Marital Arrangement and Spousal Cooperation *

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We present three lab-in-the-field studies investigating systematic heterogeneity in cooperative decision-making across spouses in arranged and love-matched marriages in Pakistan, where the former is the tradition and the latter is associated with modernization. In Study 1, we engaged married couples in a one-shot, two-person, sequential public goods game, in which we applied the strategy method to the second mover. Using hierarchical clustering to analyze the strategy data, we categorized spouses into cooperative types and found that spouses in love-matched marriages are significantly more likely to be unconditionally cooperative. Spouses in love-matched marriages are also significantly more cooperative overall. In Study 2, we replicated our findings from Study 1 in a new sample of villages similarly close to a city but found that, as distance from the city increased, the love-matched effect declined. We interpreted this as suggestive evidence that there is less tolerance and support for love matches in more remote areas. In Study 2, by also engaging the spouses in games with neighbors, we established that the observed differences in cooperation between spouses in love-matched versus arranged marriages could not be explained by the selection of unconditionally cooperative people into love-matched marriages. Finally, in Study 3, we confirmed that there is indeed a social norm prescribing arranged marriage and that this norm is stronger in more remote villages.

JEL Codes: D13, C93, J12, Z13
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1 Introduction

Households are one of the most important and commonplace decision-making units in society. Billions of dollars in public funds are allocated to households with the aim of alleviating poverty and improving social and economic outcomes. According to a recent report by Gentilini (2022), in 2020-21 about 17% of the world's population across 203 countries received such funds. The return on these allocations depends on various factors, including the capacity and willingness of spouses to cooperate in their decision making (Thomas, 1990; Hoddinott & Haddad, 1995; Duflo, 2003; Alem et al., 2023).

In this paper, we investigate whether and how the specifics of the institution of marriage affect spouses' willingness to cooperate one with another. In most societies, marriage is an event of great significance, celebrating not only the union of two individuals but also of two families. In the past, for this reason, the nuptial decisions were often made by individuals not party to the marriage itself. With the advent of industrialization and modernization, western societies shifted to a nuclear and less extended family structure and this, in turn, paved the way for increasing mate selection by choice (Goode, 1963). Thus, despite the institution of marriage being universal, it has evolved differently across societies. In many developing countries, kinship, caste, cultural norms and religious beliefs still govern the institution of marriage and, as a consequence, individuals continue to be constrained when selecting their life partners, sometimes completely, as the decision is made for them by others. We investigate whether this variation in the institutions' form has implications for decision-making by spouses. Specifically, we compare inter-spousal cooperation across two commonly recognized forms of marital union: arranged marriage, still considered to be the traditional practice in many countries, and love-matched marriage (where partner selection is made by the individuals themselves), which tends to be associated with modernization and liberal values. In addition, to generate further insights, we investigate the possible role played by selection based on cooperative tendencies into different types of marriage and the moderating effect of geographic remoteness and how this, in turn, relates to prevailing social norms.

Our investigation took place in the district of Faisalabad, which lies in the heart of Punjab, Pakistan. To our knowledge, ours is the first investigation into differences in inter-spousal cooperation between arranged and love-matched marriages, not just in Pakistan, but anywhere. We chose Faisalabad district because we expected to find a mix of the two types of marriage there. In much of South Asia, Asia, the Middle East and large parts of Africa,

the practice of arranged marriage is still predominant (Averett et al., 2017). However, modernization theory predicts that, as societies advance, the range of eligible partners widens and, with increased social interactions, the practice of arranged marriage declines (Givens & Hirschman, 1994). In Pakistan, men and women were granted the right to court marriage in the Family Laws Ordinance of 1961. However, it was not until 2003, when a high-profile ruling by the Supreme Court of Pakistan returned a verdict permitting a woman to marry without her legal guardian's permission, that the rights of women to enter marriages of their own choosing using the courts were fully established. Since then, the incidence of love-matched marriage has been slowly increasing (Munir & Akhter, 2017; Javed, 2020) and, this being the case, it is timely to examine whether this is likely to improve cooperation in household decision-making or needs to be treated as a cause for concern. Our *a priori* conjecture was that love-matched marriage would be associated with greater cooperation and, more specifically, a higher incidence of unconditional cooperation, due, in part, to the emotional bond and, in part, to the spouses having had agency in the selection of each other as partners in a lifelong cooperative endeavor.

We conducted three studies each involving lab-in-the-field experiments. In the first study, Study 1, we engaged married couples in a one-shot, two-person, sequential public goods game (PGG) in which we applied the strategy method (Fischbacher et al., 2001) to the second movers. Eliciting strategies rather than simple contribution decisions facilitates the classification of individual behaviors into types ranging from selfish, i.e., fully uncooperative, to fully and unconditionally cooperative. We hypothesized that, because marriages founded on love have the advantage of a stronger inter-spousal emotional bond, compared to those in arranged marriages, spouses in love-matched marriages are more likely to be unconditionally cooperative one with another. In addition, building on the same premise, we hypothesized that spouses in love-matched marriages are more cooperative overall, one with another. This second hypothesis is an important complement to the first as an unconditionally cooperative spouse could, in principle, be taken advantage of by an uncooperative one and it is important to distinguish between unconditional cooperativeness combined with high levels of cooperation, on the one hand, and unconditional cooperativeness combined with exploitative non-cooperation, on the other.[1]

In Study 1, conducted in a sample of villages located between 20km and 40km from the city of Faisalabad, we found that more than half of the love-matched spouses compared

[1] All that said, for practical reasons that will be explained in Section 3.1.1 below, some caution is required when interpreting our data on *levels* of cooperation between spouses.

to less than a quarter of those in arranged marriages were unconditionally cooperative when interacting with their spouses and that, overall, love-matched spouses cooperated significantly more, one with another, compared to spouses in arranged marriages.

Our second study, Study 2, was designed to distinguish between two possible mechanisms that could be driving the difference in unconditional cooperativeness between spouses in the two marriage types that we observed in Study 1. The two possible mechanisms that we focused on were: that love-matched spouses are more likely to be unconditionally cooperative one with another because individuals who are unconditionally cooperative in general are also more inclined to pursue a love match; or that spouses in arranged marriages and love matches are equally likely to be unconditionally cooperative in general but adopt different cooperation strategies when interacting with their wives or husbands. To this end, in Study 2, each participant played two PGGs, one with their spouse, one with a neighbor.

At the same time, Study 2 expanded the geographical coverage of our investigations. We conducted the Study 2 sessions in 12 villages, none of which had been included in Study 1. Of course, for our planned investigation into the mechanism driving our Study 1 result to be possible, we needed to replicate our Study 1 finding. For the Study 2 sample as a whole, we failed in this regard. However, interestingly, a heterogeneity analysis revealed that we succeeded in replicating in villages that were similarly proximate to Faisalabad as the villages in Study 1, while failing to replicate in more remote villages. So, we acknowledged this discovery in our mechanism analysis, specifically looking at whether the observed difference in unconditional cooperativeness between spouses in the two marriage types in villages close to Faisalabad could be explained by the selection of unconditionally cooperative people into love-matched marriages. Regarding the mechanism analysis, we found that the behavior of husbands and wives in the PGGs played with neighbors rather than spouses indicated that the greater prevalence of unconditional cooperation between spouses in love matches close to the city could not be attributed to the selection of unconditionally cooperative people into those love matches.

Our third study, Study 3, was designed to explore one possible explanation as to why the positive love-matched marriage effect on inter-spousal cooperativeness was moderated by proximity to the city. The explanation upon which we focus is that the social norm prescribing arranged marriage is stronger in more remote communities and that, as a consequence, in more remote communities violating the norm comes at a higher cost in terms of social disapproval and this can put a strain on the marital relationship and, thereby, undermine

cooperation between spouses. Then, to test the foundational hypothesis that the strength of the arranged marriage norm increases as proximity to the city declines, we conducted incentivized coordination games (Krupka & Weber, 2013) especially adapted to investigate and quantify the strength of the arranged marriage social norm. Our data partially support our hypothesis. We find evidence of the existence of a social norm prescribing arranged marriage and proscribing love-matched marriage and that this norm is stronger in more remote villages. We find inconclusive evidence about the existence of corresponding second order, enforcement norms that prescribe punishment for violations of the arranged marriage norm — here there is scope for further research.

The rest of the paper is organized as follows. Section 2 provides a brief review of the relevant literature. Sections 3, 4 and 5 describe Studies 1, 2 and 3, respectively, with each section containing a sub-section 1 that sets out the experimental design and procedures and a sub-section 2 that presents the results. Finally, Section 6 summarizes and concludes.

2 A brief review of the literature

Since Becker's (1973) seminal theory on marriage, a considerable body of theoretical and empirical work on households, i.e., husband-wife couples, has generated significant insights relating to decisions to marry, who ends up married to whom, decision-making within households, and how each of these impact the outcomes experienced by different types of household member.

Early theoretical models assumed that households were unitary, i.e., that they acted as single consumption and, in some contexts, production units. Within such households, Pareto efficiency is achieved through centralized decision-making (Samuelson, 1956) or pure altruism combined with identical preferences among household members or a benevolent dictator (Becker, 1991; Alderman et al., 1995). However, empirical research, both qualitative and quantitative, has challenged the unitary model, drawing attention to the role of bargaining and information asymmetries within households and the impact of each on resource allocation and overall household efficiency (Chiappori, 1993; Udry, 1996; Haddad et al., 1997; Munro, 2018).

More recent theoretical work has focused on collective models of household decision-making, which take into account the individuality of household members (Alderman et al., 1995). There are two broad types of collective models: cooperative bargaining mod-

els and non-cooperative bargaining models. The cooperative bargaining models apply a game theoretic approach to households made up of individuals' whose bargaining power depends on their outside options. The cooperative models indicate that, under the assumption of full information sharing, household-level Pareto efficiency can be achieved and bargaining between household members can lead to binding commitments (Manser & Brown, 1980; Chiappori, 1992; McElroy & Horney, 1981). In non-cooperative models, the information symmetry assumption is relaxed and household-level Pareto efficiency is not always achieved (Lundberg & Pollak, 1994; Udry, 1996).

Recent empirical work involving married couples in behavioral experiments has revealed considerable diversity in spousal decision-making, with some spouses being fully cooperative, while others take advantage of opportunities to maintain individual control over resources at the expense of household-level efficiency (Ashraf, 2009; Iversen et al., 2011; Doss, 2013; Kebede et al., 2014; Munro et al., 2014; Cochard et al., 2016; Hoel et al., 2021; Afzal et al., 2022; Zhang, 2024). While various predictors of inter-spousal cooperativeness have been identified, e.g.s, assortative matching (Iversen et al., 2011), kinship structure (Lowes, 2022), observability of actions (Ashraf, 2009) and similarity of preferences (Cochard et al., 2016), to date, little attention has been given to the role played by the institutional form of a marriage. The one exception, to our knowledge, is polygyny. Barr et al. (2019) found that, in southern Nigeria, spouses and co-wives in polygynous marriages are less cooperative with each other compared to those in monogamous marriages, while Hidrobo et al. (2021) found no such difference.

A small number of studies have investigated selection into and the prevalence of arranged marriage. Batabyal & Beladi (2002) investigated selection into arranged versus love-matched marriages using a simple theoretical model and concluded that the critical determining factor was the expected time it takes an individual to find a spouse for him/herself compared to the time it takes the individual's well-wishers to find a spouse. Rosenzweig & Stark (1989) and Rubio (2014), focused on how arranged marriages involving distant kin-related households support informal insurance arrangements. Then, in related empirical work, Rubio (2014) found that, as returns to schooling increase and agricultural income becomes more stable, arranged marriage declines and the divorce rate among couples in arranged marriages rises. However, none of these studies shed light on how marital arrangement might affect other spousal behaviors.

We contribute to this literature in five distinct ways. First, we investigate how inter-spousal cooperation differs between arranged and love-matched marriages. Second, we are the first

to apply the strategy method (Fischbacher et al., 2001) within an inter-spousal PGG and then use hierarchical clustering analysis to identify behavioural types within the context of inter-spousal cooperation (Fallucchi et al., 2019). Third, through further experimentation, we rule out the possibility that the observed differences in cooperativeness between spouses in arranged and love-matched marriages are due to the selection of individuals into marriage types based on their individual cooperative types. Fourth, we investigate and find that remoteness affects the relationship between marriage type and inter-spousal cooperativeness. And fifth, adapting an entirely different experimental methodology, we explore one possible explanation for this intersectionality between geography and institutional form and, thereby, reveal that the strength of the arranged marriage norm varies with remoteness.

3 Study 1: Inter-spousal cooperation in arranged and love-matched marriages

Study 1 was designed to investigate how spouses' willingness to cooperate one with another relates to whether they are in a self-selected love match or in a marriage arranged by others. Specifically, based on the reasoning set out in the Introduction, we set out to test the following two hypotheses.

Hypothesis 1.1: Love-matched spouses are more likely to be unconditionally cooperative, one with another, compared to spouses in arranged marriages.

Hypothesis 1.2: Love-matched couples are more cooperative with each other overall compared to couples in arranged marriages.

