Keeping the Peace while Getting Your Way: Information, Persuasion and Intimate Partner Violence*

Dan Anderberg† Rachel Cassidy‡ Anaya Dam§ Wendy Janssens¶
Karlijn Morsink‖ Anouk van Veldhoven**

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Abstract

We study how new information relevant to household decisions – received by women only, men only, or both – affects disagreement and conflict in couples. We model strategic communication between partners as Bayesian persuasion, shaping both equilibrium decisions and the incidence of conflict. A novel prediction of the framework is that information received by only one partner may reduce conflict compared to when the same information is received jointly, as a privately informed partner can use persuasion to forge agreement for their preferred option. We test this prediction using data from a randomized controlled trial of an edutainment intervention addressing child marriage decisions in rural Pakistan, targeted at men, women, or both. Consistent with the model, we find that conflict – measured as the incidence of intimate partner violence (IPV) – is highest when both partners are jointly targeted. Reflecting systematic gender differences in preferences, the model also predicts that marriage delays should be largest when targeting men alone and smallest when targeting women alone, predictions that are confirmed in the data.
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† Royal Holloway University of London, Institute for Fiscal Studies, CESifo.

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§ University of Oxford

¶ Vrije Universiteit Amsterdam, Tinbergen Institute, Amsterdam Institute for Global Health and Development

‖ Utrecht University, Cornell University, Wageningen University, Center for Economic Analysis of Risk, Georgia State University.

** Utrecht University

1 Introduction

Globally, one-third of women in relationships report physical or sexual violence by their partner (WHO, 2018). Whilst the canonical household bargaining model predicts that intimate partner violence (IPV) may be reduced by improvements in women's economic resources (Farmer and Tiefenthaler, 1997; Aizer, 2010; Haushofer et al., 2019), empirical support is mixed (Bulte and Lensink, 2019; Guarnieri and Rainer, 2021; Sanin, 2025). Alternative "instrumental" models view IPV as a means to extract resources or preserve male identity (Bloch and Rao, 2002; Bobonis et al., 2013; Calvi and Keskar, 2023), yet they struggle to explain the high frequency of repeat IPV. Recent evidence also challenges both frameworks: Bhalotra et al. (2025) find IPV rises when either partner becomes unemployed, suggesting that shocks can trigger conflict regardless of the affected partner's identity.

A complementary perspective from public health links IPV to disagreements over household decisions, with violence arising when conflicts escalate (Stets and Henderson, 1991; Kernsmith, 2005). This perspective highlights the importance of how partners communicate and resolve conflicts. Indeed, an unemployment shock, as experienced by either partner in (Bhalotra et al., 2025), puts the affected household in a changed situation where they face new decisions, which may cause disagreement and conflict to arise. We build on this by modelling intra-household decision-making under incomplete information as a Bayesian persuasion game (Kamenica and Gentzkow, 2011; Bergemann and Morris, 2019), where partners differ in preferences but one may privately receive relevant information. A privately informed partner can strategically frame the message to align the household decision with their preference, potentially reducing conflict compared to when both partners are informed and persuasion is impossible.

We present an empirical application that concerns parental decisions about marriage timing for adolescent daughters in rural Pakistan, where mothers tend to weigh stigma from deviating from early-marriage norms more heavily than fathers. In this context the model predicts that: (i) beliefs update similarly when parents are directly informed, regardless of whether information is received jointly

or alone; (ii) conflict (IPV) is more likely when both are informed than when only one is; and (iii) marriage delays are most likely when fathers are informed alone, least likely when mothers are, with joint information in between.

We leverage a clustered RCT (in 177 villages, with 1,700 households) of an "edutainment" intervention on child marriage, targeted at men only, women only, both, or neither. The intervention involved mobile cinema screenings and facilitated discussions. The results of the RCT on its primary and other secondary outcomes are reported in Cassidy et al. (2024). Our analysis focuses on households with an adolescent girl, observing marriage outcomes, IPV incidence, and belief changes at six and eighteen months post-intervention. Consistent with the model, we find: (i) parents update their beliefs towards expecting a higher return to delaying marriage similarly when directly informed, whether informed privately or jointly; (ii) IPV is at least as frequent when both parents are targeted as when one is; and (iii) significant reductions in child marriage, particularly when fathers are targeted alone.

Our contributions expand three distinct literatures. First, the paper adds to the literature on economic theories of IPV where contributions to date have been broadly divided into (i) household bargaining models (Farmer and Tiefenthaler, 1997; Aizer, 2010; Haushofer et al., 2019) that predict that women whose economic opportunities improve will be empowered to reduce the abuse from their partners, and (ii) instrumental violence models, where IPV serves as a means for the perpetrator to influence their partner's behavior or reassert control, including "backlash" (Macmillan and Gartner, 1999) and resource extraction models (Bloch and Rao, 2002; Bobonis et al., 2013; Calvi and Keskar, 2023). Our paper contributes to this literature by developing a novel economic theory of IPV based on the notion that violence arises from spousal disagreements over household decisions that may escalate into violence. Our framework more naturally relates to Card and Dahl (2011) who stress the role of emotional cues in precipitating violence. Similar to them, we expect cue-triggered loss of control to lead to physical violence, which is hence our main outcome of interest. However, whereas their

work focused on cues external to the household – namely professional soccer game outcomes – affecting male perpetrators, in our case the cues triggering violence are internal disagreements about household decisions.

Second, we contribute to the literature on intra-household decision-making and information-sharing. The collective model of household decision-making, developed by Chiappori (1988, 1992), has been the standard framework over the past few decades and generalizes the household bargaining modelling approach. Extensions to the collective model have made more progress on the implications of limited commitment (e.g., Mazzocco (2007); Voena (2015)) than on information sharing. A small literature has however recently emerged. One strand of this literature establishes the existence of gender differences in the diffusion of information between partners in contexts where full information-sharing is deemed rational (e.g., Conlon et al., 2021; Fehr et al., 2022). Another strand of this literature investigates strategic motives for spouses to hide information from their partners in non-cooperative household settings. For example, Ashraf et al. (2014) find that women – when given the opportunity – strategically hide contraceptive use from their spouses, translating into lower fertility outcomes. Lowe and McKelway (2021) show that providing information about job opportunities for women to spouses jointly rather than individually reduces enrollment into the job by giving each spouse veto power.[1] Our setting contrasts the above as it presents a context where a couple face a joint decision with no hiding of actions or options, only a lack of full information about a potential option value. A spouse who receives private information will not seek to hide this, but may strategically conceal its content. That is, they may communicate truthfully or not, to manipulate their partner's beliefs in order to persuade them about which option to support.[2]

Finally, we also connect to the literature that models child marriage decisions. Recent work by Buchmann et al. (2023) shows that child marriages can be sus-

[1] Income hiding by spouses has been observed in experimental settings (Ashraf, 2009; Castilla, 2019), diverting resources towards hard-to-monitor consumption.

[2] Bayesian persuasion models (Kamenica and Gentzkow, 2011; Bergemann and Morris, 2019) have been applied in a number of domains, for example, employee feedback (Habibi, 2020), voter coalition formation (Alonso and Câmara, 2016), and matching platforms (Romanyuk and Smolin, 2019). To our knowledge, we are the first to use it as a framework for modelling intra-household communication and decision-making.

tained by an inefficient norm via equilibrium signaling, and that this is consistent with evidence from an intervention in Bangladesh involving financial incentives and a girls' empowerment program. In line with this work, in the application of our model we treat the existence of an early-marriage norm as a historical given that parents have concerns about deviating from. Further recent work by Adams and Andrew (2025) has explored parents' perceptions about the marriage market return to education in Rajasthan in India. They find that parents perceive a positive return to girls' education but also a risk of a worsening of spousal quality when marriage is delayed after leaving school. As our data does not indicate a tight relationship between school-leaving and marriage, we do not make any explicit reference to girls' own education in our model and empirical analysis.[3] Other work focuses on marriage markets analyses where child marriages occur in equilibrium. For instance, Corno et al. (2020) show that income shocks in the form of droughts affect the age of marriage through associated payments – dowries in India and bride prices in Sub-Saharan Africa. As our focus is on intra-household equilibrium decision-making and the intervention in our case study only targeted a fraction of the population, we do not model the local marriage market equilibrium.

We next present the theoretical framework (Section 2). Section 3 presents the experimental design. Section 4 presents the data. Results with respect to beliefs, IPV and child marriage are presented in Sections 5, 6 and 7. Section 8 discusses potential alternative explanation before Section 9 concludes.

2 Theoretical framework

In this section we formulate a Bayesian persuasion model where spouses, who have different preferences, face a household decision where there is incomplete information about some factor relevant to that decision. Either one or both spouses may then receive this information. If only one spouse does so, they can choose how to strategically communicate to their partner to "persuade" them. The partner in

[3] In our context, 55% of the unmarried girls in the sample have already left school at baseline. The gap between school-leaving age and age of marriage is two years or less for only 16% of girls in our sample.

turn updates their beliefs rationally using Bayes' rule, anticipating their spouse's communication strategy.[4] If the spouses, after communication and updating of beliefs end up in a disagreement about the decision, we take this to imply an elevated risk of conflict and violence.

The model is phrased in the context of the case study that we use to empirically test it but it should be noted that the framework can equally be applied to many other household decisions made under incomplete information where partners' preferences differ. In our setting, parents decide on the timing of marriage – early or delayed – for their adolescent daughters. They have incomplete information about the potential benefit to delaying marriage and trade this off against potential stigma associated with deviating from a prevailing community age-of-marriage norm. Benefits to delaying marriage can be thought of as arising from improved welfare for the daughter, for example in terms of the quality of her future spouse. Indeed we present empirical evidence that parents in our context perceive a positive association between age of marriage and prospective husband educational attainment for potential marital ages up to and beyond the threshold age for child marriage (see Section 5). We assume that mothers typically attach a stronger relative weight to community stigma than fathers and hence are more hesitant about delaying marriage. Below we show that, in our data, mothers indeed have a stronger preference for complying with community age-of-marriage norms and also have lower beliefs about community members' actions when a girl is married young (see Section 4.1). Such gender differences in preferences for norm compliance have previously been confirmed in the literature on female genital mutilation (e.g. Gage and Van Rossem, 2006; Sagna, 2014; Bellemare et al., 2015). It is well-established in psychology, law and criminology that women perceive a higher risk of social sanctions, including shame and embarrassment, than men and are more susceptible to pressure associated with deviating from common behaviors of their social groups (Tibbetts and Herz, 1996; Steinberg and Monahan, 2007). This is potentially rooted in the severity of community sanctions that women face

[4] In Bayesian persuasion games, a "sender" holds private information relevant to a decision to be taken by a "receiver". To influence the decision the sender strategically messages the receiver by implementing a communication strategy or "disclosure policy" which may or may not be fully truthful.

when deviating from community norms, as also suggested by, e.g., Said et al. (2022) and Andrew et al. (2024).

