316**	-65.971*	-76.983*	-70.210*
	(24.621)	(36.461)	(36.655)	(26.512)	(37.636)	(42.103)	(40.355)
Female	-56.266**	-59.366*	-52.987	-17.074	-24.903	-23.976	-43.277
	(28.187)	(34.884)	(34.359)	(30.841)	(37.283)	(37.403)	(30.783)
Matrilineal*Female		8.291	2.428		20.935	17.969	7.449
		(48.833)	(48.754)		(51.634)	(51.779)	(44.202)
Won Bonus			85.647***			15.229	15.661
			(24.705)			(33.372)	(33.406)
Matrilineal*Won Bonus			-102.498***			23.231	28.225
			(37.607)			(51.713)	(51.557)
Matrilineal*Won Bonus*Spouse							-129.768**
							(64.811)
Observations	1,280	1,280	1,280	640	640	640	1,920
Clusters	640	640	640	-	-	-	640
Mean	525.9	525.9	525.9	448.1	448.1	448.1	499.9
	Panel B: Control for Number of Test Questions Correct						
Test Questions Correct	35.080***	35.643***	34.333***	25.602***	26.264***	26.794***	31.823***
	(10.458)	(10.685)	(10.553)	(9.470)	(9.416)	(9.451)	(8.911)
Matrilineal	-56.274**	-73.599**	-15.601	-68.722***	-89.097**	-97.726**	-95.238**
	(24.021)	(35.422)	(35.490)	(25.995)	(36.735)	(41.613)	(39.439)
Female	-72.721**	-87.217**	-79.478**	-27.724	-44.771	-44.268	-67.665**
	(29.379)	(38.265)	(37.967)	(29.932)	(37.107)	(37.158)	(32.971)
Matrilineal*Female		34.545	28.527		40.623	37.617	31.363
		(48.798)	(48.650)		(51.545)	(51.632)	(43.829)
Won Bonus			79.754***			21.032	22.544
			(24.549)			(33.353)	(33.455)
Matrilineal*Won Bonus			-95.999**			18.451	22.536
			(37.393)			(51.366)	(51.296)
Matrilineal*Won Bonus*Spouse							-118.083*
							(64.242)
Observations	1,280	1,280	1,280	640	640	640	1,920
Clusters	640	640	640	-	-	-	640
Mean	525.9	525.9	525.9	448.1	448.1	448.1	499.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Test Questions Correct* is the number of test questions the respondent answered correctly of the 31 questions they answered while playing the three versions of the PG game. *Years Education* is equal to the number of years of education an individual reports having. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

- "I put a lot in the common pot because a wife should not have her own money." (matrilineal woman)
- "I should put a lot of money in my own account because I may work to make money in the common fund but the husband can spend it all without asking me" (patrilineal woman)
- "My wife is always complaining, so I should keep money in my own account so I can I can help her when she needs it." (matrilineal man)
- "Despite everything, I put very little in the common pot and a lot in my own because

money in a common pot always has consequences." (patrilineal man)

- "The husband should have all of the money because he is the boss of the wife." (patrilineal man)

What does this game remind you of in your life?

- "It reminds me of saving, a household with two savings accounts is a bad household and it runs the risk of divorce." (matrilineal woman)
- "It is important to always have savings in the house separate from the husband because sometimes he will make decisions without consulting the wife. Therefore, I always have my own savings." (patrilineal woman)
- "In the life of a couple, there are times when the wife knows something and the husband doesn't, likewise the husband can have a secret that the wife doesn't know." (patrilineal woman)

D.2. Trust in Researchers

Another possible explanation for the differential giving and rule breaking is that matrilineal individuals trust foreign researchers less than patrilineal individuals. Both envelopes are collected in the PG game, so if the player does not believe the researchers will return with their payments, this may lead them to break the rules by taking the money directly. I use two survey questions to control for trust: a question that asks how trusting an individual is of foreigners and a question that asks how trusting an individual is of people they meet for the first time. To ensure that trust in researchers is not driving the results, Table D14 presents the results on contributions to the household envelopecontrolling for each of the two measures of trust. Greater trust in foreigners and new people is correlated with larger contributions to the household pot. However, the results are robust to controlling for these measures of trust.

D.3. Risk and Time Preferences

A final possible explanation for differences in game play is that individuals from matrilineal and patrilineal ethnic groups have different risk and time preferences. To measure risk and time preferences, individuals were asked five incentivized questions. In three of the questions, the individuals had to choose between gambles, where one of the two options is more risky. For example, one of the questions asks respondents if they would rather play Game 1, where they can win 1500 CF with 50% probability or 1000 CF with 50% probability or Game 2, where they can win 2500 CF with 50% probability or 0 CF with 50% probability. To ensure that the respondent understood the probability of each outcome, the gambles were contextualized using a local game that has a 50% probability of winning and losing. An additional two questions asked respondents to choose between a small amount of money now or a larger amount of money in the future. The respondents were incentivized to answer truthfully because they were told that one of these questions would be randomly selected to be implemented at the end of the survey.[28]

The results controlling for the responses to the risk and time questions are presented in Table D15. Those who choose riskier gambles tend to allocate less to the household pot and those who are more patient tend to allocate more.

[28] See Appendix H for the details of the incentivized time and risk questions.

Table D14: PG Results with Controls for Trust

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Control for Trust in Foreigners						
Trust in Foreigners	96.535***	96.983***	96.527***	83.597***	84.155***	83.698***	92.251***
	(11.857)	(11.907)	(11.809)	(13.305)	(13.331)	(13.333)	(10.473)
Matrilineal	-45.887**	-61.772*	-8.609	-62.207**	-82.018**	-92.642**	-89.837**
	(23.053)	(34.376)	(34.702)	(25.818)	(37.336)	(42.225)	(39.667)
Female	-26.628	-39.422	-33.603	7.917	-8.039	-7.185	-24.765
	(24.198)	(31.823)	(31.469)	(25.887)	(32.599)	(32.714)	(27.463)
Matrilineal*Female		31.886	26.384		39.767	37.087	29.815
		(46.510)	(46.345)		(51.256)	(51.352)	(42.116)
Won Bonus			81.104***			11.646	10.904
			(24.023)			(32.011)	(32.023)
Matrilineal*Won Bonus			-88.117**			22.267	28.188
			(36.629)			(50.972)	(50.939)
Matrilineal*Won Bonus*Spouse							-116.190*
							(64.406)
Observations	1,276	1,276	1,276	638	638	638	1,914
Clusters	638	638	638	-	-	-	638
Mean	524.3	524.3	524.3	448	448	448	498.9
	Panel B: Control for Trust in New People						
Trust in New People	58.226***	58.433***	58.707***	48.225***	48.521***	48.274***	55.230***
	(14.093)	(14.111)	(14.050)	(14.907)	(14.947)	(14.985)	(12.491)
Matrilineal	-49.900**	-60.459*	-1.348	-65.574**	-80.633**	-88.323**	-85.469**
	(23.712)	(35.009)	(35.212)	(26.128)	(37.424)	(42.357)	(40.039)
Female	-16.892	-25.349	-19.194	15.900	3.839	5.059	-11.075
	(25.497)	(33.249)	(32.908)	(26.637)	(33.737)	(33.835)	(29.049)
Matrilineal*Female		21.167	15.604		30.189	27.027	19.266
		(47.779)	(47.626)		(51.937)	(52.035)	(43.374)
Won Bonus			84.620***			19.746	19.733
			(24.540)			(32.890)	(32.912)
Matrilineal*Won Bonus			-98.824***			17.098	22.545
			(37.475)			(51.614)	(51.535)
Matrilineal*Won Bonus*Spouse							-120.778*
							(64.942)
Observations	1,276	1,276	1,276	638	638	638	1,914
Clusters	638	638	638	-	-	-	638
Mean	524.3	524.3	524.3	448	448	448	498.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Trust New People* asks respondents how much they trust people they have just met for the first time on a scale of (1) not at all to (4) completely. *Trust Foreigners* asks respondents how much they trust people who are of another nationality on a scale of (1) not at all to (4) completely. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

D.4. Polygamy and Enumerator Fixed Effects

Despite purposefully targeting monogamous couples, there are 13 polygamous couples in my sample. This is primarily because when the wife participated in the initial screening survey, she reported being in a monogamous marriage. When the couple was subsequently chosen to participate in the study and the husband was interviewed, the couple was then identified as polygamous. Matrilineal individuals are no more likely to be polygamous than patrilineal individuals within my sample. To demonstrate that the public goods game results are not driven

Table D15: PG Results with Controls for Time and Risk Preferences

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Risk Index						
Risk Index	-83.255**	-85.461**	-87.232**	-71.169*	-73.805**	-76.812**	-83.907***
	(35.061)	(35.160)	(35.063)	(36.656)	(36.916)	(37.001)	(31.066)
Matrilineal	-39.610	-57.561	-3.130	-55.350**	-76.798**	-86.943**	-85.164**
	(24.739)	(36.217)	(36.327)	(26.979)	(38.534)	(43.218)	(40.692)
Female	-33.244	-47.901	-42.492	7.059	-10.454	-9.220	-31.370
	(26.044)	(34.160)	(33.856)	(27.522)	(35.339)	(35.408)	(29.988)
Matrilineal*Female		36.270	31.174		43.335	39.902	33.952
		(49.777)	(49.629)		(53.777)	(53.891)	(45.049)
Won Bonus			82.855***			22.747	23.057
			(24.987)			(33.788)	(33.793)
Matrilineal*Won Bonus			-90.736**			22.601	27.599
			(38.979)			(53.198)	(53.237)
Matrilineal*Won Bonus*Spouse							-118.109*
							(66.807)
Observations	1,228	1,228	1,228	614	614	614	1,842
Clusters	614	614	614	-	-	-	614
Mean	528.8	528.8	528.8	451.1	451.1	451.1	502.9
	Panel B: Time Preference Index						
Patience Index	144.809***	144.481***	143.929***	131.291***	130.797***	131.378***	139.785***
	(29.344)	(29.316)	(29.209)	(32.058)	(32.081)	(32.046)	(26.467)
Matrilineal	-47.203*	-56.250	-4.196	-62.059**	-75.693**	-85.403**	-83.389**
	(24.279)	(35.695)	(35.724)	(26.682)	(38.438)	(42.263)	(39.685)
Female	-20.404	-27.713	-22.338	18.439	7.424	8.938	-11.860
	(25.610)	(33.553)	(33.271)	(26.965)	(34.376)	(34.427)	(29.319)
Matrilineal*Female		18.209	13.075		27.440	23.807	16.505
		(48.558)	(48.424)		(52.823)	(52.949)	(43.915)
Won Bonus			80.270***			21.271	21.458
			(24.790)			(33.390)	(33.422)
Matrilineal*Won Bonus			-86.554**			21.706	26.520
			(38.263)			(52.551)	(52.473)
Matrilineal*Won Bonus*Spouse							-112.950*
							(65.886)
Observations	1,228	1,228	1,228	614	614	614	1,842
Clusters	614	614	614	-	-	-	614
Mean	528.8	528.8	528.8	451.1	451.1	451.1	502.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Risk Index* is an index of responses to three incentivized gambles. The indicates the proportion of the gambles for which the respondent chose the riskier option. *Patience Index* is an index of responses to two incentivized questions on receiving money at different time periods. The indicates the proportion of the questions for which the respondent chose the more patient option. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

by individuals in polygamous relationships, Table D16 presents the PG results controlling for whether the individual is in a polygamous marriage. In practice, polygamy means whether the husband has multiple wives, since women in my sample do not have multiple husbands. While individuals in polygamous marriages do give less on average to the household pot, this does not affect the coefficient for matrilineal. Finally, I also examine robustness to the inclusion of enumerator fixed effects in Panel B of Table D16. The key results are unchanged.