3.1 Study 1: Design

3.1.1 The inter-spousal, sequential public goods game

At the core of Study 1 was a specially designed one-shot, two-player, sequential PGG. In this PGG husbands and wives were paired together and randomly assigned to the roles of Player 1 and Player 2. The Player 1 spouse received an initial endowment of Pakistani Rupees (Rs.) 400, approximately 4 United States Dollars, in the form of four 100 Rupee notes,

and this was common knowledge across both players.[2] Player 2 received either Rs.100, 200, 300 or 400, again in the form of 100 Rupee notes and this set of possible amounts was also common knowledge across both players. The probability of a Player 2 receiving Rs.400 was 0.92 and the probability of him or her receiving each of the lesser amounts was approximately 0.025. These probabilities were not communicated to the participants and each Player 2's actual endowment was never revealed to their spouse, i.e., their Player 1, or any other participant in the experiment. This asymmetry in information afforded the Player 2s credible deniability, i.e., it ensured that they could, if they wished, keep their contribution decisions private. However, the asymmetry comes at a cost in the form of variation in initial endowments across Player 2 spouses and couples. We resolved this problem by, *ex ante*, planning to drop all the couples who received less than the full 2x400 initial endowment from the analysis. The probabilities listed above were selected to ensure that this protocol would do only limited harm to our sample size. In addition, we need to be mindful of the fact that the information asymmetry is, in itself, asymmetric; the Player 1 spouses are afforded no credible deniability. We discuss this further below.

In the PGG, each player made a contribution to the common pool between zero and their total initial endowment, in multiples of Rs.100. The total amount contributed to the pool was multiplied by 1.5 and then split equally between the players. Thus,

$$\pi_i = E_i - d_i + 0.75 \sum_{j=1}^{2} d_j \tag{1}$$

where E_i is the endowment received by player i and d_i is the contribution by player i to the common pool. The marginal payoff from the common pool is 0.75 units for every unit contributed. A couple maximizes the sum of their final total payoffs from the game by each contributing their entire endowment.

Player 1s move first, deciding how much to contribute to the common pool and how much to keep for themselves as in a standard public goods game.[3]

[2] When the study was conducted in August 2016, the exchange rate was 103.4 Rs/USD. The large majority of couples received a combined initial endowment of Rs.800, which was over 20 percent of an average household's weekly income.

[3] After making the contribution decisions, Player 1s were asked to state their beliefs about their spouse's contributions assuming their spouses received a full endowment of Rs.400. Average beliefs for various defined sub-samples are presented in Table A1 in Section 1 of the Online Appendix. In the interest of brevity, we do not present regression analyzes for the beliefs.

To facilitate the classification of Player 2s into different types of inter-spousal cooperation, we implemented a variant of the strategy method (Fischbacher et al., 2001; Gächter et al., 2012; Selten, 1967). Player 2s were informed of the initial endowment and were then asked to make a decision regarding their contribution to the common pool for each possible contribution by their spouse. Each Player 2 was asked "Suppose that Player 1 decided to put all Rs.400 of his(her) money in the common pool, would you put any of your money in? If you would, how much?" Then, the same questions were repeated but with the spouse's contribution at Rs.300, then Rs.200, and so on until the spouse's contribution was stated to be zero (five sets of two questions in total).[4] Finally, their Player 1 spouses' actual contributions were disclosed and Player 2s were required to hand over the pledged (according to their strategy) amounts corresponding their Player 1's contribution.

That the Player 2 spouses were afforded credible deniability, while the Player 1 spouses were not, is important to bear in mind because it means that the Player 1 spouses would have been more likely than the Player 2 spouses to anticipate reprisals had they chosen to be self-serving rather than household-serving in the PGG. We should expect the likelihood of reprisal to increase cooperativeness among those who are intrinsically less cooperative and, this being the case, for any difference in cooperativeness between spouses in love-matched and arranged marriages to manifest more strongly in Player 2 behavior as compared to Player 1 behavior.[5]

3.1.2 Measuring marriage type

Pande (2015, 2016) describes how, in South Asia, the practice of arranged marriage has evolved to allow many young men and women to take an active part in the selection of their spouses. In the light of this work, we developed a novel survey instrument that would capture variations in the extent to which a marriage is a self-selected love-match versus an arrangement by 'well-wishing' third parties. The resulting survey instrument required each participant to select the one option out of the following six that best described how their

[4] Player 2s were then asked to state their beliefs about their spouses' actual contributions. Average beliefs for various defined sub-samples are presented in Table A1 in the Online Appendix. In the interest of brevity, we do not present an analysis of the beliefs in this paper.

[5] To afford Player 1s the same level of credible deniability as Player 2s, we would have had to elicit decisions from the Player 2s relating to each of the possible decisions made by their Player 1s conditional on those Player 1s receiving an initial endowment of Rs.400 or Rs.300 or Rs.200 or Rs.100 or zero; 15 decisions in all. This two-way conditionality could have significantly reduced participant comprehension, while the tripling of the number of decisions would have inevitably increased session length. So, we chose the simpler design and accepted that the Player 1 decisions may have been confounded by the relative absence of credible deniability.

marriage came about:

1) I really liked him/her and I had to force my parents to accept my decision

2) I really liked him/her and my parents gave in without a fight

3) Partly arranged, partly our own liking for each other

4) My parents/elders made the decision, and I was forced to accept it

5) Completely arranged by my parents/elders in the family and I had no issues with it

6) Other (specify)

The first three options were designed to capture situations in which, to varying degrees, participants' own preferences and agency had a bearing on who they married. The fourth and fifth options relate to situations where the participants were either forced or passive in the setting up of their marriage match. Option 6 was included to allow for situations not covered by the specified options, but was never used, indicating that options 1 to 5 were sufficient and comprehensive.

In the analysis that follows, if either spouse selected one of the first three options, the couple was coded as a love match. We applied this protocol in order to maximize the proportion of, relatively rare, love-matched marriages in our sample.[6] However, it should be noted that we frequently observed spouses giving different responses from one another regarding how their marriage came about.[7] Such mismatches could have occurred because some respondents were hesitant to admit to love-matched marriages owing to them being in violation of the social norm. If this is the case, there may be some love-matched couples classified as arranged marriages because neither spouse signaled a love match. Alternatively, though probably less likely, some participants may have selected a love match option in order to appear more progressive or liberal to our "city-type" enumerators and, if one or both spouses did this, their arranged marriage would have been classified as a love match. Either way, spouses giving different responses from one another indicates that, in our data, marriage type is likely to be measured with some error and this could be causing attenuation bias in our estimates of behavioral differences between the two types of marriage, i.e., it could be biasing towards zero our estimates of the absolute size of the

[6] In Study 1, applying this protocol resulted in 31 out of the full sample of 108 couples being categorized as love matches.

[7] Of the 31 love matches in Study 1, 9 were mutually acknowledged, and 22 were singly acknowledged.

differences.[8]

3.1.3 Other survey data

The survey also included an extensive set of questions about individual, marriage and household characteristics that could influence cooperativeness and could, potentially, be correlated with marriage type. Additionally, the survey included three questions drawn from the 'Global Preference Survey' (GPS) (Falk et al., 2018) to capture individual spouses' tendencies to positively reciprocate, negatively reciprocate and act altruistically towards other people in general.[9] [10]

3.1.4 Participant sampling

Study 1 was conducted in the district of Faisalabad, a middle-income district, situated in the center of the Punjab province. Across the Punjab, marriages within kin or biraderi are seen as important, not only for maintaining bloodlines, but also for creating social capital and cultivating reciprocity among kin (Latif, 2017) and, to this end, decisions and negotiations on matchmaking are traditionally carried out by the elders from both families (Fricke et al., 1986). Faisalabad is an industrial district with extensive rural areas that have remained agrarian. Within this context, our focus was couples living in rural areas.[11] Our Study 1 participant sample was made up of married couples across six villages situated between 20km and 38km from Faisalabad city center.

In each village, sample selection started with the listing of 200–250 households. During this listing exercise, we obtained information about the couples in each household who would be able to attend an experimental session in their village, the names and ages of the husbands, and the lengths (in years) of the marriages. If a household indicated that more than one couple would be able to attend, one couple was randomly selected to potentially participate. Then, we drew a stratified random sample of couples, using strata defined with

[8] In the light of this measurement issue, below, we describe in footnotes how our main findings differ when mutual acknowledgment is required in the coding of love matches.

[9] See Table 1 for a full list of the characteristic and preference variables.

[10] We also included an 'inclusion of other in the self (IOS)' question (Aron et al., 1992), with 'other' set to 'your wife/husband', to measure within-marriage relationship closeness. However, our experience in the field indicated that the responses to this question cannot be taken at face value due to a strong, possibly social norm driven, inclination to respond positively to any direct questions relating to the quality of one's marriage. The findings from Study 1 are, nevertheless, robust to the inclusion of the IOS measure as an additional control in the regression analyzes.

[11] At the time of our study, the mean monthly income for households in rural Faisalabad was around Rs.13,000 (MICS, 2014).

reference to marriage length: 0-4 years, 5-9 years, 10-20 years and more than 21 years. Our pilot sessions revealed that the show-up rate might be low, especially for younger couples, probably owing to their work commitments. To address this and increase the proportion of the relatively rare love matches in the final sample, we applied a larger sampling weight to younger couples.[12]

3.1.5 Experimental session protocol

Invitations were sent out three to four days before a session. The first 15 to 16 couples to arrive for a session were registered to participate. Couples who arrived later were paid the show-up fee of Rs.300 per couple and sent away. In total, 118 couples were engaged in the study.

Two sessions were conducted in three of the villages, one session in each of the remaining three – 9 sessions in total. Each session lasted between 2.5 and 3 hours. When two sessions were conducted in a village, the participant samples were selected from different settlements within the village and the sessions were run back-to-back to eliminate the possibility of information spillovers. The session venues were mostly primary schools situated in central locations within the villages.

To accommodate the low literacy rates in the district, each session started with a group training involving a thorough oral explanation of the game using visual aids depicting carefully selected examples. Then, each participant attended a one-on-one private meeting during which the game was explained again, control questions were asked, and decisions were elicited. Scripts, translated into Urdu, were followed in both the group training and the one-on-one interviews.[13]

To prevent collusion or coercion between spouses, the group training did not specify who would play the game with whom. Participants were informed that they were playing with their spouses only in their one-on-one interviews just before making their decisions.

After completing their one-on-one interviews, the participants were seated separately from those awaiting their interviews. Participants were not allowed to talk among themselves

[12] The show-up rates in the post-pilot sessions were 30 and 55 percent for couples married less than and more than 10 years respectively. The overall show-up rate was 40 percent. Couples with marriage lengths of less than 10 years accounted for 60 percent of the sample invited to participate and 45 percent of the sample that ultimately took part and, thereby, made it into the analysis.

[13] Section 3 of the Online Appendix contains the scripts, in English, and examples of the visual aids for the group training sessions.

during the sessions. Finally, show-up fees of Rs.150 per individual and individual payoffs from the PGG were paid to participants in private.

3.1.6 Analytical methods

We investigate our hypotheses using standard non-parametric tests and regression analyzes. However, before we can test the hypothesis that love-matched spouses are more likely to be unconditionally cooperative, one with another, we need to classify the Player 2 spouses into behavioral types using the five-point PGG strategies. To do this, we apply hierarchical clustering analysis. Hierarchical clustering is a data-driven technique that divides a defined sample of data-points into a hierarchy of nested sub-samples within which the data-points are similar, according to a specified measure, and between which they differ. More specifically, we use the methods proposed by Fallucchi et al. (2019) to define the hierarchy by applying Ward's linkage method (Ward Jr, 1963), such that contribution strategies are clustered to minimize the within-cluster variance, combined with Calinksi-Harabasz index (Caliński & Harabasz, 1974) and Duda-Hart index (Duda et al., 1973) stopping rules to determine the final number of clusters or sub-samples to report on.[14]

3.2 Study 1: Results

3.2.1 Sample characteristics

Table 1 presents descriptive statistics for the 216 spouses who participated in Study 1 and, together with their husband or wife, received the maximum combined initial endowment of Rs.800. As expected, love-matched marriages were relatively rare, accounting of just 29 percent of the sample. Ages ranged from 16 to 70 years and only 60 percent of the participants had received some formal education.

The variable means for spouses in arranged and love-matched marriages are presented in columns 1 and 2, respectively. Column 3 presents the p-values for the t-test results for differences in means across the marriage types. On average and in accordance with expectations, those in love-matched marriages were younger, married more recently, had fewer children, and were living in households containing fewer adult members. Not in accordance with expectations, cousin marriages were more prevalent among the love-matches. This is out of line with the widely held perception that, when granted the freedom to select

[14] For more details on the hierarchical clustering technique refer to Section 2.2 of the Online Appendix.

a spouse, individuals pick someone from outside their extended family. One possible explanation for this finding is that, in rural Pakistan, young people's social interactions tend to be restricted to their extended family.

Finally, at the bottom of the table we see that, while none of the GPS social preference measures differed significantly across the marriage types, both Player 1s' contributions and Player 2s' average (across their strategies) contributions were significantly higher for those in love matches compared to those in arranged marriages. On average, Player 1s in love matches and arranged marriages contributed 82 and 66 percent of their endowments respectively and Player 2s in the two marriage-types contributed 85 and 67 percent of their endowments respectively. These statistics provide preliminary support for Hypothesis 1.2.

Table 1 about here

3.2.2 Inter-spousal cooperative types

Applying hierarchical clustering analysis to Player 2's strategies, we identified four distinct clusters. The mean strategies for these four clusters are presented in Figure 1, while Table 2 presents a cross-tabulation of behavioral and marriage types. Unconditional cooperators (UCs), who contribute 100 percent irrespective of their spouses' contributions, account for 31 percent of the full sample. Low token-givers (LTGs), who made low and sometimes zero contributions irrespective of their spouses' contributions, account for 36 percent. High token-givers (HTGs), who made high but rarely 100 percent contributions irrespective of their spouses' contributions, account for 24 percent. Finally, conditional cooperators (CC), whose contributions match or nearly match those of their Player 1 spouses, account for a mere 9 percent.