2.1 Set-up

Consider a set J of households belonging to a local community. In each household $j \in J$ there is a mother and a father who need to make a decision about when to make their daughter available for marriage. They can either opt for an "early marriage" or a "delayed marriage" and we denote their choice by $d_j \in \{0, 1\}$ where $d_j = 1$ indicates "delay."

Delaying marriage comes with a *potential* benefit, $r_j \in \{0, 1\}$. The realization of a benefit is, however, uncertain and all parents have incomplete information about how likely a benefit to delay is: the probability of a benefit being realized, denoted $\pi_s \in (0, 1)$, depends on a "state of the world" s which is either "low" or "high."All parents hold a common prior over s.

Assumption 1. *(Return to delay, state of the world, and prior). There is a state of the world $s \in S \equiv \{L, H\}$ over which parents share a common prior belief, $\mu \equiv \Pr(s = H) \in (0, 1)$. Any household $j \in J$ may experience a benefit, $r_j \in \{0, 1\}$ from delayed marriage. This occurs with probability,*

$$\Pr(r_j = 1 | d_j, s) = d_j \pi_s, \tag{1}$$

where $0 < \pi_L < \pi_H < 1$.

For simplicity, we will use P to denote the prior and let $\pi_P \equiv (1 - \mu)\pi_L + \mu\pi_H$ denote the perceived likelihood of a benefit to delayed marriage based on the common prior.

There is a pre-existing community age-of-marriage norm favoring early marriage and parents perceive that a decision to delay marriage comes with a risk of stigma, denoted $z_j \in \{0, 1\}$.

Assumption 2. *(Social norm and probability of stigma). Any household $j \in J$ may experience stigma, $z_j \in \{0, 1\}$, if they delay marriage and the probability of stigma occurring takes the form,*

$$\Pr(z_j = 1|d_j) = d_j\rho, \tag{2}$$

with $\rho > 0$.

As parents face a binary decision, we assume simple additive preferences over the benefit r_j and over stigma z_j. Hence let the preferences of spouse $i \in \{1, 2\}$ in household $j \in J$ be given by

$$u_{ij}(r_j, z_j) = r_j - \sigma_{ij} z_j. \tag{3}$$

Parents' preferences are assumed to vary both *across* and *within* households. This variation is captured by the individual stigma aversion $\sigma_{ij} \geq 0$. Hence the profile $\boldsymbol{\sigma}_j \equiv (\sigma_{1j}, \sigma_{2j})$ characterizes the preferences of the two spouses in household j. Within-household preference heterogeneity implies that one spouse will be no more stigma-averse than their partner. Without loss of generality, we can label the least stigma-averse spouse in each household as spouse 1, whereby $\sigma_{1j} \leq \sigma_{2j}$ for all $j \in J$. In line with general patterns of the data (see Section 4.1 below), we will refer to the less stigma-averse parent 1 as the *father* and the more stigma-averse parent 2 as the *mother*. To model preference heterogeneity, let σ_{ij} be made up of a household component γ_j and a spouse-2 specific component λ_j, both of which are positive, random and independent.

Assumption 3. *(Stigma aversion) The stigma aversions* $\boldsymbol{\sigma}_j = (\sigma_{1j}, \sigma_{2j})$ *of the parents in household* $j \in J$ *take the form* $\sigma_{1j} = \gamma_j$ *and* $\sigma_{2j} = \gamma_j + \lambda_j$ *where* γ_j *and* λ_j *are independent random variables with cumulative distribution function* Γ *and* Λ *respectively, each with support* $[0, \infty)$.

Assumption 3 implies that σ_{1j} and σ_{2j} are positively correlated – consistent with homogamy of partners' attitudes towards the marriage norm – via the common household component.

Whilst all parents share the common prior μ, individual beliefs may change in light of information provided to them, either directly or via their spouse. To this end, let μ_{ij} denote the belief held by spouse i in household j that the state is $s = H$. Given μ_{ij} and σ_{ij}, they will prefer to delay marriage if and only if their expected benefit to delay exceeds their expected disutility from stigma, that is

$$(1-\mu_{ij})\,\pi_L + \mu_{ij}\pi_H \geq \sigma_{ij}\rho. \tag{4}$$

Let $d_{ij}(k) \in \{0,1\}$ indicate whether spouse i in household j favors marriage delay given $k = L, P, K$ – that is, for either state $s \in S$ or based on the prior P. Then, using (4), $d_{ij}(k) = 1$ if and only if $\sigma_{ij} \leq \underline{\sigma}(k)$ where $\underline{\sigma}(k) \equiv \pi_k/\rho > 0$. Note that, by Assumptions 1 and 3, for any household $j \in J$, the following monotonicities trivially hold,

$$d_{ij}(L) \leq d_{ij}(P) \leq d_{ij}(H) \text{ for } i = 1,2 \quad \text{and} \quad d_{1j}(k) \geq d_{2j}(k) \text{ for } k \in L, P, H. \tag{5}$$

Any parent will be most favorable towards delay if the state is H and least favorable if it is L, and if there is disagreement then spouse 1 prefers delay and spouse 2 prefers early marriage.

Even if the parents disagree, a decision has to be made. The following assumption captures the notion of decision power in the simplest possible way.

Assumption 4. *(Decision power) The decision, $d_j \in \{0,1\}$, implemented in household $j \in J$ is the option preferred by spouse 1 with probability α and the option preferred by spouse 2 with probability $1-\alpha$, where $\alpha \in (0,1)$.*

This formulation allows for the possibility that fathers, for instance, have a larger "final say."

2.2 Communication between spouses

Consider now the case where, in each household $j \in J$, one spouse is privately informed about the state s. The informed spouse i can then send a message $\widetilde{s}_{ij} \in S$ to their partner. A natural interpretation of $\widetilde{s}_{ij} = s$ is as i claiming that the state is s, which may be truthful or not. A communication strategy for i is a mapping from the set of (true) states S to the probability of sending the message $\widetilde{s}_{ij} = H$ and can be represented as a vector $\boldsymbol{\phi}_{ij} \equiv \left(\phi_{ij}^L, \phi_{ij}^H\right)$ where $\phi_{ij}^s \equiv \Pr(\widetilde{s}_{ij} = H|s)$, and where $\boldsymbol{\phi}_{ij} \in \Phi \equiv [0,1] \times [0,1]$.

Upon receiving the message $\widetilde{s}_{ij}$ the partner, denoted $-i$, updates their belief using Bayes' rule and in line with $\boldsymbol{\phi}_{ij}$. Hence the posterior beliefs held by $-i$ will

satisfy

$$\Pr\left(s = H|\widetilde{s}_{ij} = H; \boldsymbol{\phi}_{ij}\right) = \frac{\mu\phi_{ij}^{H}}{\mu\phi_{ij}^{H} + (1-\mu)\,\phi_{ij}^{L}}, \tag{6}$$

$$\Pr\left(s = H|\widetilde{s}_{ij} = L; \boldsymbol{\phi}_{ij}\right) = \frac{\mu\left(1-\phi_{ij}^{H}\right)}{\mu\left(1-\phi_{ij}^{H}\right) + (1-\mu)\left(1-\phi_{ij}^{L}\right)}. \tag{7}$$

The order of events is as follows. Spouse i first chooses $\boldsymbol{\phi}_{ij} \in \Phi$. The state s is then revealed to i who sends a message $\widetilde{s}_{ij}$ based on s and in accordance with $\boldsymbol{\phi}_{ij}$. $-i$ then updates their beliefs as in (6) or (7). Finally, nature chooses which spouse has the final say (Assumption 4) and they implement their preferred option as the household decision d_j.

The following claim, familiar from the Bayesian persuasion literature (Kamenica and Gentzkow, 2011; Bergemann and Morris, 2019), describes the optimal communication strategies for each spouse when privately informed.[5] Spouse i will report non-truthfully – that is, engage in persuasion – when they prefer one option irrespective of the state, but their non-informed partner's preferred choice depends on their belief, making them "persuadable."[6]

Claim 1. *(Privately optimal communication)*
(i) ***Informed Spouse 1 (Father)****: If* $\sigma_{1j} < \underline{\sigma}(L)$*, but* $\underline{\sigma}(L) < \sigma_{2j} \leq \underline{\sigma}(H)$*, then the optimal communication strategy for spouse* 1 *is* $\boldsymbol{\phi}_{1j}^{*} = \left(\phi_{1j}^{*}, 1\right)$ *where,*

$$\phi_{1j}^{*} = \min\left\{\frac{\mu}{(1-\mu)}\frac{(\pi_H - \sigma_{2j}\rho)}{(\sigma_{2j}\rho - \pi_L)}, 1\right\}. \tag{8}$$

For all other $\boldsymbol{\sigma}_j$*, the truthful strategy,* $\boldsymbol{\phi}_{1j}^{*} = (0,1)$*, is optimal for spouse* 1*.*
(ii) ***Informed Spouse 2 (Mother)****: If* $\sigma_{2j} > \underline{\sigma}(H)$*, but* $\underline{\sigma}(L) \leq \sigma_{1j} < \underline{\sigma}(H)$*, then the optimal communication strategy for spouse* 2 *is* $\boldsymbol{\phi}_{2j}^{*} = \left(0, \phi_{2j}^{*}\right)$ *where,*

$$\phi_{2j}^{*} = \max\left\{1 - \frac{(1-\mu)}{\mu}\frac{(\sigma_{1j}\rho - \pi_L)}{(\pi_H - \sigma_{1j}\rho)}, 0\right\}. \tag{9}$$

For all other $\boldsymbol{\sigma}_j$*, the truthful strategy,* $\boldsymbol{\phi}_{2j}^{*} = (0,1)$*, is optimal for spouse* 2*.*

[5] Further model details and proofs are presented in Appendix A.