Table D16: PG Results with Controls for Polygamy and Enumerator Fixed Effects

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Control for Polygamy						
Polygamy	-96.067*	-96.848*	-103.135**	-117.771**	-118.942**	-119.921**	-108.725**
	(51.052)	(51.209)	(51.357)	(53.700)	(54.026)	(54.541)	(46.410)
Matrilineal	-48.854**	-59.517*	4.118	-63.230**	-79.208**	-89.978**	-85.174**
	(24.064)	(35.669)	(35.764)	(26.227)	(37.689)	(42.291)	(40.069)
Female	-29.916	-38.475	-31.936	4.079	-8.747	-7.742	-23.820
	(25.378)	(33.436)	(33.068)	(26.594)	(34.094)	(34.162)	(29.291)
Matrilineal*Female		21.406	15.613		32.076	29.087	19.948
		(48.722)	(48.521)		(52.063)	(52.159)	(44.065)
Won Bonuswon_bonus			87.165***			16.148	16.846
			(24.761)			(33.281)	(33.340)
Matrilineal*Won Bonus			-106.623***			22.755	27.166
			(37.996)			(51.802)	(51.685)
Matrilineal*Won Bonus*Spouse							-133.159**
							(65.028)
Observations	1,280	1,280	1,280	640	640	640	1,920
Clusters	640	640	640	-	-	-	640
Mean	525.9	525.9	525.9	448.1	448.1	448.1	499.9
	Panel B: Enumerator Fixed Effects						
Matrilineal	-52.702**	-74.047**	-15.358	-67.626***	-93.343***	-110.945***	-105.486***
	(22.176)	(31.319)	(32.432)	(25.463)	(35.615)	(40.244)	(36.880)
Matrilineal*Female		42.899	36.766		51.687	48.449	40.525
		(44.607)	(44.463)		(50.139)	(50.149)	(40.332)
Won Bonus			85.007***			14.553	16.070
			(23.380)			(32.204)	(32.417)
Matrilineal*Won Bonus			-97.359***			35.920	38.528
			(35.898)			(49.622)	(49.270)
Matrilineal*Won Bonus*Spouse							-133.963**
							(60.901)
Enumerator FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,280	1,280	1,280	640	640	640	1,920
Clusters	640	640	640	-	-	-	640
Mean	525.9	525.9	525.9	448.1	448.1	448.1	499.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Polygamy* is an indicator variable equal to 1 if the individual is in a polygamous marraige. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix E. Dictator Game and Ultimatum Game

E.1. Dictator Game with Spouse and Stranger

To measure altruism respondents play the dictator game (DG). Respondents played two versions of the DG, one version with their spouse and one version with a stranger. Columns (1) and (2) of Table E17 present the results from the DG with spouse. Matrilineal individuals give about 30 CF less to their spouse than patrilineal individuals do relative to a mean of approximately 150 CF. Columns (3) and (4) present the results for the DG with a stranger. Again, matrilineal individuals seem less altruistic than patrilineal individuals. Column (5) stacks the data from the two versions of the game. The coefficient on matrilineal is still negative and significant. The coefficient on spouse suggests that on average people send more to their spouse than a stranger.

The matrilineal and spouse interaction term is negative but not significant. The negative estimated effect for matrilineal individuals when playing with their spouse is almost the same magnitude as the main effect for playing with a spouse, suggesting that they are about as altruistic toward their spouse as they are to a stranger. I also look at whether a respondent chooses to send 0 CF to the other player in the DG. As shown in Column (8) matrilineal individuals are less likely to send 0 CF to the other player when that player is a stranger. Stacking the results from both games in Column (10) suggests that individuals generally are more generous with their spouses. However, matrilineal individuals are actually more likely to send 0 to their spouse than to a stranger.

The results in Table E17 suggest that matrilineal individuals may be less altruistic towards their spouse than patrilineal individuals. While patrilineal individuals are more generous to their spouses relative to a stranger, matrilineal individuals treat their spouses similar to strangers.

If I control for DG game play in the PG results, I find that amount given in the DG is strongly correlated with amount contributed to the public good. However, matrilineal individuals still contribute less relative to patrilineal when they win the bonus and are paired with their spouse (see Table E18).

E.2. Ultimatum Game with Spouse and Stranger

In addition to completing the PG and DG, the respondents also completed two versions of the ultimatum game (UG). The UG is a standard bargaining game used in economic experiments. In the UG, a player 1 is presented with an endowment, in this case 1,000 CF. The player 1 sends a proposed division of the endowment to a player 2, who can then choose to accept or reject the proposed division. If the player 2 accepts the proposed division, then they get the amounts that the player 1 proposed; however, if player 2 rejects the proposed division, then both players receive nothing. Because the UG was administered in the field, we asked the player 2's to tell us for each possible offer they could receive from a player 1, whether they would accept or reject that offer.[29]

Table E19 presents the results from the 442 individuals that completed the UG during a field visit for both amount offered to the player 2 and whether or not they would accept a 0 offer as a player 2. I present the results by sex because for the UG we are interested in the comparison between matrilineal and patrilineal within a sex. The results are similar if I present the pooled data as in Table E20. In general, individuals send more to their spouse relative to a stranger, as shown in Column (3), which stacks game play with spouse and stranger. The coefficient for matrilineal women in Panel B is negative for amount sent to spouse and amount sent to stranger, as is the matrilineal and spouse interaction term. Matrilineal women seem to send less to other players in general, and I cannot reject that they treat spouses and strangers the same. Matrilineal men do not seem to make different offers than patrilineal men as player 1s.

Individuals are more likely to accept an offer of 0 as a player 2 when paired with their spouse (the mean is 73% for men when paired with their spouse and 38% when paired with a stranger in Column (4)). Matrilineal men are 12 percentage points more likely to accept a 0 offer relative to patrilineal men when paired with their spouse. In column (6) which stacks game play for men across the games with spouse and stranger, the matrilineal and spouse interaction term is positive but not significant for matrilineal men. The UG results provide suggestive evidence that women in matrilineal societies may have more bargaining power. They are able to send lower offers to other players. Additionally, matrilineal men are more willing to accept a zero offer from their spouse, despite no monetary incentive to do so. These results seem to be specific to interactions with the spouse, though I am unable to reject that they treat their spouses and strangers same.

[29] As described above, some of the couples completed the UG in the field and others were invited into the lab. I do not include the results from the individuals who completed the UG in the lab setting, since the set up of the game play was different: in the lab individuals were only a player 1 or a player 2 and they did not complete the strategy method as a player 2. Additionally, in the lab individuals found out real time whether their offers were accepted.

Table E17: Giving in Dictator Game and Sending 0 to Player 2 in DG

	Dep. Var.: Amount Gave in Dictator Game				
	With Spouse		With Stranger		All
	(1)	(2)	(3)	(4)	(5)
Matrilineal	-27.998***	-24.884	-17.487*	-15.999	-15.441
	(10.735)	(16.045)	(10.274)	(14.236)	(14.221)
Female	-9.410	-6.897	1.099	2.300	-2.298
	(12.106)	(16.922)	(11.545)	(16.248)	(15.699)
Matrilineal*Female		-6.261		-2.991	-4.626
		(21.529)		(20.704)	(19.889)
Spouse					18.766***
					(5.155)
Matrilineal*Spouse					-10.001
					(7.066)
Observations	640	640	640	640	1,280
Clusters	-	-	-	-	640
Mean Dep. Var.	138.3	138.3	123.4	123.4	130.9
	Dep. Var.: Sent 0 in Dictator Game				
	With Spouse		With Stranger		All
	(1)	(2)	(3)	(4)	(5)
Matrilineal	0.002	0.025	-0.064*	-0.051	-0.045
	(0.035)	(0.048)	(0.037)	(0.051)	(0.048)
Female	0.039	0.058	0.023	0.034	0.046
	(0.036)	(0.046)	(0.038)	(0.050)	(0.044)
Matrilineal*Female		-0.047		-0.026	-0.037
		(0.071)		(0.074)	(0.066)
Spouse					-0.087***
					(0.018)
Matrilineal*Spouse					0.063**
					(0.030)
Observations	640	640	640	640	1,280
Clusters	-	-	-	-	640
Mean Dep. Var.	0.248	0.248	0.311	0.311	0.280

Notes: Robust standard errors are reported for all columns. Columns (5) and (10) present results from stacking game play in the DG with spouse and the DG with stranger. For Columns (5) and (10), standard errors are clustered at the individual level. Regressions control for age and age squared. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Spouse* is an indicator variable equal to 1 if the Player 2 is the spouse and equal to 0 if the Player 2 is a stranger.. *Gave in DG* is the quantity of money the respondent contributed to the Player 2 in the DG. *Gave 0 CF in DG* is an indicator variable equal to 1 if the respondent gave 0 CF to the Player 2 in the DG. $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table E18: PG Results with Controls for Dictator Game

	Dep. Var.: Amount Contributed to Shared Pot						
	With Spouse			With Stranger			All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Giving in Dictator Game						
Amount sent in DG to Spouse	0.423***	0.423***	0.430***				0.372***
	(0.077)	(0.077)	(0.076)				(0.116)
Amount sent in DG to Stranger				0.385***	0.385***	0.383***	0.090
				(0.091)	(0.092)	(0.092)	(0.124)
Matrilineal	-36.967	-47.599	12.686	-56.459**	-71.367*	-85.690**	-80.653**
	(24.017)	(35.501)	(34.922)	(26.068)	(37.241)	(41.735)	(39.742)
Female	-27.091	-35.638	-28.946	2.256	-9.725	-9.104	-21.622
	(24.875)	(32.427)	(31.931)	(26.265)	(33.673)	(33.772)	(28.088)
Matrilineal*Female		21.360	15.162		29.931	27.359	19.371
		(48.207)	(47.958)		(51.449)	(51.570)	(43.394)
Won Bonus			90.169***			7.805	5.370
			(23.813)			(33.164)	(32.826)
Matrilineal*Won Bonus			-99.592***			29.127	42.004
			(37.390)			(51.228)	(51.106)
Matrilineal*Won Bonus*Spouse							-140.141**
							(63.984)
Observations	1,280	1,280	1,280	640	640	640	1,920
Clusters	640	640	640	-	-	-	640
Mean	525.9	525.9	525.9	448.1	448.1	448.1	499.9

Notes: The data are stacked game play in the baseline HH PG and the increased returns version of the HH PG for the spouse regressions in columns (1) to (3). The data are stacked game play in the spouse and stranger versions in column (7). Standard errors are clustered at the village of origin level. Regressions control for age and age squared and include province fixed effects. *Matrilineal* is an indicator variable equal to 1 if the respondent's village of origin is in the matrilineal belt. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Won Bonus* is an indicator variable equal to 1 if the respondent won the bonus in that round of the game. To conserve space the spouse indicator and interaction terms in Column (7) are not shown. *Amount Sent in DG* is the amount of money sent to the other player in a Dictator Game with a spouse or stranger of the opposite sex.. *Amount Contributed to HH Pot* is the quantity of money the respondent contributed to the HH envelope. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table E19: Giving in Ultimatum Game and Acceptance of 0 Offers by Sex

	Amount Sent as Player 1			*Accept 0 as Player 2*		
	With Spouse	With Stranger	All	With Spouse	With Stranger	All
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Men					
Matrilineal	6.611	14.516	14.303	0.123**	0.045	0.050
	(20.409)	(22.614)	(22.250)	(0.057)	(0.069)	(0.068)
Spouse			91.429***			0.329***
			(15.725)			(0.053)
Matrilineal*Spouse			-7.478			0.066
			(23.826)			(0.082)
Observations	221	221	442	221	221	442
Clusters	-	-	221	-	-	221
Mean	350.7	262	306.3	0.733	0.380	0.557
	Panel B: Women					
Matrilineal	-43.319*	-9.547	-10.173	0.045	0.046	0.048
	(23.852)	(20.073)	(19.992)	(0.057)	(0.070)	(0.071)
Spouse			121.127***			0.232***
			(16.306)			(0.043)
Matrilineal*Spouse			-32.519			-0.005
			(24.253)			(0.082)
Observations	221	221	442	221	221	442
Clusters	-	-	221	-	-	221
Mean	305.4	195.9	250.7	0.787	0.557	0.672

Notes: Robust standard errors are reported for all columns. Columns (3) and (6) present results from stacking game play in the UG with spouse and the UG with stranger and standard errors are clustered at the individual level. Regressions control for age and age squared. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal.*Spouse* is an indicator variable equal to 1 if the Player 2 is the spouse and equal to 0 if the Player 2 is a stranger. *Amount Sent* is the quantity of money the respondent offered to the Player 2 in the UG. *Accept 0* is an indicator variable equal to 1 if the respondent said they would accept an offer of 0 as Player 2 in the UG. $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table E20: Giving in Ultimatum Game and Acceptance of 0 Offers Pooled