Figure 1 here

Table 2 here

Relating to Table 2, a Pearson chi-squared test indicates that the distributions of behavioral types for the Player 2s in arranged and love-matched marriages are distinct (p-value= 0.006). The most notable difference is in the proportions who are UC with their spouses; 55 percent of the love-matched spouses were UCs, while only 21 percent of the arranged marriage spouses displayed the same behavioral tendency. Each of the other behavioral types was more frequently observed among the arranged marriage spouses compared to the love-matched spouses.

In Table 3, column (1), we present an estimated linear probability model in which the dependent variable takes the value one for UCs and zero otherwise and the explanatory variable of interest is an indicator variable taking the value one for spouses in love-matched marriages.[15] The three GPS preferences and all of the personal, other marriage, and household characteristics summarized in Table 1 are included as controls. The p-values in parentheses account for clustering at the session level and were derived using the wild bootstrap method (Cameron et al., 2008). The estimation indicates that, after controlling for personal, other marriage and household characteristics, spouses in love-matched marriages were 38 percentage points more likely to be unconditionally cooperative compared to spouses in arranged marriages (p-value= 0.035). Given that just 31 percent of the full sample is unconditionally cooperative, this is a very large difference.[16] [17] Finally, the partial R-squared at the bottom of the table indicates that 12.3% of the variation in the dependent variable is explained by the love-match indicator, while the many controls explain only a further 6.9 percentage points.

Result 1.1: ***Spouses in love-matched marriages are significantly more likely to be unconditionally cooperative, one with another, compared to spouses in arranged marriages.***

Table 3 here

3.2.3 Inter-spousal cooperation levels

In Table 3, columns (2) and (3), we present estimated linear models in which the dependent variables are, respectively, the contribution made by a Player 1 spouse and that contribution plus the corresponding entry in the strategy submitted by the Player 2 spouse to whom (s)he is married, both as percents of the maximum amount that could be contributed. In both estimations, the explanatory variable of interest is the indicator for a love-matched marriage. The controls in column (2) are the same as in column (1). The controls in column (3) are the within-marriage, cross-spouse means of the controls in columns (1) and (2). The

[15] We present a linear probability model here to facilitate easy interpretation and cross-study comparisons and because, in the analysis for Study 2, we introduce interaction terms (Ai & Norton, 2003). Logit and Multinomial Logit estimations yield qualitatively similar conclusions, while the latter also indicates that the relative abundance of UCs in love-match marriages corresponds to a statistically significant reduction in each and every one of the other cooperative types. See Table A2 in the Online Appendix for the Multinomial analysis of the Study 1 Player 2 types.

[16] For the coefficient estimates relating to the control variables included in Table 3, refer to Table A3 in the Online Appendix.

[17] If the love-match indicator is set equal to one only when the love match is mutually acknowledged, the coefficient on the love-match indicator remains positive but becomes considerably less significant (one-sided p-value=0.055).

p-values in parentheses account for clustering at the session level using the wild bootstrap method.

Column (2) indicates that, after controlling for personal, other marriage and household characteristics, Player 1 spouses in love-matched marriages contributed 20 percentage points more to the common pool compared to Player 1 spouses in arranged marriages. This is a large difference, although, as expected, it is only weakly significant (p-value$=$ 0.066). Column (3) indicates that, after controlling for mean personal, other marriage and household characteristics, love-matched couples allocated 19 percentage points more to the common pool compared to couples in arranged marriages (p-value$<=$ 0.001). The partial R-squareds relating to the love match indicator are 7.5% and 11.4% in columns (2) and (3) respectively, indicating, once again, that, compared to the love match indicator, the many control variables are poor predictors of inter-spousal cooperative behavior.[18]

Result 1.2: ***Spouses in love-matched marriages are significantly more cooperative, one with another, compared to spouses in arranged marriages.***

4 Study 2: Inter-spousal cooperation in and selection into arranged and love-matched marriages

In Study 2, we sought answers to the following two questions.

Question 2.1: ***Do the results from Study 1 generalize to a new sample of villages?***

Question 2.2: ***Can we rule out selection of more unconditionally cooperative people into love-matched marriages as an explanation for the Study 1 results?***

Study 1 provided a preliminary insight relating to Question 2.2; none of the GPS pro-social preference measures — altruism, positive reciprocity and negative reciprocity — differed significantly depending on a spouses' marriage type (see Table 1). Our objective in Study 2 was to build on this insight by focusing specifically on selection based on unconditional cooperativeness, while, at the same time, providing stronger evidence one way or the other.

[18] If the love-match indicator is set equal to one only when the love match is mutually acknowledged, the coefficients on the love-match indicator remain positive and significant (p-values: 0.039 and 0.025 for columns (2) and (3) respectively).

4.1 Study 2: Design

To address Question 2.1, we selected and engaged with inhabitants of 12 villages that we had not visited during Study 1. These villages were located between 12km and 79km from the center of Faisalabad, five in Faisalabad tehsil, located between 12km and 23km from the city center, and seven in Samundari tehsil, located between 37km and 79km from Faisalabad city center.[19] Applying the same sampling and participant registration protocols as in Study 1, we engaged 310 married couples across the twelve villages in Study 2.[20]

To address Question 2.2, in Study 2 we engaged each participant in two two-person, sequential PGGs, one with their spouse as in Study 1, and one with a neighbor resident in their village, present at their session, and of the same gender as their spouse. The identity of the neighbor was not disclosed. The role that each participant assumed (Player 1 or Player 2) was held constant across their two PGGs and the order in which they played their two PGGs was randomized at the session level.

The survey instrument used in Study 2 generated the same set of control variables relating to individual, marriage and household characteristics and social preferences as that used in regression Table 3.[21]

We conducted two experimental sessions in each of the villages, 24 sessions in total.[22]

[19] A tehsil is a sub-division within a district.

[20] In Study 2, the show-up rates were 23 and 46 percent for couples married less than and more than 10 years respectively. The overall show-up rate was 32 percent. Couples with marriage lengths between 0 and 9 years accounted for 60 percent of the sample invited to participate and 47 percent of the final sample analyzed below.

[21] In addition, we replaced the IOS question with the Locke-Wallace Marital Adjustment (LWMA) test (Locke & Wallace, 1959), one of the most frequently used instruments to measure the quality and stability of marriages (Freeston & Plechaty, 1997; Jiang et al., 2013), two questions about who would decide how to spend own and spouse's earnings from the experiments, and a series of questions about everyday intra-household decision-making. Here, once again, our experience in the field indicated that the responses to these questions cannot be taken at face value due to a strong, possibly social norm driven, inclination to respond positively to direct questions relating to the quality of one's marriage. The findings from Study 2 are, nevertheless, robust to the inclusion of all of these variables as additional controls in the regression analyzes.

[22] The data for Study 2 was collected in two rounds. The first round was conducted in February 2018, covering 9 villages. The second round took place in April 2019, covering an additional 3 villages. All sampling procedures and experimental protocols remained consistent across both rounds.

4.2 Study 2: Results

4.2.1 Sample characteristics

Table 4 presents descriptive statistics for the 578 spouses who participated in Study 2 and, together with their wife or husband, received the maximum combined initial endowment of Rs.800. Twenty-four percent of the spouses were in love-matched marriages. As in the Study 1 sample, spouses in love-matched marriages were younger, had been married for fewer years, had fewer children, and were more likely to be cousins. In addition, they were more educated and lived in households where there were more adults. As in Study 1, none of the GPS social preference measures differed significantly across the marriage types. Finally and importantly, PGG contributions in both the games played with spouses and the games played with anonymous neighbors did not differ significantly between those in love matches and those in arranged marriages; contributions in the games played with spouses were higher among the love-matched, although not significantly so, while contributions in the games played with neighbors were effectively indistinguishable.

Table 4 here

4.2.2 Inter-spousal and inter-household cooperative types

For Study 2, we extend the hierarchical clustering analysis to participants' choices in the two PGGs. For the PGGs played with spouse, we replicated the hierarchical clustering analysis described earlier, committing to a four-cluster classification as in Study 1. Then, for the PGGs played with neighbors, we follow the Fallucchi et al. (2019) methodology. We start by identifying the modal strategy in each observed behavioral type from the clustering of inter-spousal decision strategies. Next, the Euclidean distance between each participant's strategy in the neighbor interaction and each of these four modal strategies is calculated. Finally, each participant is assigned to the cooperative type they are closest to. Following this methodology, we classified 86 percent of the with-neighbor interactions to one of the four cooperative types. The unclassified sample (14 percent) comprises of individuals whose strategies are either closest to UC (10 percent) or equidistant from two modal strategies (4 percent).[23] See section 2.3 of the Online Appendix for more details.

[23] The UCs derived by the hierarchical clustering analysis contribute their full endowment at all decision points. For consistency across inter-spousal and inter-household interactions, we maintain the same criterion for UCs. However, result 2.2 is robust to including the 10% of participants whose strategies are close to UC in neighbor interactions as UCs in the analysis.

The mean strategies for these four clusters are presented in Figure 2 (left panel: inter-spousal interactions; right-panel: neighbor interactions). Panel A (inter-spousal) and B (neighbor) of Table 5 present cross-tabulations of behavioral and marriage types for the full sample in columns (1) and (2) and the sample also divided by tehsil in columns (3) to (6).

Focusing for now on the inter-spousal classification, for the full sample a Pearson chi-squared test indicates that the distributions of behavioral types for the Player 2s in arranged and love-matched marriages are not distinct (p-value= 0.492). Result 1.1 from Study 1 does not generalize to couples in the new sample of villages in its entirety. However, in exploratory analysis, we discovered that a possible explanation for this result is that the effect of love marriages on cooperativeness is moderated by the remoteness of the village where the experiment was conducted from the city of Faisalabad. Columns (3) to (6) provide some initial evidence.

In the Faisalabad tehsil villages, which were similarly distant from the city as those in Study 1, a Pearson chi-squared test indicates that the distributions of behavioral types for the Player 2s in arranged and love-matched marriages are distinct (p-value= 0.021) with those in love matches being more than twice as likely to be UC with their spouses compared to those in arranged marriages. This greater presence of UC in the love matches is in line with the corresponding finding in Study 1, although here the increase in UCs as we move from arranged to love matches appears very closely matched by a decline in LTGs. In contrast, in the Samundari tehsil villages, which were more remote from the city, a Pearson chi-squared test indicates that the distributions of behavioral types for the Player 2s in arranged and love-matched marriages are not distinct (p-value= 0.376).

Figure 2 here

Table 5 here

4.2.3 Regression analysis of Inter-spousal cooperative types and cooperation levels

Table 6 presents the regression results relating to the behaviors of both the Player 1 and Player 2 spouses in the intra-household PGGs in Study 2. Panel A presents the Study 2 equivalents of the Study 1 estimations presented in Table 3. In column (1), we present an estimated linear probability model in which the dependent variable takes the value one for UCs and zero otherwise. In columns (2) and (3), we present estimated linear models in which the dependent variables are, respectively, the contribution made by the Player 1 spouse and this contribution plus the corresponding entry in the strategy submitted by

their Player 2 spouse, both measured as a percent of the maximum amount that could be contributed. In all three estimations, the explanatory variable of interest is the indicator for a love-matched marriage. The controls used in each estimation are the same as in the analysis of the Study 1 data. The p-values in parentheses account for clustering at the session level using the wild bootstrap method. In Panel B, the estimations additionally include a dummy variable identifying Samundari tehsil and the interaction between this and the love-match dummy. In Panel C, instead of the Samundari dummy variable we use the log of distance from the city of Faisalabad as a proxy for remoteness and interact this with the love-match indicator.

The estimation in column (1) of Panel A indicates that, when working with the full Study 2 sample, after controlling for personal, other marriage and household characteristics, we see no difference between love matches and arranged marriages in the likelihood of being an unconditional cooperator when interacting with one's spouse (p-value= 0.215). Column (2) of Panel A indicates that, after controlling for personal, other marriage and household characteristics, Player 1 spouses in love matches and arranged marriages made statistically indistinguishable contributions to the common pool (p-value= 0.666). Column (3) indicates that, after controlling for mean personal, other marriage and household characteristics, love-matched and arranged marriage couples collectively allocated statistically indistinguishable amounts to the common pool (p-value<= 0.651).[24]

The estimation in column (1) of Panel B indicates that, in Faisalabad tehsil, after controlling for personal, other marriage and household characteristics, spouses in love-matched marriages were 29 percentage points more likely to be UC compared to spouses in arranged marriages (p-value= 0.018). However, in more remote Samundari tehsil, spouses in love-matched and arranged marriages were statistically indistinguishable with regard to the likelihood of being UC when interacting with their spouse and this difference-in-difference between the tehsils is highly significant (p-value= 0.005). Column (2) of Panel B indicates that, while there is weak evidence that, in Faisalabad tehsil, Player 1 spouses in love matches contributed more than those in arranged marriages (one-sided p-value= 0.084), this difference does not differ significantly between the two tehsils (p-value= 0.386). Column (3) of Panel B indicates that, in Faisalabad tehsil, love-matched couples collectively allocated more to the common pool than arranged marriage couples (p-value= 0.019). However, in more remote Samundari tehsil, love-matched and arranged marriages couples

[24] For the coefficient estimates relating to the control variables included in Table 6 Panel A, refer to Table A4 in the Online Appendix.

were statistically indistinguishable with regard to their collective contributions and this difference-in-difference between the tehsils is weakly significant (p-value= 0.075).[25][26]

Finally, Panel C indicates that, in the analysis of the likelihood of a spouse being UC when interacting with their spouse, log of distance performs similarly well as the Samundari dummy and yields similar insights. However, in the analysis of couples' collective allocations to the common pool, this is not the case. Here, we see no evidence that the love-match effect diminishes with distance from the city in accordance with a log-linear function.