[6] It is worth noting that the informed spouse's choice of communication strategy will not depend on the distribution of decision-power within the household. Irrespective of the value of α, an informed spouse will always have an incentive to choose a communication strategy that will make their partner agree with them as often as possible, even if, in the end, the informed spouse has the final say themselves. We generalize this below to allow for a cost of lying.

The less stigma-averse father (parent 1) will – if anything – persuade the mother to delay marriage. Specifically, he will use persuasion when he prefers to delay marriage irrespective of the state but she would only want to delay at H, not at L. If the mother prefers to delay marriage based on the prior, then he optimally conveys no information (always claiming H) as this ensures that she does not update her beliefs and continues to support a delayed marriage. If, on the other hand, the mother's stigma aversion is stronger – to the point that she would prefer early marriage on the prior – then he cannot make her always agree to delay. In this case, he discloses state L with the lowest probability that makes her prefer to delay marriage upon receiving the message $\widetilde{s}_{1j} = H$. By corresponding argument, the mother (parent 2) will – if anything – persuade the father to agree to early marriage and will engage in persuasion when she prefers early marriage irrespective of the state but he would only do so at L, not at H. She will convey no information (always claiming L) if he favors early marriage based on the prior and will otherwise disclose H with the lowest probability that makes the father agree to early marriage upon receiving the message $\widetilde{s}_{2j} = L$.

Whilst we have discussed the model in the context of couples deciding on the marriage timing for their daughters, the same logic can be applied to other household decisions where spouses have incomplete information about benefits and/or costs, where they weigh consequences differently, and where one or both spouses may receive decision-relevant information. Examples may include decisions related to relocation, employment, large purchases and investments etc. The persuasion framework thus generally has many possible applications to household decisions, with or without the below focus on disagreements and IPV.

2.3 Disagreements and IPV

Disagreement between spouses can potentially lead to conflict and, ultimately, an elevated risk of IPV. Here we consider how the likelihood of disagreement varies with the potential information recipient(s). Hence let $\iota \in \mathcal{P}(\{1,2\})$ denote the "informed" set. Further, let $\delta_j \in \{0,1\}$ indicate whether the spouses in household

$j \in J$ disagree on the decision and let

$$\overline{\delta}\left(s, \iota, \boldsymbol{\sigma}_j\right) \equiv E\left[\delta_j | s, \iota, \boldsymbol{\sigma}_j\right], \tag{10}$$

denote the probability of disagreement given preferences $\boldsymbol{\sigma}_j$, when the state is s and this information is received by ι (where the expectation is over potential messages). Of course, we do not perfectly observe preferences $\boldsymbol{\sigma}_j$ and for this reason we will focus initially on the aggregate disagreement risk in the population. Hence let $\overline{\delta}\left(s, \iota\right) \equiv E_{\boldsymbol{\sigma}_j}\left[\overline{\delta}\left(s, \iota, \boldsymbol{\sigma}_j\right)\right]$, denote the aggregate disagreement frequency. Later on we will consider heterogeneity by spousal divergence of preferences.

The following claim notes that disagreements are at least as frequent when both spouses are directly informed as when one of them is privately informed. Intuitively, when only one spouse is informed, they are provided with an informational advantage that they will – at some preference profiles – use to persuade their partner to agree with their preferred option. In contrast, when both spouses are informed, no persuasion is possible.

Claim 2. *(Frequency of disagreements) The aggregate frequency of disagreements,* $\overline{\delta}\left(s, \iota\right)$ *when:*

(i) The probability of a benefit to delayed marriage is high, $s = H$*, satisfies*

$$\overline{\delta}\left(H, \{1,2\}\right) = \overline{\delta}\left(H, \{1\}\right) > \overline{\delta}\left(H, \{2\}\right); \tag{11}$$

(ii) The probability of a benefit to delayed marriage is low, $s = L$*, satisfies*

$$\overline{\delta}\left(L, \{1,2\}\right) = \overline{\delta}\left(L, \{2\}\right) > \overline{\delta}\left(L, \{1\}\right). \tag{12}$$

Claim 2 makes no comparison to the prior ($\iota = \varnothing$). This reflects the simple insight that any information – irrespective of who receives it – will generally *resolve* disagreements in some households and *induce* disagreements in others. As a result, no unambiguous prediction can be made for the aggregate effect of information relative to the no-information prior.

As indicated by Claim 1, effective persuasion will only occur between spouses whose preferences are notably different. In contrast, spouses with only minor differences in preferences are predicted to disclose information truthfully to each

other. As a consequence, in so far as individual preferences can be empirically measured, the model prediction can be refined: the above predicted effects of jointly- versus individually-received information on disagreement frequencies, and hence conflict, should hold specifically for couples with relatively larger differences in preferences.

2.4 Effects of information on marriage timing

We now consider the effect of information on the frequency of marriage delays. Define

$$\Delta d\left(s,\iota,\boldsymbol{\sigma}_j\right) \equiv E\left[d_j|s,\iota,\boldsymbol{\sigma}_j\right] - E\left[d_j|\iota=\varnothing,\boldsymbol{\sigma}_j\right], \tag{13}$$

where the expectations are over potential messages as well as over the final say. Taking expectations also over household preferences $\boldsymbol{\sigma}_j$ we obtain the aggregate effect of ι being informed that the state is s on the frequency of delayed marriages, $\Delta d\left(s,\iota\right) \equiv E_{\boldsymbol{\sigma}_j}\left[\Delta d\left(s,\iota,\boldsymbol{\sigma}_j\right)\right]$.

From Claim 1 we know that, in some households, the mother (spouse 2), when privately informed, will persuade her partner towards early marriage by not disclosing the high state. As a result, information that $s = H$ has a more positive effect on the frequency of delayed marriage when privately received by the father (spouse 1) compared to when privately received by the mother, that is $\Delta d\left(H,\{1\}\right) > \Delta d\left(H,\{2\}\right)$. Indeed, information $s = H$ when received privately by fathers will, for any household, only ever increase the probability of delayed marriage. If the same information is received privately by the mothers, their persuasion efforts in some households make the aggregate effect on marriage delay frequency ambiguous. That is, $\Delta d\left(H,\{1\}\right) > 0$ but $\Delta d\left(H,\{2\}\right)$ is ambiguous. Conversely, from Claim 1 we know that, in some households, the father (spouse 1), when privately informed, will persuade their partner to delay marriage by not disclosing the low state. Therefore, $\Delta d\left(L,\{2\}\right) < \Delta d\left(L,\{1\}\right)$, and, $\Delta d\left(L,\{2\}\right) < 0$ whilst $\Delta d\left(L,\{1\}\right)$ is ambiguous.

What if both spouses ($\iota = \{1,2\}$) learn the state s? Each would then, if they have the final say, implement their preferred choice. As fathers use persuasion

specifically in the L-state, both learning that $s = H$ has the same effect as father receiving this information privately. Correspondingly, both learning that $s = L$ has the same effect as when mothers only receive this information.[7]

The following claim summarizes the above effects.

Claim 3. *(Frequency of decisions) The effect of information on marriage delay, $\Delta d(s, \iota)$, when:*

(i) The probability of a benefit to delayed marriage is high, $s = H$, satisfies

$$\Delta d(H, \{1\}) = \Delta d(H, \{1, 2\}) > \Delta d(H, \{2\}), \tag{14}$$

where $\Delta d(H, \{1\}) = \Delta d(H, \{1, 2\}) > 0$ but $\Delta d(H, \{2\})$ is ambiguous.

(ii) The probability of a benefit to delayed marriage is low, $s = L$, satisfies

$$\Delta d(L, \{2\}) = \Delta d(L, \{1, 2\}) < \Delta d(L, \{1\}), \tag{15}$$

where $\Delta d(L, \{2\}) = \Delta d(L, \{1, 2\}) < 0$ but $\Delta d(L, \{1\})$ is ambiguous.

2.5 Commitment

The equilibrium outlined above implicitly assumed commitment to a communication strategy. The issue of commitment in persuasion games has recently received attention and this literature shows this assumption is not critical here. We present the key arguments here and present a fuller discussion in Appendix A.

Lin and Liu (2024) have recently shown that in binary-decision settings where the sender and the receives have the same preference modularity, the full-commitment outcome is also credible when only message frequencies are observable. These conditions are met in our model and credibility of the persuasion equilibrium is intuitive. For instance, a father sometimes misreporting state L as being H whilst always reporting H truthfully is credible – he would not gain from reporting H *more* frequently at state L and *not* always disclosing the H-state as that would induce the mother to favor marriage delay in cases where delaying is less valuable.

[7] Even though the communication strategies are chosen non-cooperatively, the equilibrium decision is always ex post efficient: the option chosen is always that preferred by at least one spouse given the true state of the world. An information advantage held by one spouse will, in effect, make it more likely that their preferred option is chosen.

An alternative to commitment is reputation. Best and Quigley (2024) study persuasion in a setting where a seller with private information about the quality of each sold item interacts with a sequence of buyers. Our setting parallels their model of persuasion with reputation in repeated transactions: although couples do not repeatedly decide on a daughter's marriage, they regularly face other joint decisions under incomplete information. As in their framework, the informed party's need to maintain credibility in these ongoing interactions can sustain the same persuasion strategies as under full commitment. For instance, suppose the father is informed. The mother would, as best response, only be willing to delay marriage after an H-message from the father only as long the observable average frequency of returns is at least $\sigma_{2j}\rho$. Otherwise she would withdraw her support. Knowing this, the father has the incentive to limit his non-disclosure of the L-state to ϕ^*_{1j} in order to maintain his reputation for being (sufficiently) truthful.

Based on the recent literature we therefore conclude that the assumption of commitment to a reporting strategy is defendable in our setting as the same equilibria would be credible under the weaker assumption of commitment only to an observable message frequency or could be supported by reputation.