	Dep. Var.: Amount Sent in Ultimatum Game				
	With Spouse		With Stranger		All
	(1)	(2)	(3)	(4)	(5)
Matrilineal	-18.328	7.490	1.956	15.866	21.744
	(15.717)	(20.624)	(14.910)	(22.250)	(20.160)
Female	-39.639**	-20.395	-62.041***	-51.674***	-36.034**
	(16.824)	(22.418)	(15.373)	(19.891)	(17.448)
Matrilineal*Female		-52.021*		-28.026	-40.023
		(31.479)		(29.729)	(25.393)
Spouse					106.383***
					(11.332)
Matrilineal*Spouse					-20.133
					(16.978)
Observations	442	442	442	442	884
Clusters	-	-	-	-	442
Mean	328.1	328.1	229	229	278.5
	Dep. Var.: Accept 0 in Ultimatum Game				
	With Spouse		With Stranger		All
	(1)	(2)	(3)	(4)	(5)
Matrilineal	0.085**	0.128**	0.038	0.034	0.060
	(0.041)	(0.058)	(0.049)	(0.068)	(0.059)
Female	0.085**	0.118**	0.173***	0.170***	0.144***
	(0.042)	(0.054)	(0.049)	(0.060)	(0.044)
Matrilineal*Female		-0.087		0.006	-0.040
		(0.081)		(0.097)	(0.068)
Spouse					0.277***
					(0.034)
Matrilineal*Spouse					0.042
					(0.058)
Observations	442	442	442	442	884
Clusters	-	-	-	-	442
Mean	0.760	0.760	0.468	0.468	0.614

Notes: Robust standard errors are reported for all columns. Columns (5) and (10) present results from stacking game play in the UG with spouse and the UG with stranger. For Columns (5) and (10), standard errors are clustered at the individual level. Regressions control for age and age squared. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal. *Female* is an indicator variable equal to 1 if the respondent is a woman. *Spouse* is an indicator variable equal to 1 if the Player 2 is the spouse and equal to 0 if the Player 2 is a stranger.. *Gave in UG* is the quantity of money the respondent offered to the Player 2 in the UG. *Accept 0 CF in UG* is an indicator variable equal to 1 if the respondent said they would accept an offer of 0 as Player 2 in the UG. $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix F. DHS Results: Alternative RD Specifications and Bandwidths

F.1. Child Health and Education

F.2. Decision Making and Domestic Violence

F.3. Heterogeneity by Siblings

Table F21: Children Health and Education - Robustness

	Dependent Variable					
	Num. Children Died Women Respondents			*Years of Education Children Ages 6 to 18*		
Sample Within:	200 kms (1)	100 kms (2)	50 kms (3)	200 kms (4)	100 kms (5)	50 kms (6)
	Panel A: Linear Polynomial in Latitude and Longitude					
Matrilineal	-0.155***	-0.138***	-0.120*	0.120*	0.144**	0.151*
	(0.044)	(0.049)	(0.072)	(0.066)	(0.067)	(0.089)
	Panel B: Quadratic Polynomial in Latitude and Longitude					
Matrilineal	-0.167***	-0.130**	-0.071	0.184**	0.193**	0.171*
	(0.050)	(0.057)	(0.077)	(0.072)	(0.076)	(0.093)
	Panel C: Cubic Polynomial in Latitude and Longitude					
Matrilineal	-0.151**	-0.081	-0.042	0.058	0.084	0.036
	(0.060)	(0.066)	(0.076)	(0.076)	(0.080)	(0.089)
	Panel D: Flexible Linear in Distance to Matrilineal Belt					
Matrilineal	-0.187***	-0.167*	-0.094	0.233**	0.176	0.103
	(0.070)	(0.094)	(0.131)	(0.099)	(0.125)	(0.154)
	Panel E: Flexible Quadratic in Distance to Matrilineal Belt					
Matrilineal	-0.121	-0.191	-0.035	0.184	0.160	-0.054
	(0.103)	(0.136)	(0.193)	(0.138)	(0.164)	(0.178)
	Panel F: Linear Distance to Matrilineal Belt					
Matrilineal	-0.206***	-0.189***	-0.205***	0.056	0.127**	0.203**
	(0.037)	(0.047)	(0.071)	(0.059)	(0.065)	(0.091)
	Panel G: Quadratic Distance to Matrilineal Belt					
Matrilineal	-0.207***	-0.207***	-0.200***	0.055	0.138**	0.209**
	(0.037)	(0.046)	(0.070)	(0.059)	(0.066)	(0.090)
	Panel H: Cubic Distance to Matrilineal Belt					
Matrilineal	-0.209***	-0.197***	-0.199***	0.055	0.147**	0.208**
	(0.037)	(0.047)	(0.071)	(0.059)	(0.067)	(0.090)
Observations	13,915	9,291	4,727	23,513	15,456	7,712
Clusters	399	264	131	414	273	137
Mean	0.553	0.577	0.633	2.698	2.674	2.508

Notes: Standard errors in parentheses clustered at the DHS cluster level. Columns (1) to (3) are women only. Columns (4) to (6) are all children in households of any respondent. *Matrilineal* is an indicator variable equal to 1 if the respondent is from a DHS cluster in the matrilineal belt. *Num. of Children Died* is the number of the respondent's children that have died if the respondent has had any children. *Years of Education* is the number of years of education completed by members of the household between ages 6 and 18. *Controls* include age, age squared and a rural indicator for all columns. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table F22: Decision Making and Domestic Violence - Robustness

	Dependent Variable:								
	Decision Making (AES Coefficients)			*Views of Domestic Violence (AES Coefficients)*			*Actual Domestic Violence (AES Coefficients)*		
Sample Within:	200 kms (1)	100 kms (2)	50 kms (3)	200 kms (4)	100 kms (5)	50 kms (6)	200 kms (7)	100 kms (8)	50 kms (9)
	Panel A: Linear Polynomial in Latitude and Longitude								
Matrilineal	0.190***	0.167**	0.138	-0.155***	-0.107**	-0.039	-0.142**	-0.112*	-0.150*
	(0.064)	(0.074)	(0.105)	(0.040)	(0.044)	(0.061)	(0.060)	(0.067)	(0.085)
	Panel B: Quadratic Polynomial in Latitude and Longitude								
Matrilineal	0.118*	0.105	0.058	-0.025	0.011	0.046	0.004	0.012	0.001
	(0.070)	(0.092)	(0.108)	(0.042)	(0.048)	(0.061)	(0.062)	(0.067)	(0.073)
	Panel C: Cubic Polynomial in Latitude and Longitude								
Matrilineal	0.122	0.139	0.087	-0.040	0.015	0.023	-0.067	-0.042	-0.026
	(0.095)	(0.109)	(0.112)	(0.049)	(0.056)	(0.064)	(0.075)	(0.082)	(0.082)
	Panel D: Flexible Linear in Distance to Matrilineal Belt								
Matrilineal	0.306***	0.180	0.428***	-0.063	-0.029	-0.106	-0.130	-0.137	-0.126
	(0.093)	(0.127)	(0.164)	(0.061)	(0.078)	(0.103)	(0.085)	(0.105)	(0.124)
	Panel E: Flexible Quadratic in Distance to Matrilineal Belt								
Matrilineal	0.161	0.377**	0.796***	-0.018	-0.052	-0.042	-0.153	-0.186	-0.102
	(0.135)	(0.173)	(0.222)	(0.085)	(0.111)	(0.149)	(0.114)	(0.139)	(0.176)
	Panel F: Linear Distance to Matrilineal Belt								
Matrilineal	0.117**	0.212***	0.138	-0.079**	-0.064	-0.021	-0.114**	-0.132**	-0.166**
	(0.051)	(0.062)	(0.099)	(0.033)	(0.040)	(0.059)	(0.050)	(0.056)	(0.082)
	Panel G: Quadratic Distance to Matrilineal Belt								
Matrilineal	0.120**	0.208***	0.128	-0.079**	-0.069	-0.029	-0.115**	-0.139**	-0.164*
	(0.051)	(0.065)	(0.098)	(0.033)	(0.042)	(0.059)	(0.050)	(0.057)	(0.084)
	Panel H: Cubic Distance to Matrilineal Belt								
Matrilineal	0.117**	0.209***	0.132	-0.077**	-0.076*	-0.023	-0.119**	-0.148**	-0.164*
	(0.052)	(0.066)	(0.099)	(0.033)	(0.042)	(0.056)	(0.049)	(0.060)	(0.084)
Observations	1,027	667	294	11,921	7,819	3,831	2,668	1,828	920
Clusters	281	188	88	396	261	128	247	167	82

Notes: Standard errors in parentheses clustered at the DHS cluster level. The data are for women only. *Matrilineal* is an indicator variable equal to 1 if the respondent is from a DHS cluster in the matrilineal belt. *Decision Making* presents Average Effect Size estimates for the following questions: Who is the person who usually decides on (1) using contraception, (2) how to spend respondent's earnings, (3) respondent's healthcare, (4) large household purchases, (5) visits to relatives, (6) how to spend husband's earnings ; all questions answered as a 1 to 3 categorical variable where 1 is Partner/Other Person, 2 is Respondent and Partner, and 3 is Respondent. *Views of Domestic Violence* presents Average Effect Size estimates for the following questions: is beating justified if wife (1) goes out without telling the husband (2) neglects the children (3) argues with husband (4) refuses to have sex with husband (5) burns the food; all questions answered as a 0 for no and a 1 for yes. *Actual Domestic Violence* presents Average Effect Size estimates for the following questions: (1) experienced control issues (2) experienced emotional violence (3) experienced less severe violence (5) experienced severe violence (6) experienced any sexual violence (7) experienced injuries. The response options are rescaled so that higher numbers indicate more domestic violence, with 0 for never, 1 for sometimes, and 2 for often. Controls include DHS year, age, age squared, urban/rural status, years of education and wealth. DHS clusters within ethnic group boundaries coded as bilateral are excluded from the analysis. Kinshasa and Lubumbashi are also excluded. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table F23: Decision Making and Domestic Violence - Robustness

	Dependent Variable:								
	Decision Making (AES Coefficients)			*Views of Domestic Violence (AES Coefficients)*			*Actual Domestic Violence (AES Coefficients)*		
Sample Within:	200 kms (1)	100 kms (2)	50 kms (3)	200 kms (4)	100 kms (5)	50 kms (6)	200 kms (7)	100 kms (8)	50 kms (9)
	Panel A: Linear Polynomial in Latitude and Longitude								
Matrilineal	0.190***	0.167**	0.138	-0.155***	-0.107**	-0.039	-0.142**	-0.112*	-0.150*
	(0.064)	(0.074)	(0.105)	(0.040)	(0.044)	(0.061)	(0.060)	(0.067)	(0.085)
	Panel B: Quadratic Polynomial in Latitude and Longitude								
Matrilineal	0.118*	0.105	0.058	-0.025	0.011	0.046	0.004	0.012	0.001
	(0.070)	(0.092)	(0.108)	(0.042)	(0.048)	(0.061)	(0.062)	(0.067)	(0.073)
	Panel C: Cubic Polynomial in Latitude and Longitude								
Matrilineal	0.122	0.139	0.087	-0.040	0.015	0.023	-0.067	-0.042	-0.026
	(0.095)	(0.109)	(0.112)	(0.049)	(0.056)	(0.064)	(0.075)	(0.082)	(0.082)
	Panel D: Flexible Linear in Distance to Matrilineal Belt								
Matrilineal	0.306***	0.180	0.428***	-0.063	-0.029	-0.106	-0.130	-0.137	-0.126
	(0.093)	(0.127)	(0.164)	(0.061)	(0.078)	(0.103)	(0.085)	(0.105)	(0.124)
	Panel E: Flexible Quadratic in Distance to Matrilineal Belt								
Matrilineal	0.161	0.377**	0.796***	-0.018	-0.052	-0.042	-0.153	-0.186	-0.102
	(0.135)	(0.173)	(0.222)	(0.085)	(0.111)	(0.149)	(0.114)	(0.139)	(0.176)
	Panel F: Linear Distance to Matrilineal Belt								
Matrilineal	0.117**	0.212***	0.138	-0.079**	-0.064	-0.021	-0.114**	-0.132**	-0.166**
	(0.051)	(0.062)	(0.099)	(0.033)	(0.040)	(0.059)	(0.050)	(0.056)	(0.082)
	Panel G: Quadratic Distance to Matrilineal Belt								
Matrilineal	0.120**	0.208***	0.128	-0.079**	-0.069	-0.029	-0.115**	-0.139**	-0.164*
	(0.051)	(0.065)	(0.098)	(0.033)	(0.042)	(0.059)	(0.050)	(0.057)	(0.084)
	Panel H: Cubic Distance to Matrilineal Belt								
Matrilineal	0.117**	0.209***	0.132	-0.077**	-0.076*	-0.023	-0.119**	-0.148**	-0.164*
	(0.052)	(0.066)	(0.099)	(0.033)	(0.042)	(0.056)	(0.049)	(0.060)	(0.084)
Observations	1,027	667	294	11,921	7,819	3,831	2,668	1,828	920
Clusters	281	188	88	396	261	128	247	167	82