Result 2.1: ***The results from Study 1 generalize to spouses located in a new sample of villages in Faisalabad tehsil but do not generalize to spouses located in Samundari tehsil, which is more remote. In Faisalabad tehsil, spouses in love-matched marriages are significantly more likely to be unconditionally cooperative, one with another, and love-matched couples are more collectively cooperative, compared to couples in arranged marriages.***[27]

Table 6 here

4.2.4 In less remote villages, are unconditionally cooperative people more likely to select into love matches?

Now, we turn to our primary *ex ante* research question for Study 2, whether the observed differences in unconditional cooperativeness between spouses in the two marriage types can be explained by the selection of intrinsically unconditionally cooperative people into love-matched marriages. To do this, we make use of the Player 2s' strategies in the PGGs with anonymous neighbors. If, in less remote villages, spouses in love-matched marriages are more unconditionally cooperative because of such a selection process, we would expect them to be more unconditionally cooperative in the PGGs with neighbors also. In contrast, in the absence of such a selection process, we would see no association between the Player 2s' behavioral types in the PGGs with neighbors and their marriage types.

[25] For the coefficient estimates relating to the control variables included in Table 6 Panel B, refer to Table A5 in the Online Appendix.

[26] Logit and Multinomial Logit estimations support qualitatively similar conclusions regarding the Player 2s, while the latter also indicates that the relative abundance of UCs in love-match marriages in Faisalabad tehsil corresponds to a statistically significant decline in each and every one of the other cooperative types. See Table A6 in the Online Appendix for the Multinomial analysis of the Study 2 Player 2 types when matched with their spouses.

[27] Unfortunately, if the love-match indicator is set equal to 1 only if the love match is acknowledged by both spouses, the coefficient on the indicator becomes statistically indistinguishable from zero in all the regressions. In part, this may be due to the size of the critically important sub-sample of love matches in Faisalabad tehsil; there were only 18 (7%) mutually acknowledged love matches in the Study 2 Faisalabad sample. In part, it may be that restricting the love match indicator increases the measurement error.

In Table 7 columns (1) and (2), we present estimated linear probability models in which the dependent variable takes the value one for UCs and zero otherwise and the focal sample is Player 2s in the PGGs with neighbors. All other aspects of the estimations are the same as in column (1) of Panels B and C, of Table 6, where the focal sample was the same Player 2s but in the PGGs with spouses. These estimations indicate that, in the neighbor interactions, even in the less remote villages, i.e., either those in Faisalabad tehsil (column (1)) or those closer to the city (column (2)) there is no significant difference in the likelihood of being UC between those in love matches and those in arranged marriages.

In columns (3) and (4) of Table 7, the Player 2s' UC cooperative types when playing with spouses and with neighbors are pooled and a dummy variable SP, indicating that the subject is playing the PGG with their spouse, is included along with a two-way interaction term $LM{\times}SP$ and a three-way interaction term that is either $LM{\times}SP{\times}SAM$ or $LM{\times}SP{\times}Dist$, depending on the model specification.[28]

The estimated coefficients on the two-way interaction term $LM{\times}SP$ and the three-way interaction term $LM{\times}SP{\times}SAM$ in column (3) of Table 7 indicate that the apparent differences between column (1) of Table 7 and Panel B, column (1) of Table 6 are statistically significant (p-values$=$ 0.033). Similarly, the estimated coefficients on the two-way interaction term $LM{\times}SP$ and the three-way interaction term $LM{\times}SP{\times}Dist$ in column (4) of Table 7 indicate that the apparent differences between column (2) of Table 7 and Panel C, column (1) of Table 6 are statistically significant (p-values$=$ 0.029 and 0.043 respectively). Being in a love match and closer to the city predicts the likelihood of being UC when the individual is interacting with their spouse but has no association with being UC when the individual is interacting with an anonymous neighbor.[29]

It is worth noting that this is the first study to apply the strategy method within interspousal PGGs and to observe that strategy choice is conditional on the type of partner a decision-maker has in the game.[30] This is important, as it is distinct from the idea that people are of stable cooperative types and changes in partner type simply shift the salient point in their single cooperation strategy.

Result 2.2: ***Selection of more unconditionally cooperative people into love-matched mar-***

[28] Two-way interaction terms $SP{\times}SAM$ and $SP{\times}Dist$ were included as additional controls, where appropriate.

[29] For the coefficient estimates relating to the control variables included in Table 7, refer to Table A7 in the Online Appendix.

[30] Barr et al. (2019) and Lowes (2022) also involved spouses in PGGs with their husbands or wives and with anonymous partners. However, neither applied the strategy method.

riages can be ruled out as an explanation as to why, in less remote areas, unconditional cooperativeness between spouses is more likely in love-matched marriages.

Table 7 here

5 Study 3: Geo-spatial variation in the strength of the arranged marriage social norm

One possible explanation for result 2.1 from Study 2 is that love-matched couples incur a cost associated with violating an injunctive social norm prescribing arranged marriage, that this cost takes a toll on their relationship, thereby eroding cooperativeness, that the cost and the toll are greater where the arranged marriage norm is stronger, and that the norm is stronger in more remote areas.

Previous research has found that non-traditional relationships tend to be viewed negatively by fellow society members and that this, in turn, can undermine the quality of those relationships, sometimes even leading to divorce (Bratter & King, 2008; Lehmiller & Agnew, 2006; Otis et al., 2006). In a study on racial and sexual minorities, Doyle & Molix (2014) observed that prejudice and discrimination erode self-image and this in turn undermines relationship quality. Building on this, Dhar (2013) and Tamalapakula (2019) found that spouses in inter-caste and inter-faith marriages, as well experiencing emotional, psychological and financial distress, made different fertility decisions and were more likely to become perpetrators and victims of intimate partner violence. Drawing on this literature, in Study 3 our objective was to test two hypotheses.

Hypothesis 3.1: Social norms prescribing arranged marriage exist in Pakistan.

Hypothesis 3.2: The social norms prescribing arranged marriage are stronger in more remote communities.

5.1 Study 3: Design

5.1.1 The social appropriateness rating task

To investigate the existence and measure the strength of social norms prescribing arranged marriage, we asked participants to rate the appropriateness or inappropriateness of a set of choices relating to a young couple's marriage in three hypothetical situations. First, we

asked participants to evaluate the different options facing a young couple who wanted to marry each other but for whom other plans were being made (Situation 1). How appropriate (or not) would it be for them to pursue their love match versus accept their arranged marriages? Then we moved on to potential second-order norms, asking participants to evaluate the options facing the family (Situation 2) and neighbors (Situation 3) of a young couple who had chosen to pursue a love match. How appropriate (or not) would it be for them to support versus withhold support from the love-matched couple?

In more detail, Situation 1 was described as follows:

"Imagine there are two young people, a man and a woman living in your village. They would like to be married to each other, but their parents are in the process of selecting spouses for each of them. Now the man and the woman have to choose one of the following two options: await their parents' decisions and marry the people selected by their parents; or force their parents to accept their choice to marry each other."

Then each participant was asked to rate the appropriateness of each of the choices just described using a four-point scale (very appropriate, somewhat appropriate, somewhat inappropriate, very inappropriate). The choices were presented as being made by either the man or the woman in the couple, leading to four options to be evaluated in total. Each participant rated each option twice. First, they expressed whether, in their own personal opinion, choosing the option was appropriate or inappropriate. Second, they rated each option again, but this time facing an incentive to rate the option in the same way as most other participants in the same village as themselves. They were told that, if their ratings matched those of the majority in their session, they could win up to Rs.1,000. This is the standard method developed by Krupka & Weber (2013) to elicit social norms, where participants are incentivized to coordinate their responses by making use of social norms that exist within their community.

The wording of the elicitation questions with the matching incentives in place was as follows.[31]

1. *How socially appropriate is it for the man to await his parents' decision and marry the person selected by his parents? Remember, you should pick a response which you think matches the opinion of the majority of people here today!*

2. *How socially appropriate is it for the man to force his parents to accept his choice for marriage*

[31] For the elicitation in the absence of the matching incentives, the wording differed slightly. Section 3.2 of the Online Appendix contains the scripts, in English.

and get married to the woman of his choice? Remember, you should pick a response which you think matches the opinion of the majority of people here today!

3. *How socially appropriate is it for the woman to await her parents' decision and marry the person selected by her parents? Remember, you should pick a response which you think matches the opinion of the majority of people here today!*

4. *How socially appropriate is it for the woman to force her parents to accept her choice for marriage and get married to the man of his choice? Remember, you should pick a response which you think matches the opinion of the majority of people here today!*

Situation 2 was described as follows:

"Imagine there is a young married couple in your village. The young couple is in a marriage of their own choosing, and they had to force their parents to accept their decision to be married to each other. Now two different situations are possible: 1) After marriage, both sides of the couple's families accept the boy and the girl's decision to marry each other, and welcome them into their families, and provide full support to the couple. 2) After marriage, both sides of the couple's families do not accept the boy and girl's decision to marry each other and become estranged, withdrawing any support to the couple."

Situation 3 was described as follows:

"Imagine there is a young married couple. The young couple is in a marriage of their own choosing, and they had to force their parents to accept their decision to be married to each other. The young couple recently moved into a new neighborhood, which happens to be yours. Now two different situations are possible:1) After moving into the new neighborhood, the neighbors welcome the couple into the neighborhood and offer neighborly support, regardless of the couple's decision to be in a marriage of their own choosing. 2) After moving into the new neighborhood, the neighbors do not welcome, nor offer any neighborly support to the couple because of the couple's decision to be in a marriage of their own choosing."

5.1.2 Participant sampling

We conducted one session in each of 12 villages in Faisalabad district.[32] Six of the villages were located in Faisalabad tehsil, the least and most remote of these being approximately 16km and 27km from the city respectively. The remaining six villages were located in

[32] Study 3 was carried out in April 2019.

Samundari tehsil and the least and most remote of these were approximately 35km and 70km from the city respectively.[33]

As in Studies 1 and 2, in each village, sample selection started with the listing of 200-250 households. For Study 3, we did not need to recruit couples. So, for each listed household, we collected information on all the able-bodied adults, their names, availability, ages and genders. Then, we drew a random sample of adults to be invited, stratified by gender and across three age groups (18-29, 30-44, and 45-60 years). In some households, more than one adult received an invitation.[34] We applied a larger sampling weight to the youngest age group to compensate for a lower expected show-up rate due to work commitments.[35] Around 80 adults (40 men and 40 women) were invited from each village.

5.1.3 Experimental session protocol

Invitations were sent out three to four days before a session. Up to the first 16 men and up to the first 16 women to arrive for the session in their village were admitted. In total, 341 individuals participated, 165 men (86 from Samundari tehsil, 79 from Faisalabad tehsil) and 176 women (92 from Samundari tehsil, 84 from Faisalabad tehsil).

Each session started with a group training during which the participants were introduced to the four-point social appropriateness evaluation scale. Then, each participant attended a one-on-one private meeting during which they were introduced to the three situations and made their evaluations.

The order in which the situations were presented remained constant across sessions. For each situation, the evaluations in the absence of the matching incentive were elicited first, followed by the evaluations in the presence of the matching incentive. The order of the set of evaluation questions relating to each situation (man or woman deciding, accept arranged marriage, pursue the love match, support or withhold support) was varied across sessions.

Correctly matching the majority response earned a participant Rs.250. Two of the with-incentive evaluations were selected to determine a participant's earnings, in addition to a Rs.500 participation fee.

[33] Villages involved in Studies 1 and 2 were excluded from the pool of prospective villages for Study 3.
[34] In the sample that we analyze, 16% of participants were in the same session as a fellow household member.
[35] The show-up rate for the youngest group was approximately 27%, for those aged 30-44 and 45-60 the rates were 43% and 42% respectively.

5.2 Study 3: Results

5.2.1 Sample characteristics

The mean age of the participants was 37 years and the majority had not completed primary education and were married. The proportion of married participants was slightly greater in the Samundari tehsil (See Table 8 for descriptive statistics).

Table 8 here

5.2.2 The social appropriateness of accepting an arranged marriage versus pursuing a love match

Figure 3 presents the social appropriateness ratings relating to Situation 1, where participants were asked to evaluate the appropriateness of pursuing a love match versus accepting the marriage arranged by the family. The figure is based on the sample pooled across the questions that differentiate between the man and woman in the couple making the choice and across male and female evaluating participants. However, the figure separates the ratings according to whether the incentive to match with others in the village was present or not and whether the village was in Faisalabad tehsil or, more remote, Samundari tehsil. Panels A and B graph the ratings when the incentive to match was absent and present respectively. In each panel, the two bars on the left relate to Faisalabad tehsil, the two on the right to Samundari tehsil. Within each pair of tehsil-specific bars, the left-hand bar graphs the evaluations of accepting the arranged marriage and the right-hand bar graphs the evaluations of pursuing the love match. Within each bar, the green and yellow sections indicate the proportion evaluating the choice as "very appropriate" and "somewhat appropriate" respectively, and the red and orange sections indicate the proportion evaluating the choice as "very inappropriate" and "somewhat inappropriate" respectively.

Figure 3 very powerfully indicates that an injunctive social norm prescribing arranged marriage and proscribing love matches exists across both tehsils. Panel A indicates that, in both tehsils, the very large majority of evaluators (over 80%) rated acceptance of the arranged marriage as very appropriate in their personal opinions. Opinions about the appropriateness of pursuing the love match were more varied, although, in both tehsils, the majority (over 60%) rated this as either very or somewhat inappropriate.