2.6 Cost of lying

We can also consider a "cost of lying". The risk of retribution may make lying costly particularly for women: in contexts where women have reduced autonomy, dishonesty may expose them to retaliation, emotional punishment, or even physical abuse, making the relational cost of deception especially high. Moreover, spouses may have wider reputational concerns, particularly in tightly knit family and community settings where information may travel beyond the household, concerns that are likely to be higher for women than for men due to more intensive socialisation.

Hence, consider augmenting the preferences defined in (3) by assuming a further additive cost-of-lying $\gamma_i \geq 0$ – differentiated by gender $i = 1, 2$ – which is incurred whenever a message sent $\widetilde{s}_{ij}$ misrepresents the true state s. The following

statement shows how Claim 1 generalizes in this case.

Corollary 1. *(Privately optimal communication with costs of lying)*
(i) ***Informed Spouse 1 (Father)****: Spouse 1 engages in persuasion as described in part (i) of Claim 1 if and only if* $\gamma_1 \leq (1-\alpha)\,\rho\,(\underline{\sigma}\,(L) - \sigma_{1j})$.
(ii) ***Informed Spouse 2 (Mother)****: Spouse 2 engages in persuasion as described in part (ii) of Claim 1 if and only if* $\gamma_2 \leq \alpha\rho\,(\sigma_{2j} - \underline{\sigma}\,(H))$.

On the one hand, mothers may have a relatively stronger incentive to engage in persuasion as an indirect influence if fathers have the larger direct say, $\alpha > 1/2$. On the other hand, if $\gamma_2 > \gamma_1$ they may have a weaker incentive to communicate strategically due to fear of retribution and potentially larger moral costs. This indicates that we should be aware that, empirically, the propensity to engage in persuasion may vary between mothers and fathers.

2.7 Summary of empirical predictions

While the above model adopts a stylized structure—with a binary state, perfectly revealed to the informed parent(s)—it isolates core mechanisms of intra-household disagreement and persuasion that carry over into more complex empirical settings. The RCT intervention was designed to highlight potential benefits to delaying child marriage (Cassidy et al., 2024). But for ethical and practical reasons, the intervention could not present delayed marriage as the only acceptable path, nor disregard legitimate concerns around stigma and social norms – it needed to maintain credibility with the audiences by acknowledging trade-offs. In short, the information conveyed was inherently suggestive, but also deliberately nuanced. This essential ambiguity is important to bear in mind when mapping the model to the empirical setting: it implies that even when the content leans toward supporting delay, any privately informed parent can frame or filter the message in any direction that suits their persuasion aims: a father who favors delay can always amplify the positive aspects of the information conveyed while a mother inclined toward early marriage can stress social risks etc. Thus, by its targeting design, the intervention preserves the informational asymmetries and strategic communication incentives

central to our framework, ensuring that the model's logic applies in our empirical setting.

Table 1 summarises the model's empirical predictions, linking theoretical outcomes to measurable variables in the RCT. Predictions cover (i) belief updating, (ii) disagreements and IPV, and (iii) marriage delay, with comparisons over which spouse is informed. The central intuition is that private information allows persuasion, which can align preferred choices and reduce conflict, whereas joint information precludes persuasion and may – at least weakly – increase disagreement, empirically reflected in measurable IPV incidence. We expect the largest marriage delays when fathers are informed alone, the smallest when mothers are, and intermediate effects when both are targeted.

Table 1: Summary of Model Predictions

Domain	**Comparison**	**Prediction**	**Logic**
Beliefs	Directly informed privately *vs.* directly informed jointly	No difference in belief updating	Belief updating depends only on information content, not on whether received privately or jointly.
Disagreements	One spouse privately informed *vs.* both spouses jointly informed	More frequent when both spouses are jointly informed	A privately informed spouse can use persuasion to forge agreement; joint information blocks persuasion.
Decisions	Father informed *vs.* jointly informed *vs.* mother informed	Delay frequency: Father $\geq$ Joint $\geq$ Mother	Fathers persuade toward delay; mothers persuade toward early marriage; joint information blocks persuasion.

The model predicts that the use of privately received information for persuasion will occur between spouses with greater divergence in preferences, in our case in stigma aversion. Conversely, spouses with only minor preference differences are predicted to always relay privately received information truthfully to each other. This implies that couples with relatively minor preference differences should exhibit an "invariance to information recipient" that need not hold in couples with larger preference differences. Finally, as noted above, there may be gender differences in the propensity to engage in persuasion, notably reflecting a potentially higher cost of lying for mothers than for fathers.

3 Experimental design

We leverage an existing cluster-randomized controlled trial (RCT) in 177 villages in Sindh and Punjab Provinces in Pakistan, where an educational entertainment ("edutainment") intervention addressing child marriage was implemented in treatment villages and where, crucially, the gender of the targeted household members was randomly varied. The results of the RCT on the likelihood of household and village-level child marriages are reported in detail in (Cassidy et al., 2024). The villages were randomly assigned into four treatment groups: (1) The *Female* intervention (F), targeting women only; (2) The *Male* intervention (M), targeting men only; (3) The *Female+Male* intervention ($F + M$), targeting both genders; (4) The control group (C) with no intervention.

3.1 Intervention

The intervention took place during the first six months of 2019 and consisted of an educational and entertaining (edutainment) street-theater performance delivered as a mobile cinema screening (ensuring consistency in delivery). The script was written and directed by local NGOs and performed by local actors and stressed the rights of women and girls, the consequences of early marriage in terms of health and education for the young married couple and the perceived costs of deviating from prevailing age-of-marriage norms.[8] This content was conveyed through characters embodying various positions on early marriage enacting everyday situations.

A first example of a scene that highlights the *potential benefit of marriage delay* for the girl and her future household is where a highly educated boy arrives back to the village. He argues that he wants to marry a girl that is at least 18, because he has had a realization, during his time away from the village, that marrying a young girl might lead to marriage failure and she might not be mature enough to take care of herself, their children or their household. A second example shows an

[8] The content of the play was developed by combining evidence about household's decisions about the timing of daughters' marriage – e.g., evidence about the role of household income, such as dowry and bride price (Jensen and Thornton, 2003; Corno et al., 2020; Corno and Voena, 2023), health of children and grandchildren (Jensen and Thornton, 2003), spousal and match quality (Adams and Andrew, 2025), as well as social norms governing the age of marriage (Buchmann et al., 2023). For our context, health and spousal quality benefits and costs in terms of deviation from community norms were selected as relevant.

old man reminiscing on the tragic memory of his deceased first wife. He tells a community member that she was only 15 when she succumbed to complications during childbirth. A scene that highlights *potential costs of marriage delay resulting from community norms about the age-of-marriage* shows a marriage ceremony, where the bride is only 12 years old. Community members attending the ceremony are deliberating whether this is an appropriate age of marriage. A woman says they want to stick to traditions for concerns about the opinions of the community if they delay a girl's marriage. A young nephew then tries to convince them that delaying marriage for girls reduces health risks and that traditions need to be reconsidered when they are harmful to young brides.

The screening was followed by a 30-minute group discussion that followed a standardized format, facilitated by a gender specialist from the local NGOs. In a second visit to each village approximately three months later, the local NGOs again conducted structured group discussions based around the content of the movie with the same participants.[9] The screening of the theater performance and the group discussions were held in communal areas in the village: typically a compound or a room of a community building. In most villages men and women were not allowed to attend jointly in the *Female+Male* intervention arm. Therefore, in this arm men and women attended separately but simultaneously. Care was taken to inform both groups that the other group would be watching the same screening and would be discussing the same topics at the same time. Target households were mobilized to participate in the intervention a few days prior to the screening, by a designated focal person from the village. The gender of the invited individual from target households was according to their village's treatment arm. The intervention was mainly held indoors, spaces were limited to twenty participants, and only individuals from target households participated.[10]

[9] The facilitator followed a carefully scripted list of questions about the experience of participants with the movie, the positions of the various characters, and the consequences of early marriage, encouraging active participation from all attendees.

[10] We estimate that, on average, 17% of the households with children on the marriage market are treated. In our 44 control villages we observe 309 marriages over 28 months, and thus approximately 3 marriages per village per year. Over that same period of time, we observe 44 marriages in our targeted households, so that is roughly 0.51 marriages in a year. So 17% of the "village marriage market" is treated.

3.2 Sampling and randomization

Details of the village and household sampling frame are provided in Appendix B. From the census of eligible households, ten households per village were randomly selected to participate in the study: five households with an adolescent boy ("boy households") and five households with an adolescent girl ("girl households"). As a result, the planned sample size was 1,770 households (10 households in each of the 177 villages – with three respondents per household: father, mother, and either an unmarried adolescent boy or an unmarried adolescent girl). Some villages did not have a sufficient number of households meeting the selection criteria due to their small size, leading to a final sample size of 1,687 households (5,061 respondents): 756 households (2,268 respondents) in Sindh province, and 931 households (2,793 respondents) in Punjab province. Given the focus on decisions about marriage delay for daughters, we will only report the analysis on the (half) sample of households with an adolescent girl.

After the baseline survey, villages were randomly assigned to one of the four treatment arms, after stratification first by district and second by Mahalanobis distance matching on village-level characteristics.[11] 44 villages were assigned to receive the *Male* intervention; 45 villages were assigned to receive the *Female* intervention and 44 villages the *Female+Male* intervention. The remaining 44 villages were assigned to the control group.

4 Data

The data collection for the RCT is described in full in Cassidy et al. (2024). In particular, baseline data were collected in Sindh Province in July and August 2018.

[11] The study area covered two districts in Sindh, and two in Punjab. Within each district, the Mahalanobis distance score was computed for each of our sample villages based on the following list of village-level baseline variables: boys only primary school; girls only primary school; mixed gender primary school; girls only secondary school; distance to nearest primary girls' school (in minutes); distance to nearest girls' secondary school (in minutes); are girls allowed to leave the compound; distance to the nearest town (in minutes); presence of teashop; whether the village is a main village or sub-village; total number of households; availability of female teachers in girls' school; and presence of a primary health care center. If in a district, the variable had less than or equal to two observations or a correlation ≥ 0.6 with other variables it was not included in its score computation. Villages were grouped into groups of eight villages based on the Mahalanobis distance score, and these eight villages were subsequently randomly assigned to either one of the treatment arms or the control arm.