Notes: Standard errors in parentheses clustered at the DHS cluster level. The data are for women only. *Matrilineal* is an indicator variable equal to 1 if the respondent is from a DHS cluster in the matrilineal belt. *Decision Making* presents Average Effect Size estimates for the following questions: Who is the person who usually decides on (1) using contraception, (2) how to spend respondent's earnings, (3) respondent's healthcare, (4) large household purchases, (5) visits to relatives, (6) how to spend husband's earnings ; all questions answered as a 1 to 3 categorical variable where 1 is Partner/Other Person, 2 is Respondent and Partner, and 3 is Respondent. *Views of Domestic Violence* presents Average Effect Size estimates for the following questions: is beating justified if wife (1) goes out without telling the husband (2) neglects the children (3) argues with husband (4) refuses to have sex with husband (5) burns the food; all questions answered as a 0 for no and a 1 for yes. *Actual Domestic Violence* presents Average Effect Size estimates for the following questions: (1) experienced control issues (2) experienced emotional violence (3) experienced less severe violence (5) experienced severe violence (6) experienced any sexual violence (7) experienced injuries. The response options are rescaled so that higher numbers indicate more domestic violence, with 0 for never, 1 for sometimes, and 2 for often. Controls include DHS year, age, age squared, urban/rural status, years of education and wealth. DHS clusters within ethnic group boundaries coded as bilateral are excluded from the analysis. Kinshasa and Lubumbashi are also excluded. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table F24: Heterogeneity by Siblings - Robustness - 50 km Bandwidth

	Sample Within 50 kms of the Matrilineal Belt					
	Decision Making (AES Coefficients)		*Views of Domestic Violence (AES Coefficients)*		*Actual Domestic Violence (AES Coefficients)*	
	Below Median Num. of Bros	Above Median Num. of Bros	Below Median Num. of Bros	Above Median Num. of Bros	Below Median Num. of Bros	Above Median Num. of Bros
	Panel A: Linear Polynomial in Latitude and Longitude					
Matrilineal	0.144	0.175	0.039	-0.159**	-0.105	-0.167*
	(0.124)	(0.120)	(0.075)	(0.070)	(0.098)	(0.098)
	Panel B: Quadratic Polynomial in Latitude and Longitude					
Matrilineal	0.051	0.125	0.119	-0.042	0.038	-0.008
	(0.139)	(0.112)	(0.076)	(0.069)	(0.089)	(0.094)
	Panel C: Cubic Polynomial in Latitude and Longitude					
Matrilineal	0.052	0.211*	0.103	-0.071	-0.038	-0.004
	(0.147)	(0.114)	(0.083)	(0.070)	(0.102)	(0.103)
	Panel D: Flexible Linear in Distance to Matrilineal Belt					
Matrilineal	0.497***	0.349	0.030	-0.237**	-0.099	-0.141
	(0.171)	(0.217)	(0.126)	(0.120)	(0.164)	(0.131)
	Panel E: Flexible Quadratic in Distance to Matrilineal Belt					
Matrilineal	0.850***	0.482	0.152	-0.132	-0.048	-0.200
	(0.212)	(0.297)	(0.178)	(0.175)	(0.228)	(0.193)
	Panel F: Linear Distance to Matrilineal Belt					
Matrilineal	0.130	0.179	0.025	-0.157**	-0.109	-0.224**
	(0.117)	(0.118)	(0.069)	(0.069)	(0.093)	(0.094)
	Panel G: Quadratic Distance to Matrilineal Belt					
Matrilineal	0.131	0.154	0.018	-0.158**	-0.108	-0.224**
	(0.116)	(0.114)	(0.068)	(0.067)	(0.094)	(0.094)
	Panel H: Cubic Distance to Matrilineal Belt					
Matrilineal	0.130	0.180	0.024	-0.146**	-0.109	-0.223**
	(0.117)	(0.117)	(0.066)	(0.064)	(0.095)	(0.094)
Observations	154	131	2,055	1,671	494	399
Clusters	66	67	131	131	83	81

Notes: Standard errors in parentheses clustered at the DHS cluster level. The data are for women only. Below median number of brothers is 2 or fewer brothers. *Matrilineal* is an indicator variable equal to 1 if the respondent is from a DHS cluster in the matrilineal belt. *Decision Making* presents Average Effect Size estimates for the following questions: Who is the person who usually decides on (1) using contraception, (2) how to spend respondent's earnings, (3) respondent's healthcare, (4) large household purchases, (5) visits to relatives, (6) how to spend husband's earnings ; all questions answered as a 1 to 3 categorical variable where 1 is Respondent, 2 is Respondent and Partner, and 3 is Partner. *Views of Domestic Violence* presents Average Effect Size estimates for the following questions: is beating justified if wife (1) goes out without telling the husband (2) neglects the children (3) argues with husband (4) refuses to have sex with husband (5) burns the food. *Actual Domestic Violence* presents Average Effect Size estimates for the following questions: (1) experienced control issues (2) experienced emotional violence (3) experienced less severe violence (5) experienced severe violence (6) experienced any sexual violence (7) experienced injuries. Controls include DHS year, age, age squared, years of education and wealth. DHS clusters within ethnic group boundaries coded as bilateral are excluded from the analysis. Kinshasa and Lubumbashi are also excluded. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table F25: Heterogeneity by Siblings - Robustness - 100 km Bandwidth

	Sample Within 100 kms of the Matrilineal Belt					
	Decision Making (AES Coefficients)		*Views of Domestic Violence (AES Coefficients)*		*Actual Domestic Violence (AES Coefficients)*	
	Below Median Num. of Bros	Above Median Num. of Bros	Below Median Num. of Bros	Above Median Num. of Bros	Below Median Num. of Bros	Above Median Num. of Bros
	Panel A: Linear Polynomial in Latitude and Longitude					
Matrilineal	0.167*	0.159*	-0.074	-0.198***	-0.045	-0.159**
	(0.099)	(0.082)	(0.056)	(0.051)	(0.080)	(0.073)
	Panel B: Quadratic Polynomial in Latitude and Longitude					
Matrilineal	0.031	0.178*	0.050	-0.045	0.071	-0.029
	(0.125)	(0.103)	(0.060)	(0.063)	(0.082)	(0.078)
	Panel C: Cubic Polynomial in Latitude and Longitude					
Matrilineal	0.015	0.276**	0.078	-0.082	-0.041	0.011
	(0.140)	(0.111)	(0.070)	(0.067)	(0.099)	(0.090)
	Panel D: Flexible Linear in Distance to Matrilineal Belt					
Matrilineal	0.176	0.217	0.073	-0.164*	-0.077	-0.200*
	(0.145)	(0.163)	(0.093)	(0.089)	(0.133)	(0.110)
	Panel E: Flexible Quadratic in Distance to Matrilineal Belt					
Matrilineal	0.433**	0.242	0.080	-0.205	-0.163	-0.221
	(0.181)	(0.232)	(0.138)	(0.130)	(0.185)	(0.139)
	Panel F: Linear Distance to Matrilineal Belt					
Matrilineal	0.176**	0.243***	-0.072	-0.175***	-0.086	-0.176***
	(0.080)	(0.075)	(0.048)	(0.048)	(0.068)	(0.060)
	Panel G: Quadratic Distance to Matrilineal Belt					
Matrilineal	0.176	0.217	0.073	-0.164*	-0.077	-0.200*
	(0.145)	(0.163)	(0.093)	(0.089)	(0.133)	(0.110)
	Panel H: Cubic Distance to Matrilineal Belt					
Matrilineal	0.179**	0.239***	-0.079	-0.203***	-0.113	-0.180***
	(0.081)	(0.084)	(0.051)	(0.050)	(0.072)	(0.063)
Observations	324	328	3,985	3,583	921	834
Clusters	141	149	261	261	167	164

Notes: Standard errors in parentheses clustered at the DHS cluster level. The data are for women only. Below median number of brothers is 2 or fewer brothers.*Matrilineal* is an indicator variable equal to 1 if the respondent is from a DHS cluster in the matrilineal belt. *Decision Making* presents Average Effect Size estimates for the following questions: Who is the person who usually decides on (1) using contraception, (2) how to spend respondent's earnings, (3) respondent's healthcare, (4) large household purchases, (5) visits to relatives, (6) how to spend husband's earnings ; all questions answered as a 1 to 3 categorical variable where 1 is Respondent, 2 is Respondent and Partner, and 3 is Partner. *Views of Domestic Violence* presents Average Effect Size estimates for the following questions: is beating justified if wife (1) goes out without telling the husband (2) neglects the children (3) argues with husband (4) refuses to have sex with husband (5) burns the food. *Actual Domestic Violence* presents Average Effect Size estimates for the following questions: (1) experienced control issues (2) experienced emotional violence (3) experienced less severe violence (5) experienced severe violence (6) experienced any sexual violence (7) experienced injuries. Controls include DHS year, age, age squared, years of education and wealth. DHS clusters within ethnic group boundaries coded as bilateral are excluded from the analysis. Kinshasa and Lubumbashi are also excluded. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table F26: Heterogeneity by Siblings - Robustness - 200 km Bandwidth

	Sample Within 200 kms of the Matrilineal Belt					
	Decision Making (AES Coefficients)		*Views of Domestic Violence (AES Coefficients)*		*Actual Domestic Violence (AES Coefficients)*	
	Below Median Num. of Bros	Above Median Num. of Bros	Below Median Num. of Bros	Above Median Num. of Bros	Below Median Num. of Bros	Above Median Num. of Bros
	Panel A: Linear Polynomial in Latitude and Longitude					
Matrilineal	0.172**	0.208**	-0.127**	-0.270***	-0.081	-0.204***
	(0.085)	(0.081)	(0.051)	(0.048)	(0.072)	(0.064)
	Panel B: Quadratic Polynomial in Latitude and Longitude					
Matrilineal	0.140	0.117	-0.009	-0.115**	0.052	-0.037
	(0.090)	(0.093)	(0.053)	(0.052)	(0.072)	(0.070)
	Panel C: Cubic Polynomial in Latitude and Longitude					
Matrilineal	0.086	0.222*	-0.022	-0.132**	-0.043	-0.057
	(0.118)	(0.114)	(0.063)	(0.061)	(0.088)	(0.084)
	Panel D: Flexible Linear in Distance to Matrilineal Belt					
Matrilineal	0.288**	0.337***	-0.022	-0.179**	-0.086	-0.208**
	(0.113)	(0.127)	(0.071)	(0.070)	(0.102)	(0.092)
	Panel E: Flexible Quadratic in Distance to Matrilineal Belt					
Matrilineal	0.197	0.121	0.108	-0.167*	-0.064	-0.228*
	(0.153)	(0.179)	(0.101)	(0.097)	(0.145)	(0.117)
	Panel F: Linear Distance to Matrilineal Belt					
Matrilineal	0.021	0.184***	-0.105***	-0.182***	-0.082	-0.152***
	(0.064)	(0.067)	(0.040)	(0.039)	(0.057)	(0.054)
	Panel G: Quadratic Distance to Matrilineal Belt					
Matrilineal	0.024	0.184***	-0.105***	-0.182***	-0.084	-0.153***
	(0.066)	(0.066)	(0.039)	(0.039)	(0.057)	(0.054)
	Panel H: Cubic Distance to Matrilineal Belt					
Matrilineal	0.022	0.186***	-0.103***	-0.182***	-0.095*	-0.153***
	(0.067)	(0.067)	(0.039)	(0.039)	(0.057)	(0.054)
Observations	514	479	6,185	5,304	1,374	1,175
Clusters	220	217	261	398	248	245

Notes: Standard errors in parentheses clustered at the DHS cluster level. The data are for women only. Below median number of brothers is 2 or fewer brothers.*Matrilineal* is an indicator variable equal to 1 if the respondent is from a DHS cluster in the matrilineal belt. *Decision Making* presents Average Effect Size estimates for the following questions: Who is the person who usually decides on (1) using contraception, (2) how to spend respondent's earnings, (3) respondent's healthcare, (4) large household purchases, (5) visits to relatives, (6) how to spend husband's earnings ; all questions answered as a 1 to 3 categorical variable where 1 is Respondent, 2 is Respondent and Partner, and 3 is Partner. *Views of Domestic Violence* presents Average Effect Size estimates for the following questions: is beating justified if wife (1) goes out without telling the husband (2) neglects the children (3) argues with husband (4) refuses to have sex with husband (5) burns the food. *Actual Domestic Violence* presents Average Effect Size estimates for the following questions: (1) experienced control issues (2) experienced emotional violence (3) experienced less severe violence (5) experienced severe violence (6) experienced any sexual violence (7) experienced injuries. Controls include DHS year, age, age squared, years of education and wealth. DHS clusters within ethnic group boundaries coded as bilateral are excluded from the analysis. Kinshasa and Lubumbashi are also excluded. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix G. Data Collection

G.1. Sampling Methods

A total for 442 individuals and their spouses were invited to participate in the study. These 442 individuals come from four different samples. The first sample is a subset of a random sample collected in 2015. I used Google satellite imagery to set up a sampling framework to randomly sample households using two-stage cluster sampling. The city of Kananga was divided into grid cells and subsequently each grid cell was divided into polygons. Polygons from each grid cell were randomly selected to be visited by enumerators with a probability of selection proportionate to its population share of the grid cell. This sample yielded 2001 individuals from 76 polygons. Only 65 individuals were from matrilineal ethnic groups and reported being in a monogamous marriage.