Panel B indicates that, in line with the existence of a social norm, introducing the incentive to match strengthened the already strong consensus of opinion. In Faisalabad and

Samundari tehsils respectively, in the presence of the matching incentive, 87% and 94% indicated that it would be very appropriate to accept the arranged marriages and somewhat fewer but still a considerable majority, 66% and 69% respectively, indicated that it would be very inappropriate to pursue the love match.

Figure 3 also suggests that the arranged marriage norm is stronger in Samundari tehsil where, in both panels, compared to Faisalabad tehsil, greater proportions of participants indicated that accepting the arranged marriage would be very appropriate and pursuing the love match would be very inappropriate. However, here the distinction is subtle and needs to be formally tested before a conclusion can be drawn.

Figure 3 here

In Table 9 we present ordered Logit estimations taking the evaluations relating to Situation 1 as the dependent variable and an indicator variable equal to 1 if the young person chose to pursue the love match (LM), an indicator variable equal to 1 if the evaluating participant was located in Samundari tehsil (SAM), and the interaction between the two as the explanatory variables of interest. Panel A presents the analysis for the ratings elicited when the incentive to match was absent, Panel B the analysis of the ratings elicited when the incentive to match was present.

Table 9 here

The estimations in column (1) indicate that all of the regularities observed in Figure 3, including the cross-tehsil difference, are highly significant. Pursuing the love match is considerably and significantly less appropriate than accepting the arranged marriage (p-value< 0.001) and this difference in acceptability is significantly greater in Samundari tehsil compared to Faisalabad tehsil (p-value$= 0.039$). The estimations in column (2) indicate that these findings are robust to the inclusion of demographic controls, and the estimations in column (3) indicate that the significance of the difference in norm strength across the tehsils is also robust to the inclusion of village fixed effects.[36]

[36] For the odds ratio estimates relating to the control variables and fixed effect included in Table 9, column (3), refer to Tables A8 and A9 in the Online Appendix.

5.2.3 The social appropriateness of supporting versus withholding support from a love matched couple

We now turn to Situations 2 and 3 where we investigate second-order norms that may regulate the enforcement of the first-order arranged marriage norm. Figures 4 and 5 present the social appropriateness ratings of either providing support to or withholding support from a young couple who have violated the arranged marriage norm. Figure 4 refers to Situation 2, where it is the couple's families who are either supportive or withholding support, while Figure 5 refers to Situation 3, where it is the couple's neighbors who are either supportive or withholding support. In both figures, Panels A and B graph the ratings when the incentive to match was absent and present respectively. In each figure panel, the two bars on the left relate to Faisalabad tehsil, the two on the right to Samundari tehsil. Within each pair of tehsil-specific bars, the left-hand bar graphs the ratings for supporting the love-matched couple, the right-hand bar the ratings for withholding such support.

Figure 4 and 5 here

Figures 4 and 5 are very similar. Neither indicates the existence of a second-order norm endorsing to the enforcement of the arranged marriage norm and this is the case in both Faisalabad and Samundari tehsils. Both Panel As indicate that, in both tehsils, the large majority of evaluators (over 77%) rated supporting the love-matched couple as either very or somewhat appropriate and almost as large a majority (over 67%) rated withholding support as either very or somewhat inappropriate. In the presence of the matching incentives, the appropriateness ratings for supporting the love-matched couple tended to be lower, while those for withholding support tended to be higher. However, in both tehsils, the end result was a close-to 50:50 split in opinions between appropriate and inappropriate for supporting versus withholding support.

Table 10 here

In Table 10 we present ordered Logit estimations taking the evaluations relating to Situations 2 and 3 pooled together as the dependent variable. The structure of the table and the estimations it contains are the same as in Table 9 (for Situation 1) except that the love-match dummy has been replaced with a Support the love-matched couple dummy and in the estimations in columns (2) and (3) a dummy variable 'Family', which takes the value 1 if the evaluation relates to Situation 2 and zero otherwise, is included as an additional regressor.

The estimations confirm what we observed in Figures 4 and 5. When the incentive to

match was absent, supporting the love-matched couple was considered significantly (p-value$<$ 0.001) more appropriate than withholding support. This relative appropriateness of supporting the couple disappears when the incentive to match is introduced.[37] And finally, there are no significant differences in evaluations across the two tehsils. The ordered Logits also reveal that, when the incentive to match is absent, support by the family is weakly significantly more appropriate than support by neighbors.[38]

5.2.4 Study 3: Discussion and conclusion

Before concluding this section about Study 3, it is useful to give some thought to what the evaluations relating to Situations 2 and 3 might be telling us. They provide no evidence supporting the existence of injunctive social norms endorsing the enforcement of the arranged marriage norm. However, neither do they provide evidence that such second order norms are non-existent. It is possible that the marked reduction in the appropriateness rating for supporting the love-matched couple following the introduction of the matching incentives is indicating the existence of a second-order norm proscribing such support that is in conflict with individuals' intrinsic inclinations to unconditionally support family and neighbors. It is also possible that the descriptions of sanctioning that we used when introducing Situations 2 and 3 to the evaluating participants were too harsh. This would be the case if, for example, in everyday life, while love-matched couples are frequently reminded of their transgression, they are nevertheless supported in many ways. Alternatively, over time, a love-matched couple's transgression might be forgiven and, possibly, forgotten. Moving on to why we see no difference across the tehsils, a possible explanation for this is that both the second-order norm endorsing enforcement of the arranged marriage norm and the intrinsic inclination to unconditionally support family and neighbors mentioned earlier are stronger in more remote communities.

In the light of these possible explanations, we think it inappropriate to conclude based on our findings that there are no second-order social norms endorsing the enforcement of the arranged

In summary, our findings support our initial conjecture that an arranged marriage norm exists and the strength of the norm varies depending on the remoteness of a community.

[37] An estimation based on the sample pooled across the with and without matching incentives and including the appropriate interaction terms indicates that the difference in the relative appropriatness of supporting the couple between the with and without the incentive samples is highly significant (p-value$<$ 0.001).

[38] For the odds ratio estimates relating to the control variables and fixed effect included in Table 10, column (3), refer to Tables A10 and A11 in the Online Appendix.

However, our findings are inconclusive with regard to the existence of and corresponding difference in the strength of second-order norms endorsing the enforcement of the arranged marriage norm.

Result 3.1: An injunctive social norm prescribing arranged marriage exists. However, we observe inconclusive evidence regarding second-order norms endorsing the enforcement of this arranged marriage norm.

Result 3.2: The injunctive social norm prescribing arranged marriage is stronger in more remote communities. However, we do not observe differences in the perceived appropriateness of punishing couples who break the arranged marriage norm between more and less remote villages.

6 Summary and Conclusion

In this paper, we present results from three studies involving lab-in-the-field experiments designed to explore the impact of arranged marriage on cooperation between spouses. Results from Study 1 indicated that, in villages close to a city of Faisalabad, couples in love-matched marriages are significantly more likely to be unconditionally cooperative with one another, compared to spouses in arranged marriages. Moreover, love-matched spouses are also more cooperative overall compared to spouses in arrange marriages. Study 2 revealed that, while these results could be replicated in a new sample of villages similarly close to the city, they did not generalize to more remote villages. Study 2 also indicated that the greater prevalence of unconditional cooperativeness observed in love-matched marriages in less remote villages cannot be explained by selection of unconditionally cooperative individuals into such marriages. Finally, Study 3 confirmed the presence of an injunctive social norm prescribing arranged marriage and proscribing love matches and indicated that this norm is stronger in more remote communities. The findings from Study 3 provide the foundation for an explanation as to why love-matches do not support greater cooperativeness in more remote villages.

Tables and Figures

Table 1: Participant characteristics and average behaviours in Study 1

	Arranged matches	**Love matches**	**Sig. of diff. (p-value)**	**Arranged matches**		**Love matches**	
Variable				*Men*	*Women*	*Men*	*Women*
Age (years)	38.74	31.56	*(<0.001)*	40.38	37.10	33.52	29.61
Years of education	4.50	4.48	(0.98)	5.00	4.00	5.29	3.68
Length of marriage (years)	15.49	9.74	*(<0.001)*	15.72	15.27	9.97	9.52
Number of children	3.56	2.89	*(0.04)*	3.51	3.62	2.90	2.87
Household Wealth index	0.05	-0.13	(0.47)	0.01	0.10	-0.01	-0.25
Respondent is household head	0.42	0.35	(0.41)	0.75	0.08	0.58	0.13
Number of adults in the household	4.46	3.68	*(0.03)*	4.65	4.27	3.61	3.74
Spouses are first cousins	0.51	0.71	*(<0.001)*	0.49	0.53	0.71	0.71
Altruism	7.73	7.40	(0.35)	7.84	7.62	7.00	7.81
Positive reciprocity	8.68	8.73	(0.84)	8.94	8.42	8.45	9.00
Negative reciprocity	1.81	1.35	(0.17)	2.16	1.45	1.77	0.94
Player 1 contribution (%)	66.24	82.26	*(<0.001)*	66.67	65.79	75.00	89.06
Player 2 average contribution (%)	66.88	84.68	*(<0.001)*	63.82	69.87	90.63	78.33
Observations	154	62		77	77	31	31

Note: This table presents participant characteristics for Study 1 sample. Altruism is the response (0 = completely unwilling, 10 = very willing) to the question "How willing are you to give to good causes without expecting anything in return?" Positive reciprocity indicates the extent to which a respondent thought (0 = not at all, 10 = perfectly) that they were well described by the statement "When someone does me a favour, I am willing to return it". Negative reciprocity indicates the extent to which a respondent thought (0 = not at all, 10 = perfectly) that they were well described by the statement "If I am treated very unjustly, I will take revenge even if it costs"; the Wealth Index is derived from Principal Component Analysis (PCA) and encompasses factors including finished flooring, finished roofing, number of rooms, and ownership of assets such as stove, refrigerator, freezer, air conditioner, fan, TV, radio, computer, motorcycle, bicycle, and car/truck/van, as well as the presence of a sewing machine. For this sample, maximum value of Household Wealth index is 4.46 and minimum value of Household Wealth index is -4.40. See the Online Appendix for further details about the Household Wealth index. Player 1's and Player 2's contributions are a percentage of their total endowment of Rs.400; p-values for t-test results between column 1 and column 2 are enclosed in parenthesis in column 3.

Table 2: Cooperation types across marriage types in Study 1

Cooperation type(%)	(1) **Arranged matches**	(2) **Love matches**	(3) **Study 1 Sample**
Unconditional Cooperator	20.78	54.84	30.56
Conditional Cooperator	11.69	3.23	9.26
Low token-giver	40.26	25.81	36.11
High token-giver	27.27	16.13	24.07
Observations	77	31	108

Note: The null hypothesis, that the distribution of cooperation types is consistent across marriage types, is strongly rejected. Pearson chi2(3) = 12.519 and p = 0.006.

Table 3: Regression analysis of inter-spousal cooperation in Study 1

	(1)	(2)	(3)
Dependent variable (DV)	Unconditional Cooperator	Player 1 Contribution	Household Contribution
Love match	0.384**	20.202*	19.199***
	(0.035)	(0.066)	(0.001)
Observations	108	108	108
R^2	0.192	0.115	0.192
Mean of DV	0.306	70.833	71.412
Controls	Yes	Yes	Yes
Partial R^2 (Love match)	0.123	0.075	0.114

Note: Estimated coefficients from linear models are presented; p-values in parentheses adjusted for clustering at the session level using a wild bootstrap (Cameron et al., 2008). Column (1) reports results for a dummy dependent variable equal to 1 if Player 2 is an unconditional cooperator; column (2) uses Player 1's contribution as a percentage of the initial endowment; and column (3) uses the household's combined contributions as a percentage of their combined initial endowment. Controls include participant's age, gender, years of education, number of children, respondent is the household head, number of adults in household, spouses are first cousins, years of marriage, altruism, positive reciprocity, negative reciprocity, and Household Wealth index. For Column 3, the controls are the averages of husband's and wive's responses for all the previously mentioned controls. The partial R^2 indicates how much of the variation in the dependant variable can be attributed to the explanatory variable of interest, i.e., Love match. Please refer to Table A2 in the Online Appendix for the estimated coefficients on the control variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Participant characteristics and average behaviours in Study 2

	Arranged matches	**Love matches**	**Sig. of diff. (p-value)**	**Arranged matches**		**Love matches**	
Variable				*Men*	*Women*	*Men*	*Women*
Age (years)	36.20	33.37	*(<0.00)*	38.03	34.36	35.75	31.00
Years of education	3.34	4.21	*(<0.03)*	3.89	2.79	4.85	3.58
Length of marriage (years)	14.30	11.31	*(<0.00)*	14.33	14.27	11.38	11.24
Number of children	3.67	2.89	*(<0.00)*	3.67	3.67	2.89	2.90
Household Wealth index	-0.04	0.11	(0.32)	-0.04	-0.04	0.11	0.11
Respondent is household head	0.54	0.49	(0.29)	0.88	0.21	0.77	0.21
Number of adults in the household	3.83	4.30	*(<0.03)*	3.83	3.83	4.30	4.30
Spouses are first cousins	0.41	0.68	*(<0.00)*	0.41	0.41	0.68	0.68
Altruism	7.79	7.80	(0.98)	7.71	7.88	7.66	7.93
Positive reciprocity	8.72	8.85	(0.35)	8.74	8.70	8.83	8.86
Negative reciprocity	1.77	1.68	(0.64)	1.99	1.56	1.72	1.63
Player 1 contribution to Spouse (%)	74.66	76.41	(0.48)	75.69	73.64	81.94	70.71
Player 2 contribution to Spouse (%)	74.54	75.35	(0.76)	72.73	76.39	73.57	77.08
Player 1 contribution to neighbor (%)	65.83	65.85	(0.99)	66.06	63.64	70.1	61.43
Player 2 contribution to neighbor (%)	60.32	60.21	(0.97)	54.09	66.67	63.57	56.94
Observations	436	142		218	218	71	71

Note: This table presents participant characteristics for Study 3 sample. For definitions of variables, see notes for Table 1. For this sample, maximum value of Household Wealth index is 6.73 and minimum value of Household Wealth index is -5.63; p-values for t-test results between column 1 and column 2 are enclosed in parenthesis in column 3.