Randomization of villages into treatment arms was conducted after the baseline survey. In Punjab Province, baseline village-level data was collected and the household listing exercise was conducted and sample households were selected, but it was not possible to conduct a full baseline survey due to the security situation at the time. The security situation in Punjab subsequently eased, and allowed the intervention to go ahead in Punjab according to assigned treatment arms. The midline survey was conducted from November 2019 until March 2020, i.e. six months after the intervention had ended in treatment villages, and just before the start of the COVID-19 pandemic. When target households in Punjab were visited for the midline survey, retrospective baseline questions on some outcomes of interest were included in the survey. An endline survey was conducted between September 2020 and March 2021, i.e. 18 months after the intervention and during the later stages of the COVID-19 pandemic. The RCT and the analysis of the midline and endline data are pre-registered.[12]

Household survey data were collected with three respondents per household: the father, the mother, and the adolescent child.[13] Only women received the survey module about experiences of IPV, based on the Demographic and Health Survey (DHS) IPV module (e.g., Demographic and Health Survey (2016)). Women were asked to indicate, from a list of fifteen different acts of violence potentially committed against them, if their husband had performed these acts in the last three months and ever (prior to the last three months). Out of these violent acts, eight can be classified as "emotional violence", and the remaining seven are classified as "physical violence".[14] Questions related to sexual violence were not asked, because these were considered too sensitive in this sample. WHO ethical guidelines on data collection in domestic violence research (WHO, 2001, 2016) were followed carefully, in order to preserve women's safety when asking them to report IPV experiences. In accordance with these guidelines, only women were asked to report IPV experiences to prevent their husband from knowing that they

[12] AEA RCT Registry number AEARCTR-0006098: `https://doi.org/10.1257/rct.6098-1.0`

[13] In rare cases the primary male and female caregiver of the adolescent girl were other family members, such as grandparents.

[14] A complete list of questions can be found in Appendix B.

have been asked about this, women were surveyed by female enumerators in a private and secured location, and careful referral procedures were in place.

The module about attitudes towards IPV was administered to all respondents, based on the DHS IPV attitudes module (e.g., Demographic and Health Survey, 2016). Respondents were asked if they find it justified if a husband hits or beats his wife in seven situations, as indicated in Table B2. For the same seven situations, respondents were asked to indicate on a 5-point scale how common it is for a husband from their community to hit or beat his wife in this situation. Moreover, respondents were asked what they think community members would do if they found out a husband is hitting or beating his wife. Lastly, all respondents were asked to indicate if they have personally experienced or heard of any incidents of gossiping, shaming, neglect, decision pressure, verbal attack and physical attack in the community.

Fathers reported household demographic information, on education, employment, and marriage status of all members of the household, as well as household financial and wealth indicators, and household decision-making information. Data on preferences, attitudes, expectations, and beliefs about (early) marriage were collected from all respondents. All three household members were also asked about the adolescent child's education, marital status, and (conditional on being married) the age at the time of marriage and spousal characteristics.

4.1 Descriptives, balance and attrition

Table C1 in Appendix C reports summary statistics of IPV outcomes, attitudes and household decision-making variables in the control group at midline and endline, for the households with an adolescent girl. Approximately 2.5% of women report to have had at least one experience of physical IPV in the three months prior to the midline and endline survey, with a total of 10% of women experiencing either physical or emotional IPV. Community norms are also such that IPV is perceived as widely justified in many situations. At both midline and endline, all respondents report to consider it justified for a man to beat his wife in at

least one of the seven situations asked, with a mean of approximately four situations. At midline, 94% of women are reported to have some involvement in decisions about their adolescent daughter, with 21% of women making the final decision. At endline, 98% of women are reported to have some involvement in decisions, while 12.5% make the final decision. On average, women's involvement in decisions about daughters, on a scale of one to ten, is around four.

Table 2: Gender differences in parents' preferred norm compliance

	(1) Mothers	(2) Fathers	(3) Difference	(4) Obs.
Consider tradition, community opinion, or family custom when deciding about daughters' marriage age	0.152 (0.360)	0.084 (0.278)	0.068 (0.005)***	736
Agree that marriage should not happen if the community disapproves	0.576 (0.495)	0.416 (0.494)	0.160 (0.000)***	736
Expect that no one in community would support daughter if she wants to delay marriage	0.611 (0.488)	0.582 (0.494)	0.030 (0.532)	736
Expect that community would do nothing if they found out a girl is married young	0.804 (0.397)	0.538 (0.499)	0.266 (0.000)***	736
Community members out of 10 that believe the community will tell the police if a girl is married young	2.067 (2.102)	4.045 (2.522)	-1.978 (0.000)***	736
Community members out of 10 that believe the community will pressure the families if a girl is married young	2.488 (2.322)	4.304 (2.398)	-1.817 (0.000)***	736

Notes: The table shows baseline variables answered by mothers and fathers of adolescent girls from Sindh Province only. Columns (1) and (2) present the means and standard deviations (in parentheses) of the variables for mothers and fathers respectively. Column (3) presents differences in means for fathers and mothers, with in parentheses p-values from robust standard errors clustered at the village level (unit of randomisation) from bivariate regressions of the variable of interest on gender. Column (4) indicates the number of observations, summing 368 mothers and 368 fathers in households with adolescent daughters in Sindh at baseline. The upper (lower) panel shows variables for which a higher (lower) value is associated with a higher preference for norm compliance, where a positive (negative) difference between mothers and fathers indicate mothers to be more (less) conservative than fathers. The first row presents a binary variable that is equal to one if the respondent indicated either tradition, community opinion, or family custom to be the most important consideration when deciding when to marry off their daughter, and zero otherwise. The second row presents a binary variable that is equal to one if the respondent agrees or strongly agrees with the statement "If the community disapproves of a marriage, then the marriage should not go ahead even if the parents want it to," and zero otherwise. The third row presents a binary variable that is equal to one if the respondent answered "nobody" to the question "who from the community would support her if your daughter would want to delay a suggested marriage?" The fourth row presents a binary variable that is equal to one if the respondent answered "nothing" to the question "what would the community do if they found out that a girl was about to be married before the legal marriage age?" The fifth row presents the respondents' beliefs about how many community members out of 10, averaging over men and women, think that the community would tell the police if they found out that a very young girl was about to be married. The sixth row presents the respondents' beliefs about how many community members out of 10, averaging over men and women, think that the community would speak to or pressure the families if they found out that a very young girl was about to be married. Stars indicate: * 1 percent ** 5 percent * 10 percent level of significance.

Table 2 reports baseline gender differences in preferences for compliance with community age-of-marriage norms of parents of girl adolescents (upper panel), and their beliefs about actions of the community in response to an early marriage of a girl (lower panel). Mothers have a stronger preference for complying with

community age-of-marriage norms: significantly more mothers than fathers report considering traditions, community opinions and family customs when deciding on the marriage age of their daughter and agree that marriages should not happen if the community disapproves. Mothers also expect community members to be more accepting of early marriage than fathers. Mothers are more likely than fathers to expect community members to do nothing, and also believe that fewer community members would expect the community to tell the police or pressure the families when a girl is married at a young age.

Further details of pre-determined respondent characteristics for the sample of households with adolescent girls are provided in Table C2 in Appendix C. Cassidy et al. (2024) show that (i) pre-specified village- and household-level variables were well-balanced across treatment arms and the control group, and (ii) that the average attrition rates in the control group are low (5.3% for fathers, 1.2% for mothers, and 0.7% for households at midline; 13% for fathers, 6% for mothers, and 4.6% for households at endline) with no evidence for differential attrition between experimental arms.

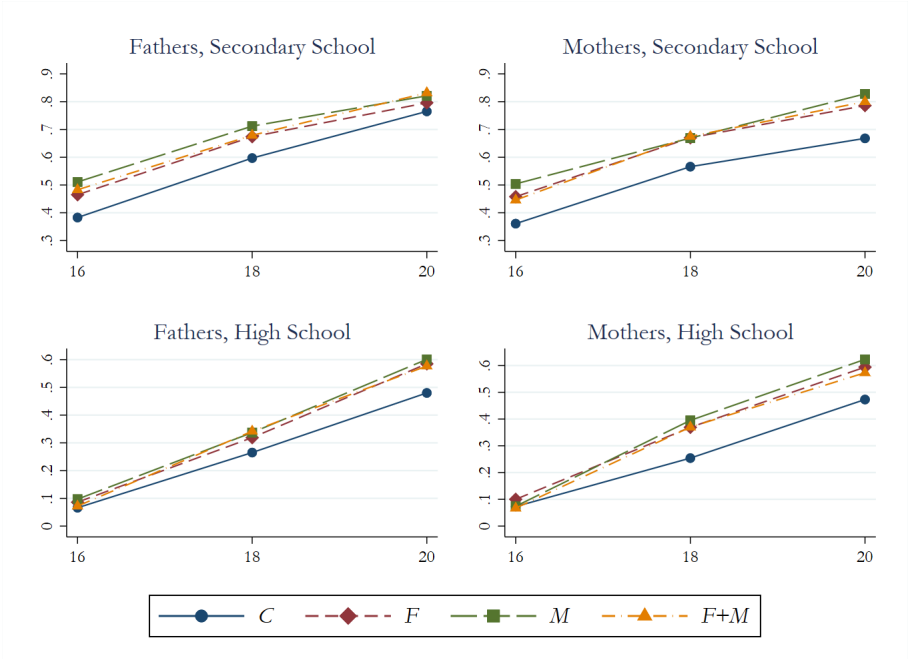
5 Results: Belief updating

We first consider parents' belief updating in response to the intervention and test our Bayesian persuasion model's predictions. The intervention distinctly stressed the educational attainment of the daughter's prospective spouse as a key potential benefit to marriage delay (see Section 3.1). Empirically, we measure parents' beliefs in terms of their expectations that the future spouse will have at least completed secondary education (grade 10 or above) or high school education (grade 12 or above), conditional on the adolescent girl marrying at age 16, 18, or 20.