In order to increase the number of married individuals from matrilineal societies, targeted sampling was undertaken. I undertook two forms of targeted sampling. The first targeted sampling method consisted of visiting polygons known to have minority ethnic groups (the most prevalent ethnic groups in this area are patrilineal). An additional 543 individuals from 30 polygons were interviewed, of whom 34 were matrilineal and married. An second form of targeted sampling used the "snowball" method to find an additional 155 individuals from 55 polygons. From this second targeted sample, 85 individuals met the inclusion criteria. Finally, an additional 45 individuals were identified from previous screening surveys conducted in 2013 and 2014. For more information on the 2013 and 2014 screening survey sampling method, see Lowes et al. (2017). See Table G27 for a summary of subsample sources. Of the 442 individuals asked to participate, 320 of them agreed, yielding a total sample of 640 individuals. These 320 couples are from 103 different polygons. See Figure G5 for the distribution of households in the sample.

Table G27: Subsample Sources

Sample Name	Method	Total Surveyed	Total Selected	Total Matrilineal
Screening Survey 2015	Random	2001	278	65
Screening Survey 2015	Targeted 1	543	34	34
Screening Survey 2015	Targeted 2	155	85	85
Screening Survey 2013 and 2014	Both	5,234	45	39
		Totals	**442**	**223**

G.2. Timeline

Individuals were visited a total of four times. Once for a screening survey to identify eligible individuals and three times for surveys and experiments. See Table G29 for a timeline of the activities, payouts and notes.

Figure G5: Household Locations in Kananga

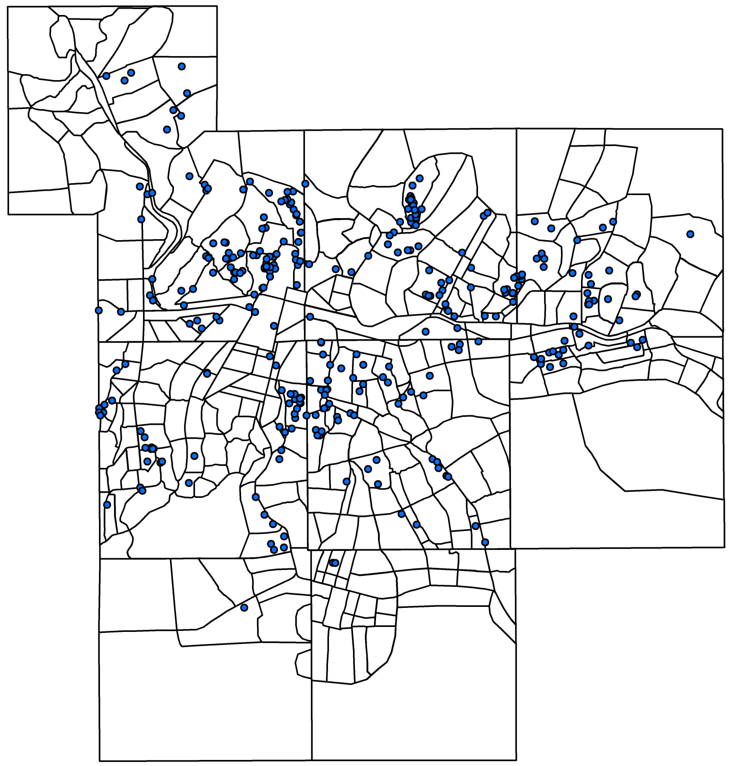


Table G28: Reasons for Migration

Panel A: Village of Birth

	Matrilineal	**Patrilineal**	SE	(p-value)
Born in Kananga	0.128	0.313	0.034	0.000
Obs.	250	390		
Years Lived in Village of Birth	13.769	12.276	0.888	0.093
Obs.	216	261		

Panel B: Reason Migrated

	Matrilineal	**Patrilineal**	SE	(p-value)
Economic Opportunities	0.404	0.449	0.045	0.317
Education	0.271	0.094	0.034	0.000
Disagreement	0.005	0.023	0.011	0.099
Moved with Parents	0.124	0.264	0.036	0.000
Outcast	0.018	0.015	0.012	0.781
Displaced	0.009	0.038	0.014	0.045
Marriage	0.078	0.060	0.023	0.446
Missionary Work	0.032	0.011	0.013	0.111
To be with Family	0.041	0.030	0.017	0.511
Death of Family Member	0.009	0.008	0.008	0.845
Health	0.009	0.008	0.008	0.845
Obs.	218	265		

Notes: *Born in Kananga* is an indicator variable equal to one if the individual was born in Kananga. *Years in Village of Birth* is the number of years the individual lived in their village of birth. Panel B presents the primary reason for migration to Kananga.

Table G29: Timeline of Surveys and Experiments

	Month	*Activities*	*Notes*
Visit 0	June	Screening Survey	-
Visit 1	July	Main Survey	-
Visit 2	August	DG with spouse DG with stranger PG with spouse (1.5 version) PG with spouse (2 version) Short survey 2	Game order randomized. Spouses interviewed at same time. Payments received after 1 week.
Visit 3	September	UG with spouse UG with stranger Man IAT Woman IAT Short survey 3 Incentivized risk and time preference questions	442 visits in field. 172 visits in lab. Game order randomized. Payments received after 1 week.

Appendix H. Experimental Protocols

H.1. Dictator Game Protocols: Version with Spouse

Now I will explain how to play this game. It is very important to pay attention because only those who understand the rules of the game well will be able to play. Let me remind you that this project is completely voluntary and you are free to leave at any time if you decide that you do not want to participate in this game.

This game is played in pairs: there is a Player 1 and a Player 2. You will play with someone chosen randomly from the population of Kananga, or with your spouse. Neither you nor I will know exactly who you are playing with. Only one person in our research office will know who plays with who, and he will never tell anyone.

I will give 1000 FC to each pair of players. Player 1 must decide how to divide the money between himself and player 2. Player 1 must give between 0 and 1000 FC to player 2. Player 2 takes home what Player 1 gives him, and Player 1 takes home the rest. Now, we are going to run through some examples to show how this game can be played.

TAKE THE MONEY IN YOUR HANDS FOR THESE DEMONSTRATIONS AND PUSH THE OFFER MADE TO PLAYER 2 ACROSS A LINE ON THE MAT.

1. Here is the first example. Imagine that Player 1 chooses to allocate 900 CF to Player 2. Then, Player 2 will go home with 900 CF. Player 1 will go home with 100 CF (1000 CF minus 900 CF equals 100 CF). 2. Here is another example. Imagine that Player 1 chooses to allocate 200 CF to Player 2. Then, Player 2 will go home with 200 CF. Player 1 will go home with 800 CF (1000 CF minus 200 CF equals 800 CF). 3. Here is another example. Imagine that Player 1 chooses to allocate 500 CF to Player 2. Then, Player 2 will go home with 500 CF. Player 1 will go home with 500 CF (1000 CF minus 500 CF equals 500 CF). 4. Here is another example. Imagine that Player 1 chooses to allocate 700 CF to Player 2. Then, Player 2 will go home with 700 CF. Player 1 will go home with 300 CF (1000 CF minus 700 CF equals 300 CF). 5. Here is another example. Imagine that Player 1 chooses to allocate 0 CF to Player 2. Then, Player 2 will go home with 0 CF. Player 1 will go home with 1000 CF (1000 CF minus 0 CF equals 1000 CF).

Now please respond to the following test questions to be sure that you have understood. Then, I will tell you if you are a Player 1 or a Player 2 and you will begin to play.

USE THE FOLLOWING LIST AS TEST QUESTIONS. THE TOTAL OF 5 EXAMPLES AND 6 TEST QUESTIONS ENCOMPASSES THE COMPLETE SERIES OF POSSIBLE ALLOCATIONS THAT PLAYER 1 COULD MAKE. IF IT IS NECESSARY TO ASK MORE TEST QUESTIONS, START AGAIN WITH THE

FIRST EXAMPLE ABOVE AND WRITE "TEST QUESTIONS REPEATED" ON THE ANSWER FORM.

1. Imagine that Player 1 chooses to allocate 1000 CF to Player 2. How much will Player 2 go home with? [1000] And how much will Player 1 go home with? [0]
2. Now imagine that Player 1 chooses to allocate 400 CF to Player 2. How much will Player 2 go home with? [400] How much will player 1 go home with? [600]
3. Now imagine that Player 1 chooses to allocate 600 CF to Player 2. How much will Player 2 go home with? [600] How much will player 1 go home with? [400]
4. Now imagine that Player 1 chooses to allocate 100 CF to Player 2. How much will Player 1 go home with? [900] How much will player 2 go home with? [100]
5. Now imagine that Player 1 chooses to allocate 800 CF to Player 2. How much will Player 1 go home with? [200] How much will player 2 go home with? [800]
6. Now imagine that Player 1 chooses to allocate 300 CF to Player 2. How much will Player 1 go home with? [700] How much will player 2 go home with? [300]

Now that you fully understand the game, do you still want to participate?
IF THE PERSON INDICATES "YES", ADMINISTER THE OF THE GAME IN THE ORDER IN WHICH THEY APPEAR ON YOUR LIST.

For this activity, you are a Player 1. The Player 2 you play with will be your spouse. Your choices in this game will be secret. I will not tell your spouse how you have played. I will also not tell anyone else in the community how you have played. Your choices will be kept secret because your spouse will be paid for a randomly selected game, and they will have no way of knowing which game they were paid for.

Here is the 1000 CF. Now, please go inside the tent. While you are there, divide this money and put the amount you would like to give to Player 2 in the envelope marked "Spouse". Put the rest of the money in the envelope marked "Me". Then, seal both envelopes, keep the one marked "Me," and put the one marked "Spouse" in the bag in front of the tent.
I will never know how much you have chosen to put in the two envelopes. Only one person in our research office will know, and he will never tell anyone.

CHECK THAT THE PLAYER HAS UNDERSTOOD HOW TO DIVIDE THE MONEY BETWEEN HIMSELF AND THE PLAYER 2 IN THE TWO ENVELOPES. THEN, LEAVE THE PLAYER ALONE IN THE TENT UNTIL HE IS FINISHED. MAKE SURE THAT OTHER PEOPLE DON'T BOTHER OR SPEAK TO THE PLAYER WHILE HE IS IN THE TENT. WHEN HE IS FINISHED, START THE NEXT ACTIVITY.

H.2. Ultimatum Game Protocols: Version with Spouse

Now I will explain how to play this game. It is very important to pay attention because only those who understand the rules of the game well will be able to play. Let me remind you that this project is completely voluntary and you are free to leave at any time if you decide that you do not want to participate in this game.

This game is played in pairs: there is a Player 1 and a Player 2. You will play with someone chosen randomly from the population of Kananga or with your spouse. Neither you nor I will know exactly who you are playing with. Only one person in our research office will know who plays with who, and he will never tell anyone.

I will provide 1000 CF to each pair of Players. Player 1 must decide how to divide this money between himself and Player 2. Player 1 must offer between 0 CF and the 1000 CF (the total) to Player 2.

Before receiving the offer the Player 1 has proposed, Player 2 has to state whether he would accept or reject each of the possible offers between 0 CF and 1000 CF. If Player 2 has stated that he would accept Player 1's offer, then Player 2 gets the amount of the offer and Player 1 gets the rest. If Player 2 has stated that he would reject Player 1's offer, then neither Player receives any money from this game. Now, we are going to run through some examples to show how this game can be played.

TAKE THE MONEY IN YOUR HANDS FOR THESE DEMONSTRATIONS AND PUSH THE OFFER MADE TO PLAYER 2 ACROSS A LINE ON THE MAT.