Table 5: Cooperation types across marriage types, geographical areas and interaction types in Study 2

	Full Sample		Faisalabad Tehsil		Samundari Tehsil	
	(1)	(2)	(3)	(4)	(5)	(6)
Cooperation Types(%)	**Arranged Marriage**	**Love Match**	**Arranged Marriage**	**Love Match**	**Arranged Marriage**	**Love Match**
Panel A: Player 2 types in PGGs with spouses						
Unconditional Cooperator	24.77	33.80	19.15	44.44	29.03	27.27
Conditional Cooperator	21.56	21.13	18.09	14.81	24.19	25.00
High token-giver	32.57	26.76	32.98	33.33	32.26	22.73
Low token-giver	21.10	18.31	29.79	7.41	14.52	25.00
Observations	218	71	94	27	124	44
Panel B: Player 2 types in PGGs with anonymous neighbors						
Unconditional Cooperator	22.58	22.58	17.86	22.73	26.47	22.50
Conditional Cooperator	16.13	14.52	17.86	13.64	14.71	15.00
High token-giver	8.60	11.29	8.33	18.18	8.82	7.50
Low token-giver	52.69	51.61	55.95	45.45	50.00	55.00
Observations	186	62	84	22	102	40

Notes: This table presents cooperation types for when Player 2s interact with their spouses (Panel A) and anonymous neighbors (Panel B) for Study 2. Panel A, Columns 1 & 2, Pearson chi2(3) = 2.4081 (p-value = 0.492); Panel A, Columns 3 & 4, Pearson chi2(3) = 9.7805 (p-value = 0.021); Panel A, Columns 5 & 6, Pearson chi2(3) = 3.1029 (p-value = 0.376); Panel B, Columns 1 & 2, Pearson chi2(3) = 0.4495 (p-value = 0.930); Panel B, Columns 3 & 4, Pearson chi2(3) = 2.3888 (p-value = 0.496); Panel B, Columns 5 & 6, Pearson chi2(3) = 0.3796 (p-value = 0.944).

Table 6: Regression analysis of inter-spousal cooperation in Study 2

Panel A	(1)	(2)	(3)
Dependent variable (DV)	Unconditional Cooperator	Player 1 Contribution	Household Contribution
Love match	0.086	1.866	2.136
	(0.215)	(0.666)	(0.651)
R^2	0.059	0.051	0.033
Controls	Yes	Yes	Yes
Panel B			
Love match (LM)	0.292**	5.893	9.420**
	(0.018)	(0.168)	(0.019)
Samundari tehsil (SAM)	0.102	-2.761	1.494
	(0.174)	(0.388)	(0.662)
LM x SAM	-0.338***	-6.529	-11.948*
	(0.005)	(0.386)	(0.075)
R^2	0.083	0.059	0.046
Controls	Yes	Yes	Yes
Panel C			
Love match (LM)	1.056***	13.358	23.918
	(0.009)	(0.535)	(0.340)
Log distance from city (Dist)	0.098*	-3.335	-0.009
	(0.066)	(0.420)	(1)
LM x Dist	-0.276**	-3.188	-6.158
	(0.014)	(0.643)	(0.438)
R^2	0.084	0.059	0.039
Controls	Yes	Yes	Yes
Mean of DV	0.270	75.087	74.913
Observations	289	289	289

Note: Estimated coefficients from linear models are presented; p-values in parentheses adjusted for clustering at the session level using a wild bootstrap (Cameron et al., 2008). Column (1) reports results for a dummy dependent variable equal to 1 if Player 2 is an unconditional cooperator; column (2) uses Player 1's contribution as a percentage of the initial endowment; and column (3) uses the household's combined contributions as a percentage of their combined initial endowment. For the list of controls, see notes for Table 3. Please refer to Table A3 (Panel A) and Table A4 (Panel B and C) in the Online Appendix for the estimated coefficients on the control variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Regression analysis of Unconditional Cooperation (UC) including interactions with neighbours

Partner Type/Sample	**Neighbour Interaction**		**Pooled**	
	(1)	(2)	(3)	(4)
Dependent Variable (DV)	UC	UC	UC	UC
Love match (LM)	0.074	0.382	0.070	0.403
	(0.344)	(0.208)	(0.382)	(0.178)
Samundari tehsil (SAM)	0.042		0.051	
	(0.581)		(0.513)	
LM x SAM	-0.086		-0.096	
	(0.374)		(0.313)	
Partner is spouse (SP)			0.032	-0.050
			(0.189)	(0.645)
LM x SP			0.227**	0.633**
			(0.033)	(0.029)
SP x SAM			0.041	
			(0.248)	
LM x SP x SAM			-0.232**	
			(0.033)	
Log distance from city (Dist)		0.056		0.062
		(0.406)		(0.365)
LM x Dist		-0.103		-0.112
		(0.198)		(0.150)
Dist x SP				0.031
				(0.356)
LM x SP x Dist				-0.155**
				(0.043)
Observations	289	289	578	578
R^2	0.052	0.055	0.073	0.074
Mean of DV	0.194	0.194	0.232	0.232
Controls	Yes	Yes	Yes	Yes
Partial R^2 (Love match)	0.002	0.005	0.001	0.002

Note: Estimated coefficients from linear probability models are presented. The dependent variable is a dummy for a Player 2 Unconditional Cooperator; p-values in parentheses adjusted for clustering at the session level using a wild bootstrap (Cameron et al., 2008); For a list of controls, see notes for Table 3. Please refer to Table A6 in the Online Appendix for the estimated coefficients on the control variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Participant characteristics in Study 3

Variable	**Samundari Tehsil**	**Sig. of diff. (p-value)**	**Faisalabad Tehsil**
Age (years)	37.49	(0.16)	35.67
Female respondents (%)	51.68	(0.98)	51.53
Years of education	4.53	(0.86)	4.45
Married	0.86	(***0.03***)	0.93
Length of marriage (years)	14.67	(0.56)	13.90
Number of children	3.10	(0.58)	2.96
Household Wealth index	-0.001	(0.67)	-0.08
Respondent is household head	0.37	(0.69)	0.35
Number of adults in the household	3.37	(0.55)	3.33
Positive reciprocity	9.35	(0.65)	9.41
Negative reciprocity	1.46	(0.38)	1.23
Altruism	8.24	(0.71)	8.31
Observations	178		163

Note: This table presents participant characteristics for Study 3 sample. For definitions of variables, see notes for Table 1; For Samundari tehsil, maximum value of Household Wealth index is 7.15 and the minimum value of Household Wealth index is -3.05; For Faisalabad tehsil, maximum value of Household Wealth index is 3.34 and minimum value of Household Wealth index is -2.91; Sample size for Household Wealth index and Number of adults in the household is 159 in Faisalabad tehsil and 177 in Samundari tehsil because of missing values; p-values for the t-test results between Column 1 and Column 3 are presented in parentheses in Column 2.

Table 9: Ordered Logit Analysis (Odds ratios) of appropriateness ratings for Situation 1

	(1)	(2)	(3)
Dependent variable (DV)	Appropriateness Rating	Appropriateness Rating	Appropriateness Rating
Panel A: No matching incentives			
Love match (LM)	0.037***	0.038***	0.037***
	(0.009)	(0.009)	(0.009)
Samundari tehsil (SAM)	1.743**	1.785**	
	(0.453)	(0.471)	
LM x SAM	0.446**	0.416**	0.402**
	(0.170)	(0.161)	(0.160)
Panel B: With matching incentives			
Love match (LM)	0.012***	0.012***	0.011***
	(0.004)	(0.004)	(0.004)
Samundari tehsil (SAM)	2.370**	2.391**	
	(0.846)	(0.861)	
LM x SAM	0.373**	0.349**	0.322**
	(0.178)	(0.170)	(0.169)
Observations	1364	1344	1344
Controls	No	Yes	Yes
Village fixed effects	No	No	Yes

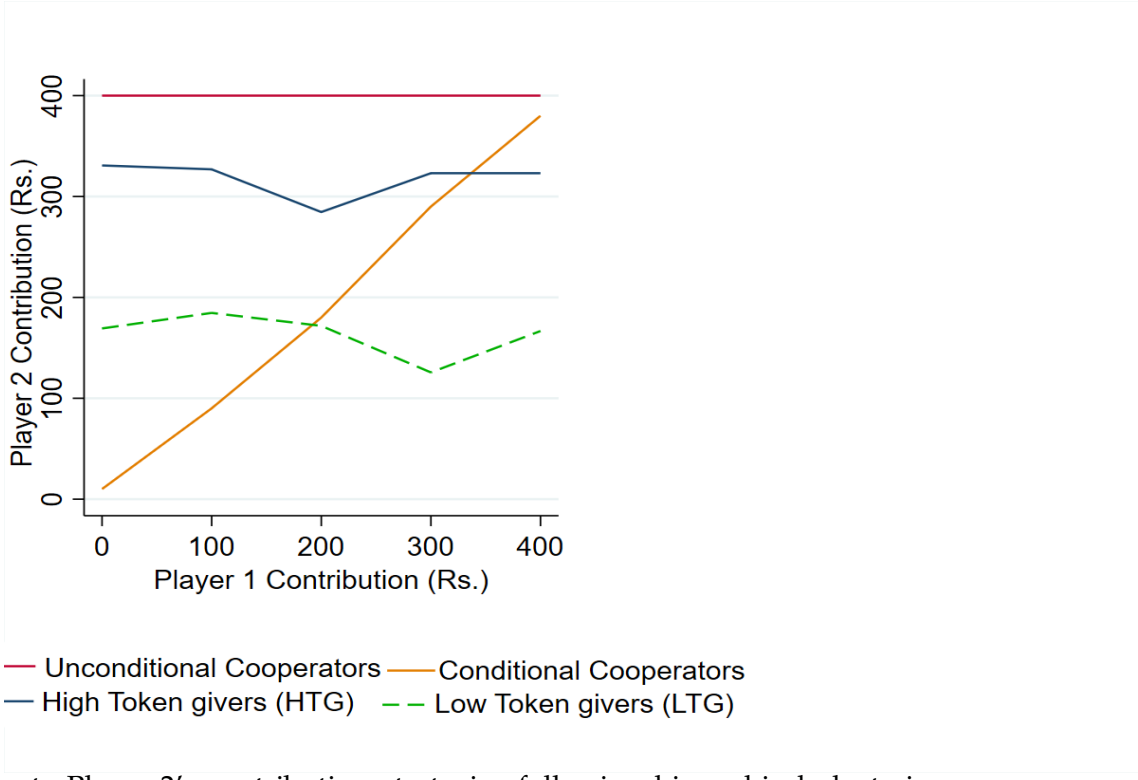
Note: Table 9 shows the ordered Logit odds ratios for Situation 1 evaluations. The key variables are whether the young person pursued a love match (LM), whether the evaluator was from Samundari (SAM), and their interaction. Panel A shows results without the matching incentive, Panel B with the incentive. Odds ratios indicate the effect of LM, SAM, and LM×SAM on social appropriateness ratings. Standard errors clustered at the individual level in parentheses. Ordinal dependent variable: -1: Very inappropriate, -0.33: Somewhat inappropriate; 0.33: Somewhat Appropriate; 1: Very Appropriate. Sample size in columns 2 and 3 reduced due to missing household characteristics. Controls include gender of vignette protagonist, evaluating participant's age, gender, years of education, number of children, is a household head, number of adults in household, is married, years of marriage, altruism, positive reciprocity, negative reciprocity, and Household Wealth index. See Tables A7 and A8 in the Online Appendix for the estimated cut points and odds ratios for the control variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 10: Ordered Logit Analysis (Odds ratios) of appropriateness ratings for Situation 2 and 3

	(1)	(2)	(3)
Dependent variable (DV)	Appropriateness Rating	Appropriateness Rating	Appropriateness Rating
Panel A: No matching incentives			
Support LM couple (Support)	4.997***	5.050***	5.065***
	(1.172)	(1.214)	(1.218)
Samundari tehsil (SAM)	1.052	1.076	
	(0.167)	(0.172)	
Support x SAM	0.801	0.787	0.785
	(0.247)	(0.247)	(0.246)
Family		1.106*	1.107*
		(0.058)	(0.058)
Panel B: With matching incentives			
Support LM couple (Support)	0.807	0.780	0.782
	(0.178)	(0.177)	(0.178)
Samundari tehsil (SAM)	1.114	1.124	
	(0.186)	(0.192)	
Support x SAM	0.788	0.797	0.794
	(0.266)	(0.274)	(0.274)
Family		1.072	1.071
		(0.047)	(0.047)
Observations	1364	1344	1344
Controls	No	Yes	Yes
Village fixed effects	No	No	Yes