Figure 1 shows the expectations of fathers and mothers, at midline, by treatment group and for the control group. A key empirical feature highlighted by the figure is that both parents' beliefs about the daughter's future spouse's education are monotonically increasing in age of marriage over the range considered, for both education levels. This highlights that, in line with our framework, parents perceive

a benefit – in terms of the quality of the spouse – to delaying marriage up to and beyond the threshold age for child marriage. The fact that this monotonicity is present also in the control group indicates that the intervention reinforced, rather than induced, parents' beliefs about a positive relationship. Based on Figure 1, there is no evidence to suggest that, in our context, parents perceive that delaying marriage until the threshold age for child marriage would worsen the educational attainment of the daughter's future spouse.[15]

Figure 1: Parental beliefs about spouse educational attainment by age of marriage.



Notes: The figure shows the estimated proportion of parents who state, at midline, that they expect that the future spouse of their daughter will have at least completed secondary school (upper panels) – Grade 10 and above – or high school (lower panels) – Grade 12 and above – conditional on marrying at age 16, 18 or 20, and by treatment arm. The solid blue line in each panel represents the mean expectation in the control group (C) by the potential marriage age and the potential education level of the future spouse, and for fathers (left panels) and mothers (right panels). For the three treatment arms (*Female*, *Male* and *Female+Male*), the figure adds the estimated marginal treatment effects by treatment arm to the control group means. The control group means and estimated marginal treatment effects are presented, by potential age of marriage, in Tables 3, C4 and C6. For further details of the estimation of the marginal treatment effects, see the notes to these tables.

Turning to testable implications, our framework asserts that parents may receive information about a key factor relevant to their decision. They are then

[15] Existing models of child marriage generally assume a perceived deterioration of expected groom quality after a certain age of marriage (see e.g. Buchmann et al., 2023; Wahhaj, 2018). Adams and Andrew (2025) provide empirical support for this pattern in another context, showing that in Rajasthan, India, parents' beliefs about groom quality in terms of employment deteriorate with age quickly after a girl leaves school. In our context, however, 55% of the unmarried girls in the sample have already left school at baseline, even at the young age of 13, suggesting that marriage and schooling of girls are not tightly connected decisions in our setting. Indeed, the gap between school-leaving age and age of marriage is two years or less for only 16% of girls in our sample.

predicted to update their beliefs the same whenever directly informed, whether informed alone or informed jointly (see Table 1). In contrast, there are no robust predictions for how the belief updating by a parent who is only indirectly informed via their spouse compares to how their beliefs would have been updated had they been directly informed themselves – the belief updating by an indirectly informed parent will depend on their privately informed partner's disclosure strategy, making the indirectly informed parent's belief updates potentially biased in either direction.

Figure 1 illustrates that the parents generally have low expectations that the daughter's future spouse will have completed high school if she marries at age 16 and the intervention has little to no impact on this particular belief. All other beliefs are – based on the observed cell means – consistently positively affected by each treatment arm.[16] For the formal statistical testing, our preferred empirical specification, as pre-specified, is

$$Y_{ivs} = \alpha + \eta T_v + \rho T_v G_{ivs} + \theta G_{ivs} + \delta_s + \varepsilon_{ivs}, \tag{16}$$

where Y_{ivs} is the outcome variable of interest for individual i in village v and randomization strata s at midline or at endline.[17] T_v is a vector of indicators for the assignment of the village to each of the three treatment arms: the *Female*, *Male* and *Female+Male* intervention arms. G_{ivs} is a dummy that is equal to one if the gender of the adolescent child in the household is a girl. The vector of estimated coefficients η, therefore, represent the intent-to-treat (ITT) effects on households with an adolescent boy, and $\eta + \rho$ represents the ITT effects on households with an adolescent girl.[18] Given our focus on decisions about daughters' marriages, we will report marginal treatment effects on households with an adolescent girl, $\eta + \rho$. Dummies δ_s for randomization strata based on Mahalanobis distance matching on baseline village-level characteristics per province are included when possible.

[16] To preserve visibility, Figure 1 does not include any confidence intervals. The regression analysis below provides the formal statistical tests for the treatment effects.

[17] We continue to use specification (16) throughout this paper, unless stated otherwise. We estimate equation (16) as logit regressions for binary outcome variables (e.g., experience of any type of IPV) and as OLS regressions for continuous variables (e.g., the number of situations where the respondent finds it justified if a husband hits or beats his wife).

[18] Estimated effects are ITT effects, since not all targeted individuals and households in treatment villages were always able to attend the intervention.

Standard errors are clustered at village level, which is the level of randomization.

For convenience, all results tables in the current and following sections (Sections 6 and 7) will follow a common structure of presenting *estimated treatment effects* in an upper panel and *tests of implications* from the Bayesian persuasion framework in a lower panel.

Columns (1) to (4) in the upper panel of Table 3 thus report ITT effects, at midline, on the beliefs of fathers and mothers of girl adolescents about the future spouse's educational attainment if their daughter marries at age 18. p-values for two-sided tests for any difference in beliefs compared to the no-intervention control group are reported, along with p-values for one-sided tests for positive effects. For comparison, in the control group, 60% of fathers and 57% of mothers expect their daughter to marry a future spouse with secondary education if she were to marry at age 18 and the corresponding control group expectations for the spouse to have a high school education are 27% and 25% for fathers and mothers respectively.

The beliefs of both fathers and mothers about the future spouse having either secondary or high school education are increased relative to the control group, regardless of who is targeted in the intervention. Indeed, all one-sided tests for positive effects are statistically significant (at 10% or higher), except for fathers' beliefs in relation to high school in the *Female* arm. Table C6 in Appendix C presents corresponding results for parents' beliefs if the daughter marries at 20 and similarly confirm consistently positive treatment effects on parents' beliefs (columns 1 to 4).[19] These results thus overall confirm that the intervention positively impacted parents' beliefs about the educational attainment of their daughter's future spouse if marrying at or beyond the threshold age for child marriage.[20]

[19] We report ITT effects conditional on marriage at 16 in Tables C4, and in Appendix C.

[20] In Tables C3, C5 and C7 in Appendix C, we also include sharpened q-values correcting for false discovery rate using the Benjamini-Hochberg procedure (Benjamini and Hochberg, 1995; Anderson, 2008) and show that the results are robust.

Table 3: Belief updating on spousal quality if daughter marries at age 18

	Marriage at age 18				Marriage delay return age 16 to 18			
	Secondary School		High School		Secondary School		High School	
	Father	Mother	Father	Mother	Father	Mother	Father	Mother
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female vs. Control	0.077	0.104	0.054	0.115	-0.005	0.006	0.031	0.092
p-val $F \neq C$	(0.111)	(0.063) *	(0.284)	(0.034) **	(0.908)	(0.887)	(0.470)	(0.059) *
	[0.130]	[0.092] *	[0.289]	[0.049] **	[0.922]	[0.878]	[0.496]	[0.057] *
p-val $F > C$	(0.056) *	(0.032) **	(0.142)	(0.017) **	(0.546)	(0.444)	(0.235)	(0.030) **
	[0.066] *	[0.048] **	[0.137]	[0.023] **	[0.536]	[0.445]	[0.232]	[0.027] **
Male vs. Control	0.115	0.103	0.072	0.141	-0.012	-0.041	0.038	0.142
p-val $M \neq C$	(0.019) **	(0.068) *	(0.152)	(0.010) ***	(0.778)	(0.289)	(0.397)	(0.002) ***
	[0.030] **	[0.073] *	[0.220]	[0.021] **	[0.812]	[0.296]	[0.451]	[0.005] ***
p-val $M > C$	(0.010) **	(0.034) **	(0.076) *	(0.005) ***	(0.611)	(0.855)	(0.199)	(0.001) ***
	[0.021] **	[0.029] **	[0.116]	[0.009] ***	[0.614]	[0.847]	[0.218]	[0.003] ***
Female+Male vs. Control	0.082	0.109	0.077	0.116	-0.018	0.024	0.070	0.123
p-val $F{+}M \neq C$	(0.082) *	(0.053) *	(0.124)	(0.031) **	(0.644)	(0.567)	(0.097) *	(0.009) ***
	[0.089] *	[0.063] *	[0.163]	[0.043] **	[0.699]	[0.587]	[0.104]	[0.025] **
p-val $F{+}M > C$	(0.041) **	(0.027) **	(0.062) *	(0.015) **	(0.678)	(0.284)	(0.049) **	(0.005) ***
	[0.043] **	[0.025] **	[0.086] *	[0.020] **	[0.595]	[0.257]	[0.048] **	[0.010] **
Female+Male vs. Male	-0.033		0.005		-0.006		0.032	
p-val $F{+}M \neq M$	(0.481)		(0.923)		(0.870)		(0.486)	
	[0.522]		[0.935]		[0.859]		[0.525]	
Female+Male vs. Female		0.005		0.001		0.017		0.031
p-val $F{+}M \neq F$		(0.928)		(0.984)		(0.667)		(0.547)
		[0.935]		[0.993]		[0.674]		[0.615]
Observations	769	814	769	814	769	814	769	814
Control Mean	0.597	0.566	0.265	0.254	0.214	0.205	0.199	0.180

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16). In Column 1-4, the dependent variable takes on value one if the respondent - father (columns 1 and 3) or mother (columns 2 and 4) - states that they expect that the future spouse of their daughter will have at least completed secondary (columns 1 and 2) – Grade 10 and above – or high school (columns 3 and 4) – Grade 12 and above – if she is married at 18 at midline. In Column 5-8, the dependent variable is the difference of the indicator that the father (column 5 and 7) or mother (column 6 and 8) expects that their daughter's future spouse will have at least completed secondary (columns 5 and 6) or high school (columns 7 and 8) if she is married at age 18 compared to age 16. In our sample, there are no respondents that expect the spouse's education level to be lower when marriage is delayed from age 16 to 20. Therefore, the dependent variable takes on either value 1, if expectations about the spouse's education improved, or 0 if the expectations stayed the same. This allows us to estimate this in a logit regression. Regressions include fixed effects for randomization strata. In parentheses, p-values from standard errors clustered at the village level (unit of randomization) and one-sided p-values in accordance with the model predictions are reported. Corresponding p-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation. The row "control mean" indicates the percentage in the control group stating the above expectation.