1. Here is the first example. Imagine that Player 1 offers 900 CF to Player 2. Now, before hearing about this, Player 2 has stated that he would reject an offer of 900 CF from Player 1. Player 2 has also stated whether he would accept or reject all the other possible offers that Player 1 might have made, but we will not worry about that now. Because Player 2 said he would reject 900 CF, Player 1 goes home with nothing and Player 2 goes home with nothing.

2. Here is another example. Imagine that Player 1 offers 200 CF to Player 2. Now, before hearing about this, Player 2 has stated that he would accept an offer of 200 CF from Player 1. Player 2 has also stated whether he would accept or reject all the other possible offers that Player 1 might have made. Because Player 2 said he would accept this offer, Player 1 goes home with 800 CF (1000 CF minus 200 CF equals 800 CF), and Player 2 goes home with 200 CF.

3. Here is another example. Imagine that Player 1 offers 500 CF to Player 2. Now, before hearing about this, Player 2 has stated that he would reject an offer of 500 CF from Player 1. Player 2 has also stated whether he would accept or reject all the other possible offers that Player 1 could have made. Because Player 2 said he would reject an offer of 500 CF, Player 1 goes home with nothing and Player 2 goes home with nothing.

4. Here is another example. Imagine that Player 1 offers 700 CF to Player 2. Now, before hearing about this, Player 2 has stated that he would accept an offer of 700 CF from Player 1. Player 2 has also stated whether he would accept or reject all the other possible offers that Player 1 could have made. Because Player 2 said he would accept an offer of 700 CF, Player 1 goes home with 300 CF (1000 CF minus 700 CF equals 300 CF). And Player 2 goes home with 700 CF.

5. Here is another example. Imagine that Player 1 offers 0 CF to Player 2. But this time, before hearing about this offer, Player 2 has stated that he would reject an offer of 0 CF from Player 1. Player 2 has also stated whether he would accept or reject all the other possible offers that Player 1 could have made. In this case, Player 1 goes home with nothing and Player 2 goes home with nothing.

6. Imagine now that Player 1 offers 1000 CF to Player 2. But this time, before hearing about this, Player 2 has stated that he would accept an offer of 1000 CF from Player 1. Player 2 has also stated whether he would accept or reject all the other possible offers that Player 1 could have made. Then Player 1 goes home with nothing (1000 CF minus 1000 CF equals zero) and Player 2 goes home with 1000 CF.

Now please respond to the following test questions to make sure that you have understood the game. Then, I will tell you if you are a Player 1 or a Player 2, and you will start to play the game for real.

USE THE FOLLOWING LIST AS TEST QUESTIONS. IF IT IS NECESSARY TO ASK MORE TEST QUESTIONS, START AGAIN WITH THE FIRST EXAMPLE ABOVE, AND WRITE "TEST QUESTIONS REPEATED" ON THE ANSWER PAGE.

1. Suppose that Player 1 offers 100 CF to Player 2 and that, before hearing about this, Player 2 has stated that he would accept an offer of this amount. In this case, how much will Player 1 go home with? [900 CF] And how much will Player 2 go home with? [100 CF].

2. And what if, before hearing about this, Player 2 has stated that he would reject an offer of this amount. In this case, how much will Player 1 go home with? [0 CF] And how much will Player 2 go home with? [0 CF]

3. Now try this one. Suppose that Player 1 offers 800 CF to Player 2 and that, before hearing about this, Player 2 has stated that he would accept an offer of this amount. In this case, how much will Player 1 go

home with? [200 CF] And how much will Player 2 will go home with? [800 CF]

4. And what if, before hearing about this, Player 2 has stated that he would reject an offer of this amount. In this case, how much will Player 1 go home with? [0 CF] And how much will Player 2 go home with? [0 CF]

5. Now try this one. Suppose that Player 1 offers 300 CF to Player 2 and that, before hearing about this, Player 2 has stated that he would reject an offer of this amount. In this case, how much will Player 1 go home with? [0 CF] And how much will Player 2 go home with? [0 CF]

6. And what if, before hearing about this, Player 2 has stated that he would accept an offer of this amount. In this case, how much will Player 1 go home with? [700 CF] And how much will Player 2 go home with? [300 CF]

Now that you fully understand the game, do you still want to participate?

IF THE PERSON INDICATES YES, ADMINISTER THE ACTIVITY.

For this activity, you are a Player 1. The Player 2 you play with will be your spouse. Here is the 1000 CF. Now, please go inside the tent. While you are there, divide this money and put the amount you would like to offer to Player 2 in the envelope marked "Spouse" Put the rest of the money in the envelope marked "Me". Then, seal the two envelopes and put them both in the bag in front of the tent. I will never know how much you have chosen to put in the two envelopes. Only one person in our research office knows and he will never tell anyone.

CHECK THAT THE PLAYER HAS UNDERSTOOD HOW TO DIVIDE THE MONEY BETWEEN HIMSELF AND THE PLAYER 2 IN THE TWO ENVELOPES. THEN, LEAVE THE PLAYER ALONE IN THE TENT UNTIL HE IS FINISHED. MAKE SURE THAT OTHER PEOPLE DON'T BOTHER OR SPEAK TO THE PLAYER WHILE HE IS IN THE TENT.

WHEN HE IS FINISHED, SAY:

You are also a Player 2. As before, the Player 1 you play with will be your spouse. Now I will ask you which offers you will accept and which offers you will reject.

1. If Player 1 offered you 1000 CF and kept 0 CF for him or herself would you accept or reject?
2. If Player 1 offered you 900 CF and kept 100 CF for him or herself would you accept or reject?
3. If Player 1 offered you 800 CF and kept 200 CF for him or herself would you accept or reject?
4. If Player 1 offered you 700 CF and kept 300 CF for him or herself would you accept or reject?
5. If Player 1 offered you 600 CF and kept 400 CF for him or herself would you accept or reject?
6. If Player 1 offered you 500 CF and kept 500 CF for him or herself would you accept or reject?
7. If Player 1 offered you 400 CF and kept 600 CF for him or herself would you accept or reject?
8. If Player 1 offered you 300 CF and kept 700 CF for him or herself would you accept or reject?
9. If Player 1 offered you 200 CF and kept 800 CF for him or herself would you accept or reject?
10. If Player 1 offered you 100 CF and kept 900 CF for him or herself would you accept or reject?
11. If Player 1 offered you 0 CF and kept 1000 CF for him or herself would you accept or reject?

Now that you have told me what amounts you would accept or reject, our research office will calculate your payoff after comparing your responses with the offer made by Player 1. I will return in a few days to a week with your payment for these activities.

WHEN YOU HAVE FINISHED, ADMINISTER THE NEXT ACTIVITY.

H.3. Public Goods Game Protocols: Version with Spouse + Multiplied by 1.5

Today you and your spouse will be participating in an activity. You will be working with me in this tent. Your spouse is working with my co-worker in the other tent. In this game, you will be given money to divide between two cups: a personal cup and a shared cup. Your spouse will also be given money to divide between a personal cup and a shared cup.

The money that you and your spouse will contribute to the shared cup will be increased by 1.5. This means that we will add half of the total amount contributed to the shared cup by you and your spouse. For example, if you put 1000 CF in the shared cup and your spouse puts 0 CF, it will become 1500 CF after the increase. Then the money in the shared cup will be divided equally between you and your spouse. For example, 1500 CF will be divided in two: each player will receive 750 CF. All the money that you put in the personal cup will be yours.

Now we will explain the game to you step by step. First we will tell you how much money you have to play this game. The amount of money that we give you at the start of the game will the amount that you will divide between the two cups.

You will receive at least 1000 CF, but there is a chance you will get a bonus. You will roll this black and white dice. The dice has 6 sides: three black, and three white. If you roll black, then you will receive a bonus of an additional 500 CF. If you roll white, you will not receive any additional money.

Your spouse will also receive at least 1000 CF and have the opportunity to get the bonus as well. Like you, your spouse will roll a dice to determine if he/she receives the bonus.Your spouse will not know if you received the bonus or not. Your spouse will only know how much you contribute to the shared cup.

The money that you are paid is yours, and you will decide how to allocate it between the two cups: the personal cup and the shared cup. We will collect the money that you and your spouse have allocated to the personal and the shared cups. Someone in our reserach office will increase the money that you and your spouse put in the shared cup by 1.5, and then divide it evenly between you two. The amount of money that you put in the personal will not change. In a few days or a week, we will return with your payments from the personal cup and the shared cup.

You can put as much or as little as you want into the shared cup. You can contribute any amount from 0 CF to 1000 CF if you did not win the bonus, and any amount from 0 CF to 1500 CF if you did win the bonus. The decision is yours.

For each amount that could be in the shared cup, this poster tells you what will happen to your money.

PICK UP THE MULTIPLICATION SHEET AND SHOW IT TO THE PLAYER.

For each amount that could be in the shared cup, you can see here how much money you'll receive once the amount is increased by 1.5, and then divided equally between you and your spouse.

DISCUSS A FEW EXAMPLES TO DEMONSTRATE HOW TO USE THE MULTIPLICATION SHEET.

Are there any questions so far? In short: there are two amounts of money you can receive to use in this game. You will be given 1000 CFs, or 1500 CF if you win the bonus. You'll decide how you want to divide that money between a personal cup and a shared cup. At the same time, your spouse will be making the same decision. The money that you put in the shared cup and the money your spouse puts in the shared cup will be increased by 1.5. It will then be divided evenly between the two of you. But remember, you will get all the money you put in the personal cup.

EXAMPLES

Now, we are going to run through some examples to show how this game can be played.

TAKE THE MONEY IN YOUR HANDS FOR THESE DEMONSTRATIONS. FOR EACH EXAMPLE, COUNT THE AMOUNTS OF MONEY THAT YOU ARE TALKING ABOUT. BEGIN WITH 1000 CF. ADD 500 CF IF THE EXAMPLE INCLUDES WINNING A BONUS. THEN, PUT THE "PERSONAL MONEY" ON TOP OF THE PERSONAL CUP, AND THE "SHARED MONEY" ON TOP OF THE SHARED CUP.

1. Here is the first example. Imagine that you do not win the bonus, so you have 1000 CF to divide. Imagine that you decide to put 700 CF in the shared cup, and to put 300 CF in the personal cup. Imagine that your spouse decides to put 500CF in the shared cup. In total there is 700+500=1200 CF in the shared cup. This amount will be increased by 1.5, meaning that it will increase to 1800 CF. Both you and your spouse will receive an equal share of the money in the shared cup: 900 CF each. At the end of the game, you will receive 900 CF from the shared cup plus 300 CF from the personal cup, a total of 1200 CF. Your spouse will not know whether or not you won the bonus; he/she will only know how much money you put in the shared cup.

2. Here is another example. Imagine that you do not win the bonus, so you have 1000 CF to divide. Imagine that you decide to put 1000 CF in the shared cup and your spouse also decides to put 1000 CF in the shared cup. In total there is 1000+1000=2000 CF in the shared cup. This amount will be increased by 1.5, meaning that it will increase to 3000 CF. Both you and your spouse will receive an equal share of the money in the shared cup: 1500 CF each. At the end of the game, you will receive 1500 CF total, since you did not put any money in the personal cup. Your spouse will not know whether or not you won the bonus; he/she will only know how much money you put in the shared cup.

3. Now imagine that you win the bonus of 500 CF, so you have a total of 1500 CF divide. Imagine that you decide to put 200 CF in the shared cup and to put 1300 CF in the personal cup. Imagine that your spouse decides to put 800 CF in the shared cup. In total there is 200+800=1000CF in the shared cup. This amount will be multiplied by 1.5, meaning that it will increase to 1500 CF. Both you and your spouse will receive an equal share of the money in the shared cup: 750 CF each. At the end of the game, you will receive 750 CF from the shared cup plus 1300 CF from the personal cup, a total of 2050 CF. Your spouse will not know whether or not you won the bonus; he/she will only know how much money you put in the shared cup.

4. Now imagine that you win the bonus of 500 CF, so you have a total of 1500 CF divide. Imagine that you decide to put 1200 CF in the shared cup and to put 300 CF in the personal cup. Imagine that your spouse decides to put 900 CF in the shared cup. In total there is 1200+900=2100 CF in the shared cup. This amount will be multiplied by 1.5, meaning that it will increase to 3150 CF. Both you and your spouse will receive an equal share of the money in the shared cup: 1575 CF each. At the end of the game, you will receive 1575 CF from the shared cup plus 300 CF from the personal cup, a total of 1875 CF. Your spouse will know that you received the bonus because you contributed over 1000 CF to the shared cup and that is only possible when you have received the bonus.

TEST QUESTIONS

Now please respond to the following test questions to be sure that you have understood.