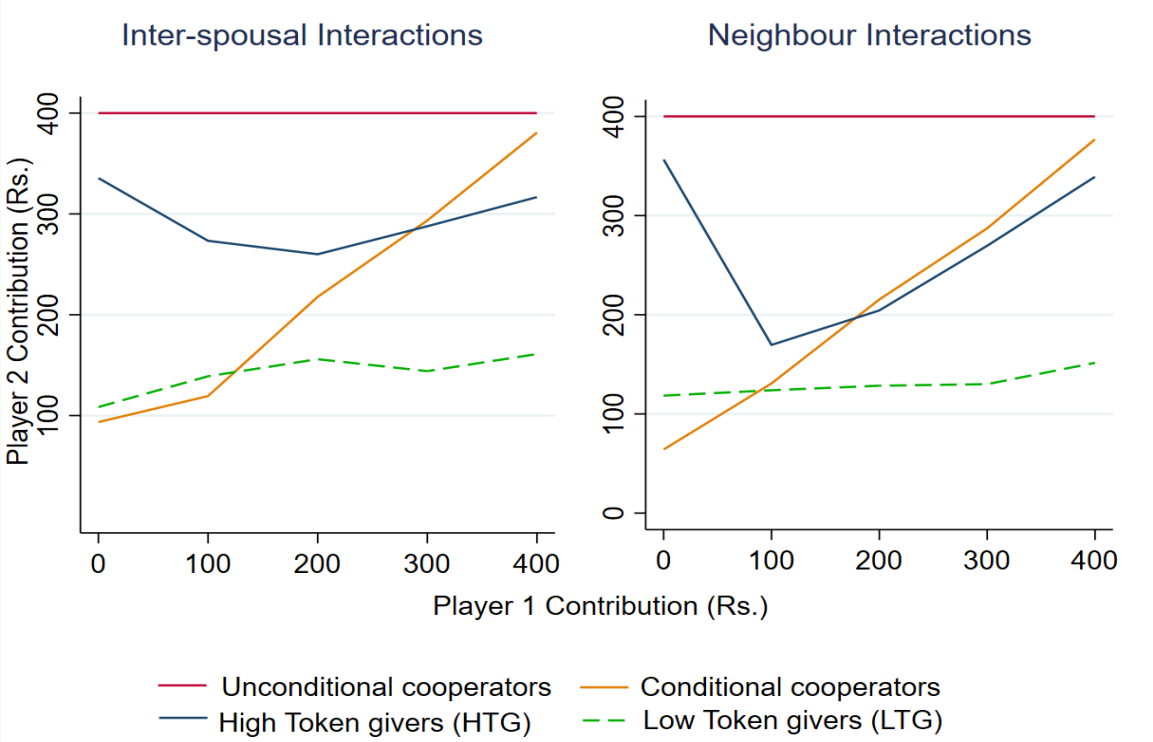
Note: Table 10 shows ordered Logit odds ratios for Situations 2 and 3 evaluations. Key variables are "Support" for the love-matched couple and, in columns (2)–(3), a "Family" dummy for Situation 2. Panel A shows results without matching incentives, Panel B with incentives. Odds ratios indicate the effects of Support, SAM, LM×SAM, and Family on social appropriateness ratings. Standard errors clustered at the individual level in parentheses. Ordinal dependent variable: -1: Very inappropriate, -0.33: Somewhat inappropriate; 0.33: Somewhat Appropriate; 1: Very Appropriate. Sample size in columns 2 and 3 reduced due to missing household characteristics. Controls include evaluating participant's age, gender, years of education, number of children, is a household head, number of adults in household, is married, years of marriage, altruism, positive reciprocity, negative reciprocity, and Household Wealth index. See Tables A9 and A10 in the Online Appendix for the estimated cut points and odds ratios for the control variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 1: Player 2 cooperative types in Study 1



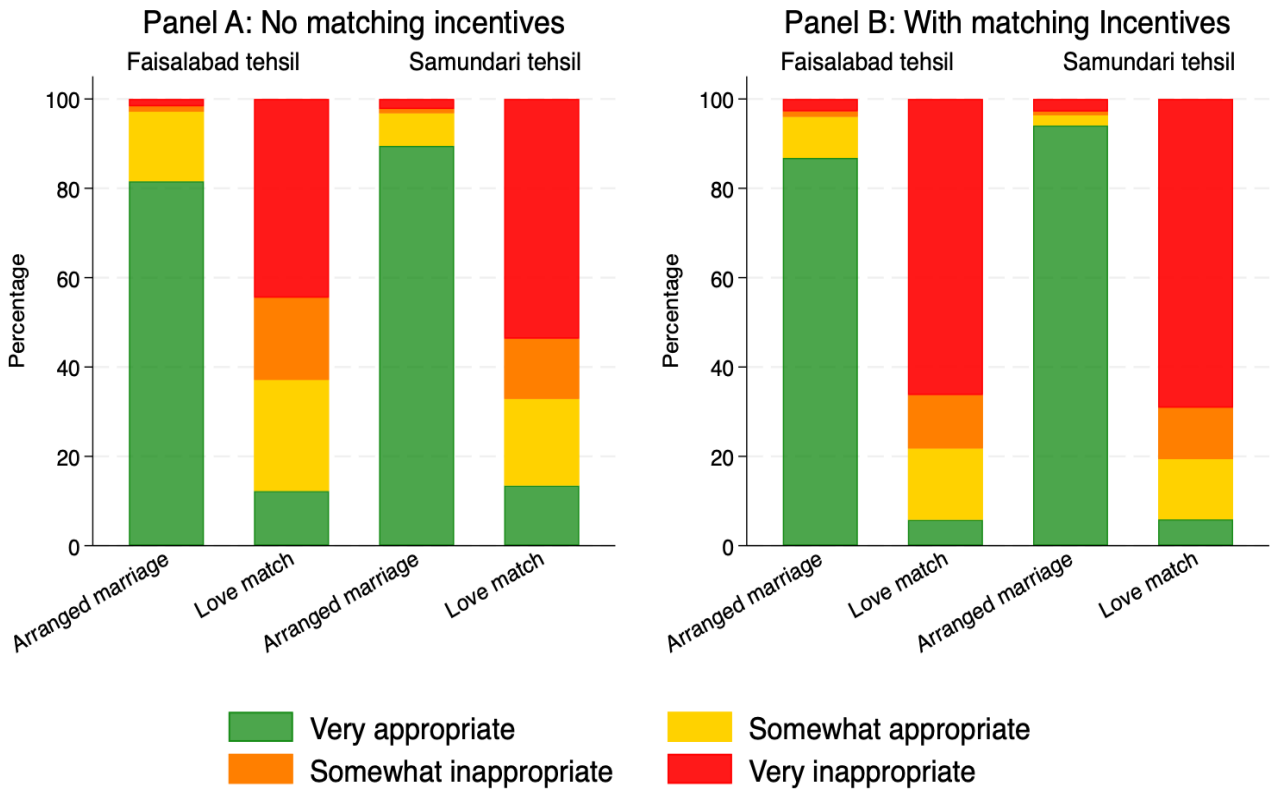
Notes: This figure presents Player 2's contribution strategies following hierarchical clustering. The red horizontal line at Rs.400 represents unconditional cooperators, who contribute their full amount regardless of Player 1's contribution. The yellow upward-sloping line represents conditional cooperators, who match their partner's contribution. The dark blue line, centered around Rs.300, depicts high token-givers, while the green dashed line shows the average contribution pattern of participants in the low token-givers cluster.

Figure 2: Player 2 cooperative types in Study 2



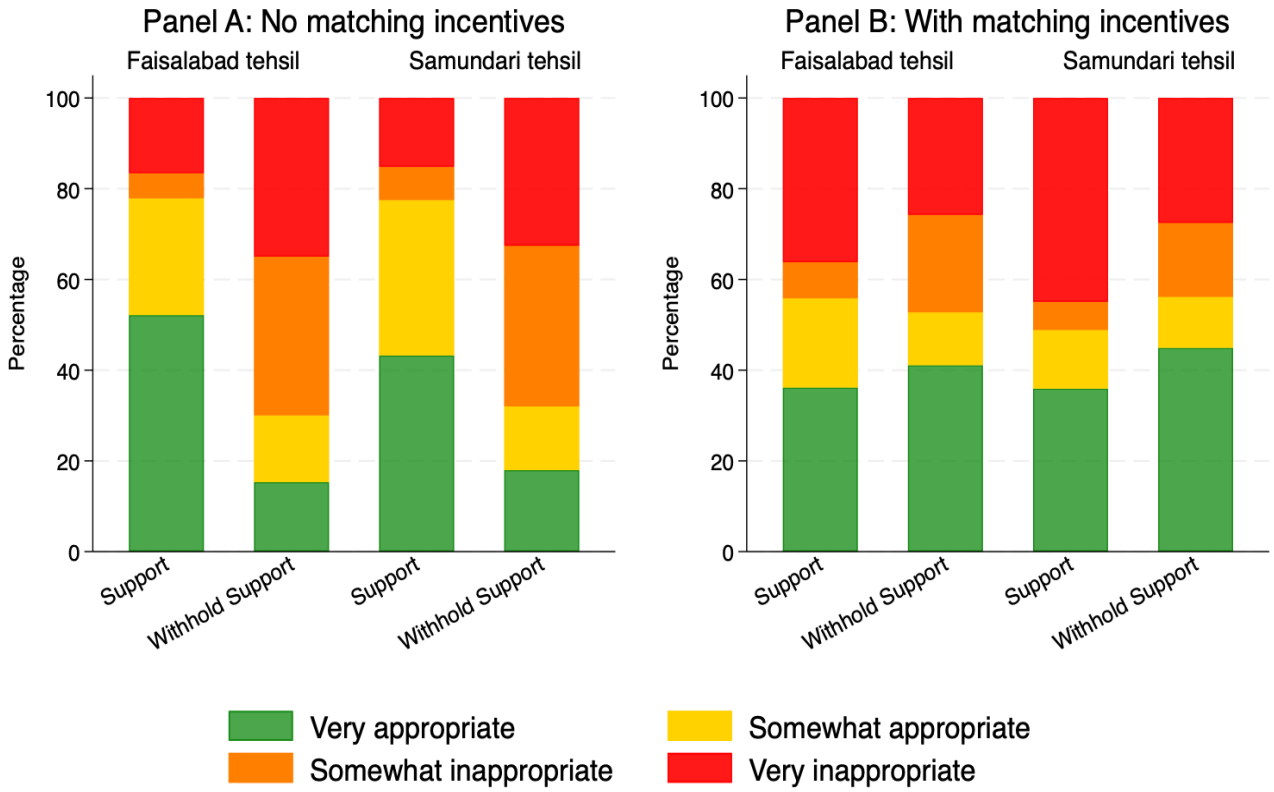
Notes: The two panels show Player 2's contribution strategies identified through hierarchical clustering during interactions with their spouses (left) and neighbors (right). The red horizontal line at Rs.400 represents unconditional cooperators, who contribute their full amount regardless of Player 1's contribution. The yellow upward-sloping line represents conditional cooperators, who match their partner's contribution. The dark blue U-shaped line around Rs.300 depicts high token-givers, while the green dashed line represents the average contribution pattern of participants in the low token-givers cluster.

Figure 3: The Social Appropriateness of Arranged and Love-match Marriages



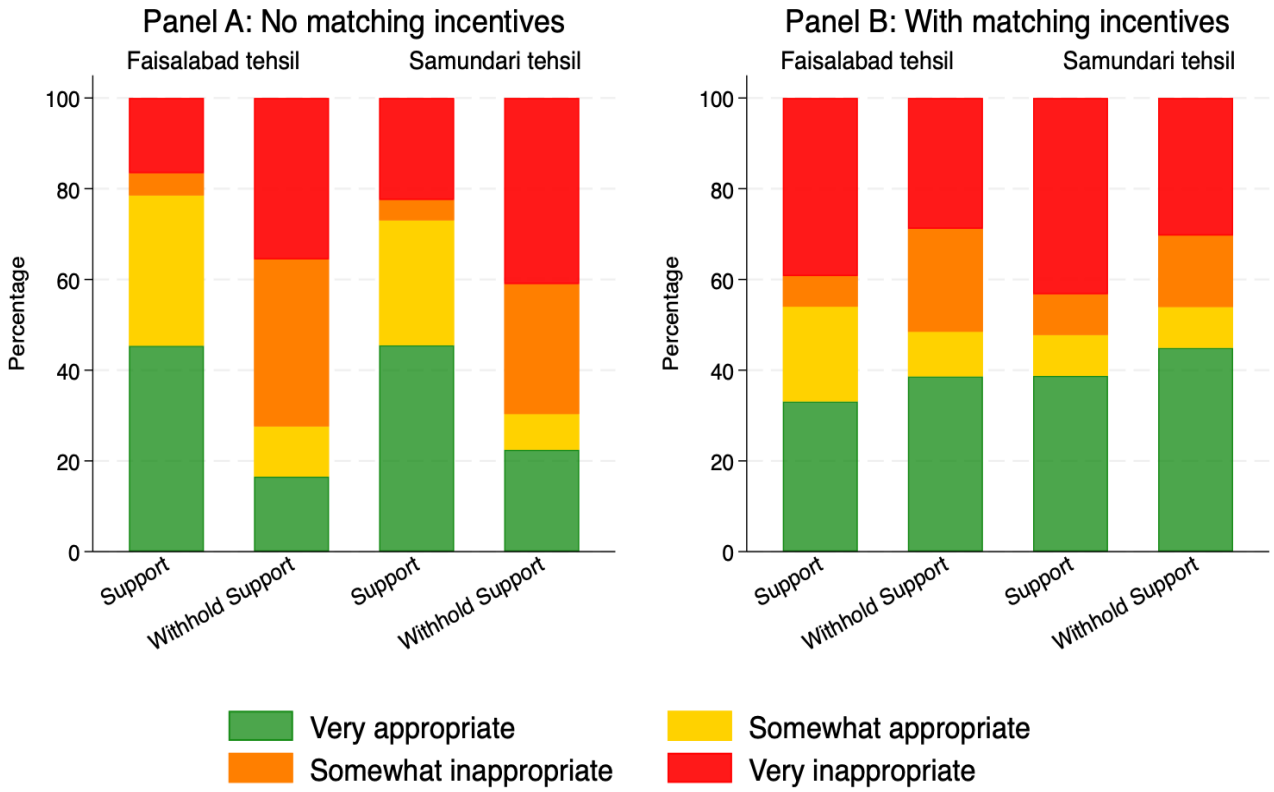
Notes: Figure 3 shows social appropriateness ratings for Situation 1, comparing views on pursuing a love match versus accepting an arranged marriage. Panels A and B display ratings when the incentive to match with others in the village was absent and present, respectively, across Faisalabad and Samundari tehsils. Each tehsil has two bars: one for accepting the arranged marriage and one for pursuing the love match. Green and yellow segments show "very" and "somewhat appropriate" responses; red and orange segments show "somewhat" and "very inappropriate" responses. Figure 3 shows a strong injunctive social norm favoring arranged marriages across both tehsils. Over 80% of evaluators rated acceptance of arranged marriages as very appropriate, while opinions on pursuing a love match were more varied, though the majority (over 60%) still considered it very or somewhat inappropriate.