Increased expectations about the spouse's educational attainment however only imply increased perceived returns to marriage delay if positively related to marriage age. Columns (5) to (8) in Table 3 therefore report ITT effects on the difference in each parents' belief conditional on marriage age 18 compared to age 16. Estimated treatment effects on the parents' perceived benefit to delaying marriage until age 18 in terms of the future spouse having secondary school education (columns 5 and 6) are generally small, not consistently positive, and not statistically significant, reflecting the largely uniform increases shown in the upper panels

of Figure 1. Estimated treatment effects on perceived benefits of delaying marriage until age 18 in terms of the future spouse having high school education (columns 7 and 8) on the other hand are consistently positive and sizeable. Compared to the control group, the perceived benefit to delaying marriage until age 18 increases by 15-35% among fathers and 50-80% among mothers. The positive effects are statistically significant (at 5% or higher) in all treatment arms for mothers and in the joint *Female+Male* treatment arm for fathers. Columns (5) to (8) in Table C6 show that the treatment effects on parents' perceived benefits to a longer marriage delay (from age 16 to 20) show a very similar pattern as for the shorter delay (from age 16 to 18), with positive and statistically significant impacts specifically on the perceived returns in terms of the future spouse having high school education.

The lower panel in Table 3 reports tests of the Bayesian persuasion model's prediction that parents update beliefs the same when directly informed alone as when directly informed jointly (see Table 1). Specifically, for each education level – secondary school and high school – we compare fathers' beliefs in the *Male* arm and in the *Female+Male* arm and, similarly, we compare mothers' beliefs in the *Female* arm and in the *Female+Male* arm. We observe no statistically significant differences in any of the four tests (columns 1 to 4). The same tests apply to the belief updating on delay benefits (columns 5 to 8) and, again, are not rejected.[21]

In Table 4, we consider heterogeneity in the ITT effects on parents' beliefs by whether the father and mother have a relatively *low* or *high* difference in preferences for norm compliance at baseline. We focus here specifically on beliefs about the future spouse having high school education.[22] Columns (1) to (4) again report the estimated impact on parents' beliefs conditional on the daughter marrying at age 18.[23] In line with the findings reported in Table 3, we find that the estimated coefficients are consistently positive. However, the splitting of the sample also means that we lose precision and only half of the one-sided test for positive effects are statistically significant (at 10% or higher). Columns (5) to (8) report estimated treatment effect on the parents' perceived benefit to delaying marriage to age 18

[21] Table C4 and C6 show that the same holds for beliefs at marriage ages 16 and 20.
[22] Table C8 in Appendix C gives the corresponding results for beliefs about secondary school education.
[23] Table C9 in Appendix C gives the corresponding results for beliefs conditional on marriage age 20.

from age 16. Again, we find the estimated effects to be consistently positive but, due to lower precision, only statistically significant in half of the cases.[24]

Table 4: Heterogeneous belief updating by spousal difference in preferences

	Marriage at age 18				Marriage delay return age 16 to 18			
	Father's beliefs		Mother's beliefs		Father's beliefs		Mother's beliefs	
	Low	High	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female vs. Control	0.054	0.058	0.102	0.141	0.031	0.033	0.106	0.068
p-val $F \neq C$	(0.344)	(0.440)	(0.117)	(0.072) *	(0.582)	(0.578)	(0.082) *	(0.284)
	[0.399]	[0.465]	[0.142]	[0.092] *	[0.631]	[0.582]	[0.092] *	[0.306]
p-val $F > C$	(0.172)	(0.220)	(0.059) *	(0.036) **	(0.291)	(0.289)	(0.041) **	(0.142)
	[0.187]	[0.224]	[0.069] *	[0.046] **	[0.298]	[0.285]	[0.045] **	[0.143]
p-val high $\neq$ *low*		<0.968>		<0.676>		<0.982>		<0.639>
Male vs. Control	0.079	0.065	0.074	0.242	0.043	0.032	0.081	0.232
p-val $M \neq C$	(0.198)	(0.375)	(0.270)	(0.000) ***	(0.428)	(0.637)	(0.146)	(0.000) ***
	[0.259]	[0.434]	[0.297]	[0.000] ***	[0.450]	[0.664]	[0.163]	[0.001] ***
p-val $M > C$	(0.099) *	(0.188)	(0.135)	(0.000) ***	(0.214)	(0.318)	(0.073) *	(0.000) ***
	[0.114]	[0.249]	[0.137]	[0.000] ***	[0.205]	[0.368]	[0.080] *	[0.001] ***
p-val high $\neq$ *low*		<0.876>		<0.054>*		<0.899>		<0.055>*
Female+Male vs. Control	0.049	0.126	0.079	0.184	0.040	0.117	0.102	0.170
p-val $F{+}M \neq C$	(0.419)	(0.080) *	(0.227)	(0.012) **	(0.452)	(0.052) *	(0.083) *	(0.012) **
	[0.445]	[0.107]	[0.267]	[0.023] **	[0.448]	[0.055] *	[0.113]	[0.023] **
p-val $F{+}M > C$	(0.209)	(0.040) **	(0.114)	(0.006) ***	(0.226)	(0.026) **	(0.042) **	(0.006) ***
	[0.195]	[0.068] *	[0.141]	[0.010] **	[0.177]	[0.035] **	[0.060] *	[0.011] **
p-val high $\neq$ *low*		<0.384>		<0.256>		<0.333>		<0.430>
Female+Male vs. Male	-0.030	0.061			-0.003	0.085		
p-val $F{+}M \neq M$	(0.641)	(0.422)			(0.952)	(0.241)		
	[0.662]	[0.439]			[0.960]	[0.284]		
Female+Male vs. Female			-0.022	0.043			-0.004	0.102
p-val $F{+}M \neq F$			(0.724)	(0.583)			(0.953)	(0.135)
			[0.761]	[0.601]			[0.951]	[0.151]
p-val joint relevance of recipient	0.882	0.617	0.902	0.382	0.978	0.361	0.906	0.034**
Observations	453	316	494	320	453	316	494	320
Control Mean	0.248	0.291	0.307	0.167	0.188	0.215	0.220	0.115

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents from logit regressions, separately for households where parents have below median (*low*, columns 1, 3, 5 and 7) or above median (*high*, columns 2, 4, 6 and 8) differences in preferences for norm compliance. In Column 1-4, the dependent variable takes on value one if the respondent - father (columns 1 and 2) or mother (columns 3 and 4) - states that they expect that the future spouse of their daughter will have at least completed high school if she is married at 18 at midline. In Column 5-8, the dependent variable is the difference of the indicator that the father (column 5 and 6) or mother (column 7 and 8) expects that their daughter's future spouse will have at least completed high school if she is married at age 18 compared to age 16. In our sample, there are no respondents that expect the spouse's education level to be lower when marriage is delayed from age 16 to 18. Therefore, the dependent variable takes on either value 1, if expectations about the spouse's education improved, or 0 if the expectations stayed the same. This allows us to estimate this in a logit regression. We indicate parents as having *low* differences in preferences when the number (out of 6) of questions about own norm compliance attitudes in Table 2 they answer differently at baseline (for Punjab Province we take parents' answers at midline), is below or equal to the median, and as having *high* differences in preferences when it is above the median. Regressions include fixed effects for randomization strata. *p*-values from standard errors clustered at the village level (unit of randomization) are reported in parentheses. Corresponding *p*-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "p-val joint relevance of recipient" indicates the p-value of the joint Wald test that the estimated marginal treatment effect in the *Female*, *Male* and *Female+Male* arm are all equal. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for. The row "control mean" indicates the percentage in the control group stating the above expectation.

As outlined in Section 2 we expect persuasion by privately informed spouses – that is, by fathers in the *Male* arm and and by mothers in the *Female* arm – to be

[24] The lower panel of Table 4 also reports tests of the model prediction that belief updating should be the same when directly informed alone as when directly informed jointly and show that these tests are not rejected.

most pervasive in couples who have relatively larger differences in preferences. In contrast, couples with relatively smaller differences in preferences are predicted to disclose information truthfully to each other. As a result, the testable prediction from the model is that treatment effects should be invariant to the identity of the information recipient – that is, equal across the three treatment arms – among couples with low preference differences. In contrast, such invariance would not be implied by the model to hold among couples with large preference differences.

Tests of equality of effects across treatment arms are presented in the lower panel of Table 4. Consistent with model predictions the tests are never rejected among couples with low preference differences (with p-values at 0.88 or higher). In contrast, for couples with high preference differences invariance to information recipient is rejected for mothers' perceived benefit to marriage delay (p-value<0.05).

This reflects that mothers appear to update their beliefs strongly in the *Male* arm, that is, when fathers are privately informed, consistent with fathers using persuasion towards delaying marriage by exaggerating potential benefits. Fathers, even in couples with high differences in preference, update their beliefs fairly similarly across the three treatment arms, suggesting that mothers engage less in strategic communication, possibly due to a higher cost of lying.

6 Results: IPV impacts

In this section we consider IPV incidence. The main prediction to be tested is that, when comparing across possible information recipients, IPV incidence should be the highest when spouses are jointly informed (in the *Female+Male* arm), leaving no scope for persuasion. In contrast, IPV incidence should be no higher when either fathers or mothers are privately informed (in the *Male* and the *Female* arm, respectively) and can use persuasion to forge agreement (see Table 1).

Table 5 presents ITT effects on the likelihood that mothers of adolescent girls experienced physical IPV in the three months prior to the midline or endline survey, obtained from estimating (16) as a logit. For comparison, in the control group (as previously shown in Table C1), 2.4% and 2.5% of women experienced physical

IPV in the three months prior to the midline and endline survey respectively. The upper panel of Table 5 presents estimated effects relative to the control group. As a reminder, there are no unambiguous predictions for the comparison of IPV incidence between any of the treatment arms and the control arm as new information received by either spouse or both can resolve disagreements in some households while, at the same time, induce disagreements in others. For this reason, we present p-values for two-sided tests of any potential treatment effects. Indeed, we find no significant impact on IPV incidence relative to the control group, regardless of who is targeted in the intervention.