USE THE FOLLOWING LIST AS TEST QUESTIONS. IF IT IS NECESSARY TO ASK MORE TEST QUESTIONS, START AGAIN WITH THE FIRST EXAMPLE ABOVE AND WRITE "TEST QUESTIONS REPEATED" ON THE ANSWER FORM.

1. Imagine that you do not win the bonus, and that you put 500 CF in the shared cup. How much money did you put in your personal cup? [500 CF]
2. Now imagine that your spouse puts 1000 CF in the shared cup. How much money total is there in the shared cup? [1500 CF]
3. After we multiply this amount by 1.5, how much money will there be in the shared cup? [2250 CF]
4. When we divide this money in half, how much will you receive? [1125 CF]
5. In total, how much money will you receive? [1125+500=1625 CF]

6. Imagine that you do not win the bonus, and that you put 800 CF in the shared cup. How much money did you put in your personal cup? [200 CF]
7. Now imagine that your spouse puts 200 CF in the shared cup. How much money total is there in the shared cup? [1000 CF]
8. After we multiply this amount by 1.5, how much money will there be in the shared cup? [1500 CF]
9. When we divide this money in half, how much will you receive? [750 CF]
10. In total, how much money will you receive? [750+200=950 CF]
11. Now imagine that you win the bonus of 500 CF. How much money do you have to divide? [1500 CF]
12. Imagine that you put 900 CF in the shared cup. How much money did you put in your personal cup? [600 CF]
13. Now imagine that your spouse puts 900 CF in the shared cup. How much money total is there in the shared cup? [1800 CF]
14. After we multiply this amount by 1.5, how much money will there be in the shared cup? [2700 CF]
15. When we divide this money in half, how much will you receive? [1350 CF]
16. In total, how much money will you receive? [600+1350=1950 CF]
17. Now imagine that you win the bonus of 500 CF. How much money do you have to divide? [1500 CF]
18. Imagine that you put 1500 CF in the shared cup. How much money did you put in your personal cup? [0 CF]
19. Now imagine that your spouse puts 500 CF in the shared cup. How much money total is there in the shared cup? [2000 CF]
20. After we multiply this amount by 1.5, how much money will there be in the shared cup? [3000 CF]
21. When we divide this money in half, how much will you receive? [1500 CF]
22. In total, how much money will you receive? [0+1500=1500 CF]
23. Who is the other player in this game? [SPOUSE.]
24. By how much is the money in the shared cup increased? [1.5.]
25. Will the other player know if you won the bonus? [NO]

Are there any questions? Now we've finished explaining the instructions for the game, so we will ask you to make your decisions. We will collect the money that you have put in the personal and the shared cups, and we will take it back to our research office. One of the researchers will record your choices, augment the money that you and your spouse put to the shared cup, and divide it in half. I will return in a few days or a week with money you get from this game.

HAND THE PLAYER 1000 CF.

Here is your 1000 CF. Now please roll the die to find out if you will win the bonus.

HAND THE PLAYER THE BLACK AND WHITE DIE. LET THEM ROLL THE DIE, AND RECORD THE RESULT OF THE THROW. IF THEY ROLL BLACK, HAND THEM 500 CF. IF THEY ROLL WHITE, DO NOT GIVE THEM ANY MORE MONEY.

DID HE/SHE WIN THE BONUS (DIE ROLL WAS BLACK)?

Now, I will leave you alone to make your decisions and divide your money. I will come back in a few minutes.

LEAVE THE TENT. AFTER A COUPLE OF MINUTES, KNOCK/CALL OUT TO CHECK IF THE PLAYER IS READY FOR YOU TO RE-ENTER. IF THEY ARE READY, GO BACK INTO THE TENT AND PICK UP BOTH ENVELOPES.

Now I will collect your envelopes and take them back to our office. One of the researchers in the office will combine the money that you contributed to the shared cup with the money that your spouse contributed to the shared cup. He will multiply this amount by 1.5, and then divide it equally between you two. The amount of money in your personal cup will not change. I will come back in a few days or a week with all of your winnings from the game.

COLLECT BOTH THE PERSONAL AND SHARED ENVELOPES FROM THE PLAYER. THE AMOUNT OF MONEY THE PLAYER WILL RECEIVE WILL BE CALCULATED BY THE OFFICE.
WHEN HE IS FINISHED, START THE NEXT ACTIVITY.

H.4. Risk and Time Preference Questions

All individuals were asked the following questions. They were told that one of the 5 questions would be chosen at random, and the choice when they answered the question would actually be implemented. For example, If for question 1 I said I would prefer Game 2, if question 1 were selected, the respondent would play Game 2.

1. **Question 1**: Now imagine you have a choice between playing two different games of kwatanfumu ujambonge. *Game 1*: We play kwatanfumu ujambonge. If you win, you get 1500 CF. If you lose, you get 1000 CF. *Game 2*: We play kwatanfumu ujambonge. If you win, you get 2500 CF. If you lose, you get 500 CF. Which game would you choose to play?
2. **Question 2**: Now imagine you have a choice between playing two different games of kwata nfumu ujambonge. *Game 1*: We play kwatanfumu ujambonge. If you win, you get 1000 CF. If you lose, you get 1000 CF. *Game 2*: We play kwatanfumu ujambonge. If you win, you get 2500 CF. If you lose, you get 500 CF. Which game would you choose to play?
3. **Question 3**: Now imagine you have a choice between playing two different games of kwatanfumu ujambonge. *Game 1*: We play kwatanfumu ujambonge. If you win, you get 1500 CF. If you lose, you get 1000 CF *Game 2*: We play kwatanfumu ujambonge. If you win, you get 2500 CF. If you lose, you get 0 CF. Which game would you choose to play?
4. **Question 4** Now imagine you have a choice between the following options: *Option A*: 500 CF immediately *Option B*: 1500 CF in two weeks Which option would you choose?
5. **Question 5**: Now imagine you have a choice between the following options: *Option A*: 500 CF in two weeks *Option B*: 1500 CF in four weeks. Which option would you choose?

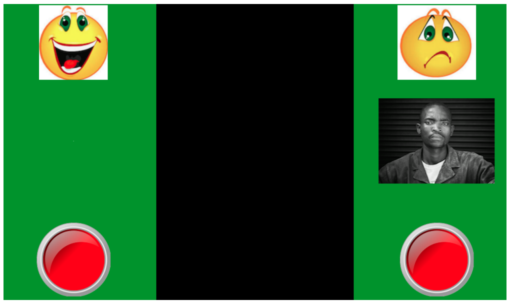
Appendix I. Gender Implicit Association Test

The gender IATs were administered on ten-inch Samsung Galaxy III tablets. During the IAT, respondents are asked to sort words to the left side of the screen or to the right side of the screen by pushing a button on that side of the screen. Respondents hear words from four different categories when completing the men and women IATs: words related to women, words related to men, happy words and sad words. Happy words are always sorted to the left and sad words are always sorted to the right. What varies across blocks is whether words related to women (men) are to be sorted to the left with happy words or to the right with sad words. The IAT consists of five blocks: a practice block in which individuals sort happy or sad words only, a block in which the respondent hears happy words, sad words, and words related to women (men) and must sort the women (men) words to the left side with the happy words, and a block in which the respondent hears happy words, sad words, and words related to women (men) and must sort the women (men) words to the right side with the sad words. The order of the blocks is randomized across individuals, so that respondents either does the women or men blocks first, and either sorts the target with the happy or sad block first.

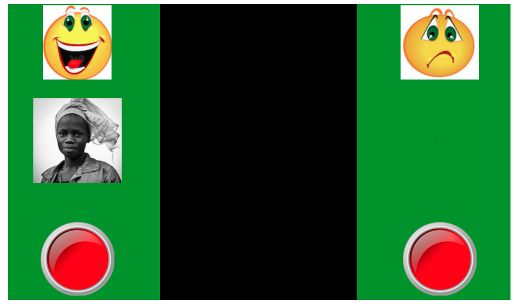
Figure I6 presents screen shots from the Men and Women IATs. In I6a is an image from the Men IAT. In this particular block, male words are to be sorted to the right with sad words. In

I6a, female words are to be sorted to the left with happy words. The words that the respondent hears are either in French or Tshiluba, though the majority of the respondents completed the IAT in Tshiluba.

Figure I6: Screen Shots from Implicit Association Test (IAT)



(a) Men IAT



(b) Women IAT

I.1. IAT Construction

In the following tables I present the words used in the Gender IAT. Table I30 lists the happy and sad words used in English, French and Tshiluba. Table I31 presents the male and female words used in the IAT. In this context respondents could choose between doing the IAT in French or Tshiluba.

Table I30: Happy and Sad Words in IAT

Happy Words			*Sad Words*		
English	French	Tshiluba	English	French	Tshiluba
Laughter	Le rire	Tuseku	Evil	Le Mal	Bubi
Happy	Heureux	Diakalenga	Failure	L'echec	Dipanga
Pleasure	Le plaisir	Kusankisha	Hurt	La douleur	Bisama
Joy	La joie	Disanka	Bad	Mauvais	Bibi
Love	L'amour	Dinanga	Horrible	Horrible	Tshienza bowa
Glorious	Glorieux	Butumbi	Terrible	Terrible	Tshikuate bowa
Generous	Genereux	Muena Kalolo	Suffering	La souffrance	Dikenga
Nice	Sympatique	Buimpe	Wicked	Mechant	Lonji

I.2. IAT Results

Given that matrilineal kinship systems affect spousal cooperation, matrilineal individuals may have different implicit views of the other sex. In order to measure implicit views of the other sex, I conducted two Single-Target Implicit Association Test (ST-IAT) where the targets are men or women to measure implicit attitudes towards men or towards women. The ST-IAT, developed by Bluemke and Friese (2008), is a variant of the original IAT that measures an individual's association with a single target rather than an individual's relative association between two targets as in the original IAT. Recent work in DRC has used IATs to measure associations with various targets including ethnic groups, chiefs, and historical figures (Lowes et al., 2015; Lowes

Table I31: Male and Female Words in IAT

Male Words			*Female Words*		
English	French	Tshiluba	English	French	Tshiluba
Man	L'homme	Mulume	Woman	La femme	Mukaji
Men	Les hommes	Balume	Women	Les femmes	Bakaji
Father	Le pere	Tatu	Mother	La mere	Mamu
Fathers	Les peres	Batatu	Mothers	Les meres	Bamamu
Boy	Le garcon	Muana wa balume	Girl	La fille	Muana wa bakaji
Young man	Le jeune homme	Songa mulume	La jeune femme	Terrible	Songa mukaji

and Montero, 2018; Lowes et al., 2017). In this case, the target groups are men and women. For details of the administration of the IATs, see Appendix I.

During an IAT, the respondent sorts happy words to the left, sad words to the rights, and words related to women (men) to either the left or the right depending on the block (round) of the IAT. The intuition behind the IAT is that if a respondent has a positive view of women (men), the respondent will have an easier time sorting words related to women (men) to the left with happy words than to the right with sad words. The IAT is intended to identify if the respondent uses a subconscious heuristic that "good things go left and bad things go right" (Lowes et al., 2015). By examining the difference in the speed at which the respondent sorts the words related to women (men) across the two blocks I can infer their implicit view of women (men).[30]

The IAT allows me to test whether matrilineal individuals have different implicit views of their own sex and the other sex. Unfortunately, the implementation of the IAT does not allow me to create a stranger counter factual, as I am able to do for the experimental measures. Rather the IAT measure will include implicit views toward all members of the same and opposite sex. Table I32 presents the results from the gender IATs. Columns (1) and (2) present the results for the IAT examining implicit views on men and columns (3) and (4) present the results for the IAT examining implicit view on women. Matrilineal women in particular have very strong positive implicit views of women. Columns (5) and (6) present an analysis of own-sex preference: this subtracts the individual's D-score for the opposite sex from their D-score for their own sex, so that a more positive value signifies a greater own sex preference. Both matrilineal men and women have stronger own sex preferences than patrilineal individuals. This is consistent with greater polarization within the household for matrilineal individuals.

I.3. *Gender IAT Protocols*

Block A [Good-Bad Practice]

We are going to play a tablet game. Before we play, I would like you to put on these headphones.

You are going to hear some words. Some words will be [good words] and some words will be bad words. If you hear a good word, I want you to press the left button as fast as you can. There is a smiley face on the left side to remind you to press the left] button when you hear a good word. But if you hear a bad word, I want you to press the right button as fast as you can. There is a frowny face on the right side to

[30] I follow Lowes et al. (2015) and calculate the standard *D-Score* as the inferred measure of the implicit view of women (men) for a given respondent. The *D-Score* is defined as: *D-Score* $= [Mean(latency^{-ve}) - Mean(latency^{+ve})]/SD(latency^{+ve\,and\,-ve})$, where $Mean(latency^{-ve})$ is the average response time in milliseconds for the block in which the women (men) words are sorted to the right, $Mean(latency^{-ve})$ is the average response time for the block in which the women (men) words are sorted to left, and $SD(latency^{+ve\,and\,-ve})$ is the standard deviation in response times across both blocks. In this *D-Score*. more positive values will indicate more positive implicit views.