Figure 4: The Social Appropriateness of Family Supporting and Withholding Support from Love-matched Couples



Notes: Figure 4 presents social appropriateness ratings for Situation 2, comparing opinions on families either providing support to or withholding support from a young couple who have violated the arranged marriage norm. Panels A and B show ratings for cases where the incentive to match with others in the village was absent and present, respectively, across Faisalabad and Samundari tehsils. Each tehsil displays two bars: one for supporting the couple and one for withholding support. The green and yellow segments indicate "very" and "somewhat appropriate" responses, while the red and orange segments indicate "somewhat" and "very inappropriate" responses. The graphs suggest that there is no clear second-order norm endorsing the enforcement of the arranged marriage norm across both tehsils.Without incentives, over 70% rated supporting the couple as appropriate and over 67% rated withholding support as inappropriate. With incentives, support ratings declined and withholding ratings increased, resulting in a near 50:50 split in both tehsils.

Figure 5: The Social Appropriateness of Neighbors Supporting and Withholding Support from Love-matched Couples



Notes: Figure 5 presents social appropriateness ratings for Situation 3, comparing opinions on neighbors either providing support to or withholding support from a young couple who have violated the arranged marriage norm. Panels A and B show ratings for cases where the incentive to match with others in the village was absent and present, respectively, across Faisalabad and Samundari tehsils. Each tehsil displays two bars: one for supporting the couple and one for withholding support. The green and yellow segments indicate "very" and "somewhat appropriate" responses, while the red and orange segments indicate "somewhat" and "very inappropriate" responses. The graphs suggest that there is no clear second-order norm endorsing the enforcement of the arranged marriage norm across both tehsils. Without incentives are large majority (over 70%) rated supporting the couple as appropriate and rated withholding support as inappropriate. With incentives, support ratings declined and withholding ratings increased, resulting in a near 50:50 split in both tehsils.

References

Afzal, U., d'Adda, G., Fafchamps, M., & Said, F. (2022). Intrahousehold consumption allocation and demand for agency: A triple experimental investigation. *American Economic Journal: Applied Economics*, *14*(3), 400–444.

Ai, C., & Norton, E. C. (2003). Interaction terms in logit and probit models. *Economics letters*, *80*(1), 123–129.

Alderman, H., Chiappori, P.-A., Haddad, L., Hoddinott, J., & Kanbur, R. (1995). Unitary versus collective models of the household: is it time to shift the burden of proof? *The World Bank Research Observer*, *10*(1), 1–19.

Alem, Y., Hassen, S., & Köhlin, G. (2023). Decision-making within the household: The role of division of labor and differences in preferences. *Journal of Economic Behavior Organization*, *207*, 511-528.

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of personality and social psychology*, *63*(4), 596.

Ashraf, N. (2009). Spousal control and intra-household decision making: An experimental study in the philippines. *American Economic Review*, *99*(4), 1245–1277.

Averett, S., Argys, L. M., & Hoffman, S. D. (2017). Marriage markets in developing countries. *The Oxford handbook of women and the economy*, 97–120.

Barr, A., Dekker, M., Janssens, W., Kebede, B., & Kramer, B. (2019). Cooperation in polygynous households. *American Economic Journal: Applied Economic*, *11*(2), 266 - 283.

Batabyal, A. A., & Beladi, H. (2002). Arranged or love marriage? that is the question. *Applied Economics Letters*, *9*(13), 893–897.

Becker, G. S. (1973). A theory of marriage: Part i. *Journal of Political economy*, *81*(4), 813–846.

Becker, G. S. (1991). *A treatise on the family: Enlarged edition*. Harvard university press.

Bratter, J. L., & King, R. B. (2008). "but will it last?": Marital instability among interracial and same-race couples. *Family Relations*, *57*(2), 160–171.

Caliński, T., & Harabasz, J. (1974). A dendrite method for cluster analysis. *Communications in Statistics-theory and Methods*, *3*(1), 1–27.

Cameron, A. C., Gelbach, J. B., & Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. *The review of economics and statistics*, *90*(3), 414–427.

Chiappori, P.-A. (1992). Collective labor supply and welfare. *Journal of political Economy*, *100*(3), 437–467.

Chiappori, P.-A. (1993). *Unitary versus collective models of the household: Time to shift the burden of proof?* (Vol. 94) (No. 17). World Bank Publications.

Cochard, F., Couprie, H., & Hopfensitz, A. (2016). Do spouses cooperate? an experimental investigation. *Review of Economics of the Household*, *14*, 1–26.

Dhar, R. L. (2013). Intercaste marriage: A study from the indian context. *Marriage & family review*, *49*(1), 1–25.

Doss, C. (2013). Intrahousehold bargaining and resource allocation in developing countries. *The World Bank Research Observer*, *28*(1), 52–78.

Doyle, D. M., & Molix, L. (2014). How does stigma spoil relationships? evidence that perceived discrimination harms romantic relationship quality through impaired self-image. *Journal of Applied Social Psychology*, *44*(9), 600–610.

Duda, R. O., Hart, P. E., & Stork, D. G. (1973). *Pattern classification and scene analysis* (Vol. 3). Wiley New York.

Duflo, E. (2003). Grandmothers and granddaughters: old-age pensions and intrahousehold allocation in south africa. *The World Bank Economic Review*, *17*(1), 1–25.

Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., & Sunde, U. (2018). Global evidence on economic preferences. *The Quarterly Journal of Economics*, *133*(4), 1645–1692.

Fallucchi, F., Luccasen, R. A., & Turocy, T. L. (2019). Identifying discrete behavioural types: a re-analysis of public goods game contributions by hierarchical clustering. *Journal of the Economic Science Association*, *5*(2), 238–254.

Fischbacher, U., Gächter, S., & Fehr, E. (2001). Are people conditionally cooperative? evidence from a public goods experiment. *Economics letters*, *71*(3), 397–404.

Freeston, M. H., & Plechaty, M. (1997). Reconsideration of the locke-wallace marital adjustment test: is it still relevant for the 1990s? *Psychological reports*, *81*(2), 419–434.

Fricke, T. E., Syed, S. H., & Smith, P. C. (1986). Rural punjabi social organization and marriage timing strategies in pakistan. *Demography*, 489–508.

Gächter, S., Nosenzo, D., Renner, E., & Sefton, M. (2012). Who makes a good leader? cooperativeness, optimism, and leading-by-example. *Economic Inquiry*, *50*(4), 953–967.

Gentilini, U. (2022). *Cash transfers in pandemic times - evidence, practices, and implications from the largest scale up in history.* Retrieved from https://documents1.worldbank.org/curated/en/099800007112236655/pdf/P17658505ca3820930a254018e229a30bf8.pdf

Givens, B. P., & Hirschman, C. (1994). Modernization and consanguineous marriage in iran. *Journal of Marriage and Family*, *56*(4), 820 - 834.

Goode, W. J. (1963). World revolution and family patterns. *Free Press*.

Haddad, L. J., Hoddinott, J. F., & Alderman, H. (1997). Intrahousehold resource allocation in developing countries: models, methods and policies.

Hidrobo, M., Hoel, J. B., & Wilson, K. (2021). Efficiency and status in polygynous pastoralist households. *The Journal of Development Studies*, *57*(2), 326–342.

Hoddinott, J., & Haddad, L. (1995). Does female income share influence household expenditures? evidence from côte d'ivoire. *Oxford Bulletin of Economics and Statistics*, *57*(1), 77–96.

Hoel, J. B., Hidrobo, M., Bernard, T., & Ashour, M. (2021). What do intra-household experiments measure? evidence from the lab and field. *Journal of Economic Behavior & Organization*, *188*, 337–350.

Iversen, V., Jackson, C., Kebede, B., Munro, A., & Verschoor, A. (2011). Do spouses realise cooperative gains? experimental evidence from rural uganda. *World Development*, *39*(4), 569–578.

Javed, U. (2020). Moral panic and social change. *Dawn*. Retrieved from https://www.dawn.com/news/1583316

Jiang, Y., Terhorst, L., Donovan, H. S., Weimer, J. M., Choi, C.-W. J., Schulz, R., ... Sherwood, P. R. (2013). Locke-wallace short marital-adjustment test: Psychometric evaluation in caregivers for persons with primary malignant brain tumor. *Journal of nursing measurement*, *21*(3), 502–515.

Kebede, B., Tarazona, M., Munro, A., & Verschoor, A. (2014). Intra-household efficiency: An experimental study from ethiopia. *Journal of African Economies*, *23*(1), 105–150.

Krupka, E. L., & Weber, R. A. (2013). Identifying social norms using coordination games: Why does dictator game sharing vary? *Journal of the European Economic Association*, *11*(3), 495–524.

Latif, M. (2017). *Re-envisioning kinship and the state in pakistan (doctoral dissertation* . University of Pittsburgh.

Lehmiller, J. J., & Agnew, C. R. (2006). Marginalized relationships: The impact of social disapproval on romantic relationship commitment. *Personality and Social Psychology Bulletin*, *32*(1), 40–51.

Locke, H. J., & Wallace, K. M. (1959). Short marital-adjustment and prediction tests: Their reliability and validity. *Marriage and family living*, *21*(3), 251–255.

Lowes, S. (2022). *Kinship structure and the family: Evidence from the matrilineal belt* (Tech. Rep.). National Bureau of Economic Research.

Lundberg, S., & Pollak, R. A. (1994). Noncooperative bargaining models of marriage. *The American Economic Review*, *84*(2), 132–137.

Manser, M., & Brown, M. (1980). Marriage and household decision-making: A bargaining analysis. *International economic review*, 31–44.

McElroy, M. B., & Horney, M. J. (1981). Nash-bargained household decisions: Toward a generalization of the theory of demand. *International economic review*, 333–349.

MICS. (2014). *Multiple indicators cluster survey*. Punjab Bureau of Statistics, Government of the Punjab.

Munir, A., & Akhter, N. (2017). *Rising trend of nontraditional marriages in pakistan: cause and implications.* (Presented at the International Conference on Arabic Studies Islamic Civilization.)

Munro, A. (2018). Intra-household experiments: A survey. *Journal of Economic Surveys*, *32*(1), 134–175.

Munro, A., Kebede, B., Tarazona-Gomez, M., & Verschoor, A. (2014). Autonomy and efficiency. an experiment on household decisions in two regions of india. *Journal of the Japanese and International Economies*, *33*, 114–133.

Otis, M. D., Rostosky, S. S., Riggle, E. D., & Hamrin, R. (2006). Stress and relationship quality in same-sex couples. *Journal of social and Personal Relationships*, *23*(1), 81–99.

Pande, R. (2015). 'i arranged my own marriage': arranged marriages and post-colonial feminism. *Gender, Place & Culture*, *22*(2), 172–187.

Pande, R. (2016). Becoming modern: British-indian discourses of arranged marriages. *Social & Cultural Geography*, *17*(3), 380–400.

Rosenzweig, M. R., & Stark, O. (1989). Consumption smoothing, migration, and marriage: Evidence from rural india. *Journal of political Economy*, *97*(4), 905–926.

Rubio, G. (2014). How love conquered marriage: Theory and evidence on the disappearance of arranged marriages. *Unpublished manuscript*.

Samuelson, P. A. (1956). Social indifference curves. *The quarterly journal of economics*, *70*(1), 1–22.

Selten, R. (1967). Die strategiemethode zur erforschung des eingeschr nkt rationale verhaltens im rahmen eines oligopolexperiments. *Beitr ge zur experimentellen Wirtschaftsforschung*, 136.

Tamalapakula, S. (2019). The politics of inter-caste marriage among dalits in india. *Asian Survey*, *59*(2), 315–336.

Thomas, D. (1990). Intra-household resource allocation: An inferential approach. *Journal of human resources*, 635–664.

Udry, C. (1996). Gender, agricultural production, and the theory of the household. *Journal of political Economy*, *104*(5), 1010–1046.

Ward Jr, J. H. (1963). Hierarchical grouping to optimize an objective function. *Journal of the American statistical association*, *58*(301), 236–244.

Zhang, S. (2024). Asymmetric information, intrahousehold cooperation, and consumption choices: Experimental evidence from kenya. *Intrahousehold Cooperation, and Consumption Choices: Experimental Evidence from Kenya (October 08, 2024)*.