Figure I7: Gender IAT results

Table I32: D-Scores for Man ST-IAT and Woman ST-IAT

	Dep. Var.: D-Scores for Man ST-IAT and Woman ST-IAT					
	Man ST-IAT		Woman ST-IAT		Prefer Own Sex	
	(1)	(2)	(3)	(4)	(5)	(6)
Matrilineal	0.034	0.075	0.020	-0.054	0.118*	0.129
	(0.042)	(0.061)	(0.042)	(0.060)	(0.060)	(0.087)
Female	-0.002	0.031	0.061	0.001	-0.027	-0.017
	(0.041)	(0.052)	(0.044)	(0.053)	(0.061)	(0.077)
Matrilineal*Female		-0.082		0.150*		-0.023
		(0.084)		(0.084)		(0.121)
Observations	614	614	614	614	614	614
Mean	0.07	0.07	0.067	0.067	0.019	0.019

Notes: The data are the D-Scores calculated for the man ST-IAT and woman ST-IAT for each individual. Robust standard errors are in parentheses. Regressions control for age and age squared. *Matrilineal* is an indicator variable equal to 1 if the respondent reports an ethnic group that is matrilineal. *Female* is an indicator variable equal to 1 if the respondent is a woman. *D-Score* is the inferred measure of an individual's implicit view of men(women). *Prefer Own Sex* is an individual's D-Score of the IAT where the target is their own sex minus the D-Score where the target is the opposite sex. A positive value indicates an implicit preference for own sex. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

remind you to press the right button when you hear a bad word.

Now, there are few things to remember. Please use one finger for each button.

[Demonstrate by holding one finger by both buttons and pressing each one at a time.]

After you press the button be sure to take your finger off of it because if you hold it down [demonstrate holding it down], the button will stop working.

Now, the last thing that I want you to remember is to try to play as fast as you can. It is okay if you make mistakes, I just want to see how quickly you can play.

But if you do press the wrong button, a red “X" will appear. If this happens, just press the correct button and keep playing.

Ok, are you ready?

[Make sure the participant has one finger by each button and is ready to begin before starting.]

[Push the start button to start]

Block B [Man to Left]

Ok, that was good.

Now you will words related to men.

If you hear a word related to men, I want you to press the left button as quickly as you can. And look, there is a picture of a man on the left side to remind you to push the left button when you hear a word related to men.

Like before, you will also hear good words and bad words. If you hear a bad word, I want you to push the right button as quickly as you can like you were doing before. And, if you hear a good word, I want you to push the left button as quickly as you can like you were doing before.

Remember, I would like you to go as quickly as you can. There is no problem if you press the wrong button.

[Make sure the participant has one finger by each button before starting the first block]

[Push the start button to start]

Block C [Man to Right]

Ok, that was good.

Now you will words related to men.

If you hear a word related to men, I want you to press the right button as quickly as you can. And look, there is a picture of a man on the right side to remind you to push the right button when you hear a word related to men.

Like before, you will also hear good words and bad words. If you hear a bad word, I want you to push the right button as quickly as you can like you were doing before. And, if you hear a good word, I want you to push the left button as quickly as you can like you were doing before.

Remember, I would like you to go as quickly as you can. There is no problem if you press the wrong button.

Ok, are you ready to start?

[Push the start button to start]

Block D [Woman to Left]

Ok, that was good.

Now you will words related to women.

If you hear a word related to women, I want you to press the left button as quickly as you can. And look, there is a picture of a woman on the left side to remind you to push the left button when you hear a word related to women.

Like before, you will also hear good words and bad words. If you hear a bad word, I want you to push the right button as quickly as you can like you were doing before. And, if you hear a good word, I want you to push the left button as quickly as you can like you were doing before.

Remember, I would like you to go as quickly as you can. There is no problem if you press the wrong button.

[Make sure the participant has one finger by each button before starting the first block]

[Push the start button to start]

Block E [Woman to Right]

Ok, that was good.

Now you will words related to women.

If you hear a word related to women, I want you to press the right button as quickly as you can. And look, there is a picture of a woman on the right side to remind you to push the right button when you hear a word related to women.

Like before, you will also hear good words and bad words. If you hear a bad word, I want you to push the right button as quickly as you can like you were doing before. And, if you hear a good word, I want you to push the left button as quickly as you can like you were doing before.

Remember, I would like you to go as quickly as you can. There is no problem if you press the wrong button.

Ok, are you ready to start?

[Push the start button to start]

Appendix J. EDA Data Collection Protocols

J.1. Lab Set Up

A subset of couples were invited to complete some of the activities in a lab space set up by the research team. The lab space consisted of four rooms, two rooms in one building and two rooms in a neighboring building. Two couples were invited to the lab at a time, with the women assigned to rooms in one building and the men assigned to the rooms in the other building. This was to assure each respondent sufficient privacy from their spouse.

In each room, there was: one respondent, an enumerator, a lab assistant, a video camera, a table and two chairs. The video camera was placed so that game play decisions could be recorded. Respondents were asked their permission to have the session video recorded. They were also asked if they would consent to wear a special watch that records electrodermal activity. They were told that the watch measures their emotional responses to the activities that they would participate in. Once consent was acquired, an assistant enumerator started the video camera. At the same time they would also start a stopwatch application on a tablet. Thus, the start time of the stop watch corresponded to the start time of the video footage. In view of the video camera, the assistant would then put the watch on the respondent's left wrist. The watch starts recording physiological data only after it's start button has been pushed twice. Again, in view of the video camera, the assistant would push the watch start button twice and the watch light would come on to signal that it had started recording data. The assistant would add a lap on the stopwatch app - this records the time that the watch was started relative to the start time of the stopwatch.

The enumerator would then begin the assigned activities with the respondent. In this case, the activities were an ultimatum game with a spouse and an ultimatum game with a stranger. Given the set up in the lab, participants were assigned only the role of a player 1 or a player 2 for both of the UG, rather than participating in the activities as both a player 1 and a player 2. As for activities administered in the field, the order of game play was randomized (and stratified along couple type). Additionally, assignment of player 1 or player 2 type was randomized and stratified along gender and couple type.

At particular pre-specified events, the enumerator would add laps to the stopwatch app. This allowed me to identify approximately when the respondent was exposed to particular stimuli. For the ultimatum game, four event times were recorded. If the respondent was a player 1, the following event times were recorded in the stopwatch application: (1) when the respondent announced the offer he would send to his spouse, (2) when the respondent received the spouse's response to his offer, (3) when the respondent announced the offer he would send to a stranger, and (4) when the respondent received the stranger's response to his offer. If the respondent was a player 2, the following even times were recorded in the stopwatch application: (1) when the respondent received the offer from his spouse, (2) when the respondent announced whether he would accept or reject the offer from the spouse, (3) when the respondent received the offer from a stranger, and (4) when the respondent announced whether he would accept or reject the offer from the stranger. The final event times used in the analysis were constructed by watching the videos and noting the second at which each event of interest happened.

Appendix K. Data Sources and Variable Definitions

K.1. Geographic Data and Variables

- **Elevation:** The elevation data is provided by the Global Climate Database created by Hijmans et al. (2005) and available at http://www.worldclim.org/. This data provides elevation information in meters at the 30 arc-second resolution (approximately at the 1 km^2 level near the equator). The elevation measure is constructed using NASAs SRTM satellite images (http://www2.jpl.nasa.gov/srtm/). My paper's elevation variable calculates the mean elevation for each village of origin.

- **Precipitation:** Precipitation data is provided by the Global Climate Database created by Hijmans et al. (2005) and available at http://www.worldclim.org/. This data provides monthly average rainfall in millimeters. I calculate the average rainfall for each month for each village of origin nd average this over the twelve months to obtain our yearly precipitation measure in millimeters of rainfall per year.

- **Temperature:** Temperature data is provided by the Global Climate Database created by Hijmans et al. (2005) and available at http://www.worldclim.org/. I use the average yearly temperature in degrees Celsius in each village of origin.

- **Soil Suitability:** Soil suitability is the soil component of the land quality index created by the Atlas of the Biosphere available at http://www.sage.wisc.edu/iamdata/ used in Michalopoulos (2012) and Ramankutty et al. (2002). This data uses soil characteristics (namely soil carbon density and the acidity or alkalinity of soil) and combines them using the best functional form to match known actual cropland area and interpolates this measure to be available for most of the world at the 0.5 degree in latitude by longitude level. (The online appendix in Michalopoulos (2012) provides a detailed description of the functional forms used to create this dataset.) This measure is normalized to be between 0 and 1, where higher values indicate higher soil suitability for agriculture. Our Soil Suitability variable measures the average soil suitability in each village of origin to provide a measure of soil suitability that also ranges between 0 and 1, with higher values indicate higher soil suitability for agriculture.

- **Plough Suitability:** Plough suitability is the sum of the FAO crop suitability measures for wheat, barley and rye normalized by the share of land suitable for agriculture within a 50 km buffer around each village of origin.

- **TseTse Fly Suitability:** TseTse Fly Suitability is the estimated tsetse fly suitability measure from Alsan (2015) for each village of origin.

K.2. DHS Survey Data and Variables:

Survey data on development outcomes for individuals is provided by the 2007 and 2014 DHS survey on the DRC implemented by The DHS Program with the help of the DRC Ministry of Planning. The 2007 survey fieldwork was carried out from January 2007-August 2007 and sampled 9995 women between the ages of 15-49 and 4757 men between the ages of 15-59. The 2014 DHS was carried out between August 2013 and February 2014 and sampled 18,827 women between the ages of 15-49 and 8,656 men between the ages of 15-59.

The survey provides detailed information on education, assets, and health outcomes for individuals in multiple villages. As well, the survey provides GPS coordinates for each village (i.e. *clusters* in the survey); these coordinates are displaced by up to 5km for all urban clusters, and 99% of rural clusters and up to 10 km for 1% of rural clusters. Importantly, this displacement is random, and simply induces classical measurement error. The survey data and detailed information on the sampling procedure and variable definitions is available at http://dhsprogram.com/data/Data-Variables-and-Definitions.cfm. Below we explain the variable definitions for the variables used in this paper from the DHS 2007/2014 DRC survey:

- **Years of Education:** For each individual surveyed, the DHS survey asks the individual the total number of years of education in single years.

- **Wealth Index:** Wealth Index is a is a 1 to 5 categorical variable where 1 is poorest quintile and 5 is richest quintile (in the entire DRC 2007/2014 sample) from the Wealth Factor Score.

- **Number of Deceased Children:** Number of Deceased Children is the total number of male and/or female children that have died (at any age) for each respondent.

The DHS survey runs a survey instrument on health behavior to a subsample of the sampled female population (about a third of the entire sample). The following variables are only defined for this subsample:

- **Who usually makes decisions about...:** The subsample is asked who is the person who usually decides on (1) using contraception, (2) how to spend respondent?s earnings, (3) respondent?s healthcare, (4) large household purchases, (5) visits to relatives, (6) how to spend husband?s earnings. I rescale the response options so that it is a 1 to 3 categorical variable where 1 is Partner/Other Person, 2 is Respondent and Partner, and 3 is Respondent where a higher value indicates greater autonomy in decision making.

- **Wife Beating is Justified if ....:** The aforementioned subsample also provides questions on when wife beating is justified. Importantly, this question is only asked to females in the sample. The respondent is asked to answer Yes or No to whether wife beating is justified under different scenarios. Thus, the variables "Wife Beating is Justified if Goes Without Saying", "Wife Beating is Justified if Wife Argues" and "Wife Beating is Justified if Wife Refuses Sex" are indicator variables equal to one if the respondent agrees with the respective statement.

- **Domestic Violence** Actual Domestic Violence presents Average Effect Size estimates for the following questions: (1) experienced control issues (2) experienced emotional violence (3) experienced less severe violence (5) experienced severe violence (6) experienced any sexual violence (7) experienced injuries. The response options are rescaled so that higher numbers indicate more domestic violence, with 0 for never, 1 for sometimes, and 2 for often.

- **Number of male siblings alive**: This is the number of male siblings that an individual reports are still alive. *Above median number of brothers* is constructed from this variable and is equal to one if the respondent has more than the median. The median number of brothers is two.