Table 5: Treatment effects on incidence of physical IPV

	Midline	Endline
	(1)	(2)
Female vs. Control	0.014	0.004
p-val $F \neq C$	(0.556)	(0.809)
	[0.595]	[0.861]
Male vs. Control	-0.008	-0.014
p-val $M \neq C$	(0.582)	(0.341)
	[0.735]	[0.382]
Female+Male vs. Control	0.028	0.021
p-val $F{+}M \neq C$	(0.219)	(0.297)
	[0.281]	[0.218]
Female+Male vs. Male	0.036	0.035
p-val $F{+}M > M$	(0.043) **	(0.021) **
	[0.051]*	[0.033]**
Female+Male vs. Female	0.014	0.016
p-val $F{+}M > F$	(0.311)	(0.210)
	[0.359]	[0.211]
Observations	816	775
Control Mean	0.024	0.025

Notes: The table reports post-estimated marginal treatment effects for mothers of girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16). The dependent variables takes on value one if the mother experienced any type of physical IPV in the three months prior to the midline survey (column 1), or endline survey (column 2), perpetrated by their husband. A detailed overview of the survey questions that ask women about IPV experiences can be found in Table B1 in Appendix B. Standard errors are clustered at the village level, which is our level of randomization. Two-sided p-values and one-sided p-values in accordance with the model predictions are reported in parentheses. Corresponding p-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Dummies for randomization strata are excluded due to strata perfect prediction of the outcome variable. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation. The row "control mean" indicates the percentage of women in the control group that report to have experienced physical IPV in the last 3 months.

The lower panel of Table 5 presents tests of the model's predictions, comparing the *Female+Male* arm to the *Male* and *Female* arms. In line with the predictions, we observe the highest likelihood of physical IPV when men and women are jointly

targeted. At midline, the observed IPV incidence rate in the *Female+Male* arm is 3.6 percentage points higher than in the *Male* arm, and 1.4 percentage points higher than in the *Female* arm. The former difference is statistically significant (p-value<0.05) in the relevant one-sided test. The corresponding differences at endline are 3.5 and 1.6 percentage points respectively, where again the former difference is statistically significant. The results in Table 5 thus confirm the prediction that IPV incidence is lower when fathers are privately informed compared to when both parents are informed. Whilst the corresponding comparison between the *Female+Male* arm and the *Female* arm has the predicted positive sign, we cannot reject the null hypothesis of equality. This is consistent with the findings in Section 5 that suggest that fathers engage more in persuasion than mothers, possibly due to gender differences in the cost of lying.[25]

Table 6 presents heterogeneous ITT effects of IPV incidence. As noted, we expect persuasion to be most pervasive in households where the spouses have larger differences in baseline preferences (see Section 2). In contrast, spouses with more aligned preferences are expected to communicate truthfully to each other, making their outcomes invariant to the identity of the information recipient. Hence the testable model prediction is that, for couples with low differences in preferences, the treatment effects across the treatment arms should be the same. In contrast, such invariance with respect to who is being targeted in the information intervention is not implied to hold for couples with more divergent preferences. Stated differently, the elevated risk of IPV in the *Female+Male* arm compared to the *Female* and *Male* arms should only occur among couples with larger preference differences. The lower panel of Table 6, columns (1) and (3), confirm that, for couples with low preference differences, the effect on IPV is not statistically different between the *Female+Male* arm and the *Female* and *Male* arms, respectively, neither at midline nor at endline.

[25] Table C10 in Appendix C reports corresponding ITT effects on the incidence of emotional IPV.

Table 6: Heterogeneous treatment effects on physical IPV by spousal difference in preferences

	Midline		Endline	
	Low	High	Low	High
	(1)	(2)	(3)	(4)
Female vs. Control	0.024	-0.001	-0.016	0.037
p-val $F \neq C$	(0.295)	(0.971)	(0.472)	(0.178)
	[0.281]	[0.919]	[0.499]	[0.233]
p-val high $\neq$ *low*		<0.472>		<0.112>
Male vs. Control	0.003	-0.026	-0.013	-0.013
p-val $M \neq C$	(0.864)	(0.382)	(0.596)	(0.318)
	[0.632]	[0.360]	[0.666]	[0.437]
p-val high $\neq$ *low*		<0.406>		<0.976>
Female+Male vs. Control	0.029	0.026	-0.007	0.065
p-val $F{+}M \neq C$	(0.248)	(0.475)	(0.768)	(0.044) **
	[0.318]	[0.522]	[0.839]	[0.035] **
p-val high $\neq$ *low*		<0.935>		<0.066>*
Female+Male vs. Male	0.027	0.052	0.005	0.078
p-val $F{+}M > M$	(0.157)	(0.033) **	(0.392)	(0.004) ***
	[0.202]	[0.031] **	[0.546]	[0.003] ***
Female+Male vs. Female	0.006	0.028	0.009	0.028
p-val $F{+}M > F$	(0.425)	(0.227)	(0.312)	(0.228)
	[0.471]	[0.205]	[0.369]	[0.202]
p-val joint relevance of recipient	0.495	0.166	0.886	0.003***
Observations	496	320	463	312
Control Mean	0.016	0.038	0.033	0.013

Notes: The table reports marginal treatment effects on physical IPV from OLS regressions, for mothers of girl adolescents, separately for households where parents have below median (*low*, columns 1 and 3) or above median (*high*, columns 2 and 4) differences in preferences for norm compliance. The dependent variables takes on value one if the mother experienced any type of physical IPV in the three months prior to the midline survey (columns 1 and 2), or endline survey (columns 3 and 4), perpetrated by their husband. A detailed overview of the survey questions that ask women about IPV experiences can be found in Table B1 in Appendix B. The variable indicating differences in norm compliance preferences between spouses is the number (out of 6) of questions about own norm compliance attitudes, as presented in Table 2, in which parents differ in their answer at baseline. For Punjab Province, where the baseline survey could not be conducted, we take parents' answers at midline. We indicate parents as having *low* differences in preferences when the number of these variables they answer differently is below or equal to the median, and as having *high* differences in preferences when it is above the median. Standard errors are clustered at the village level, which is our level of randomization. Two-sided p-values and one-sided p-values in accordance with the model predictions are reported in parentheses. Corresponding p-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. In angle brackets in columns (2) and (4) in the top panel, we indicate the p-value for the difference in point estimates of the sample of households with *low* and *high* differences in preferences. Dummies for randomization strata are excluded due to strata perfect prediction of the outcome variable. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "p-val joint relevance of recipient" indicates the p-value of the joint Wald test that the estimated marginal treatment effect in the *Female*, *Male* and *Female+Male* arm are all equal. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for. The row "control mean" indicates the percentage of women in the control group that report to have experienced physical IPV in the last 3 months.

In contrast, columns (2) and (4) show that, among couples with large differences in preferences, IPV incidence is significantly higher in the *Female+Male* arm than in the *Male* arm, at both midline and endline. The point estimates also indicate higher IPV incidence in the *Female+Male* compared to the *Female*

arm, indeed sizeably so, but the estimates are not precise enough to establish statistical significance at either survey point. The differences imply that a test of invariance to information recipient – that is, equality of the three treatment effects in the top panel – is rejected among couples with large preference differences at endline (p-value<0.01). In general the estimates suggest that, in line with the predictions from the Bayesian persuasion framework, it matters for IPV incidence who receives information. Specifically, the findings indicate that IPV risk is elevated when both parents jointly receive information, especially compared to when fathers are informed alone, and particularly in couples with more misaligned preferences.

In Appendix B, we present a set of robustness checks to mitigate concerns for reporting bias arising from changes in women's attitudes towards IPV, and conclude that it is unlikely that reporting bias explains our IPV results.

7 Results: Child marriage impacts

Finally, we consider the decision outcome – the timing of the daughter's marriage – and we will outline here some key results published in this paper's companion paper (Cassidy et al., 2024). Based on our findings on beliefs in Section 5, we would expect the intervention to reduce child marriages by delaying some girls' marriages. However, in Section 4.1 we also observed systematic gender-variation in attitudes towards adherence to community age-of-marriage norms, consistent with our Assumption 3 that was key to why the identity of the information recipient matters. Hence the key predictions that we test here (see Table 1) are that: (i) when fathers are targeted alone (*Male* arm) child marriages should reduce *no less* than when fathers and mothers are targeted jointly (*Female+Male* arm) and, conversely, (ii) when mothers are targeted alone (*Female* arm) child marriages should reduce *no more* than when fathers and mothers are targeted jointly (*Female+Male* arm), with some inequality being strict.

We present estimates for the average annual hazard for entry into child marriage using a discrete approximation of a censored duration model as developed

in Cassidy et al. (2024).[26] The probability of adolescent i, with baseline age k, treatment v, and strata s, entering child marriage at age t, indicated by Y_{itvks}, is specified as,

$$Y_{itvks} = \beta T_v + \phi_t + \gamma_k + \delta_s + \epsilon_{iktvs}. \tag{17}$$

T_v is a vector of treatment arm dummies and β is our coefficients of interest, representing the ITT effects on the average annual hazard rate of child marriage. δ_s are fixed effects for randomization strata, ϕ_t is a vector of age fixed effects accounting for the different probability of marriage at at-risk ages $\{13, 14..., 17\}$, and γ_k are fixed effects for girls' baseline age to account for cohort effects. We estimate equation (17) using OLS with standard errors robust to village-level heteroskedasticity, as this was the level of randomization.

Table 7 presents estimated treatment effects up to midline and endline. Columns (1) and (2) present estimations from equation (17) where observations beyond the censoring point are coded as missing, our preferred specification. We also present results from an alternative specification in columns (3) and (4), where censored observations that are still at risk of being child married are coded as the cohort-specific, age-specific, and treatment arm-specific probability of marriage between their current age and below the age 18 threshold. In columns (5) and (6) we present estimated marginal effects from a pre-specified specification where the outcome for each adolescent is a single indicator for child marriage.[27] In the control group, the average annual hazard rate of child marriage for girls is 2.9 percent per year by midline and 4.2 percent per year by endline. Columns (5) and (6) shows that 6 percent and 12 percent of girls are child married in the control group at midline and endline, respectively.

The upper panel of Table 7 presents estimates of the impact of the intervention relative to the control group. To check specifically if it reduced the probability of early marriages we include one-sided tests alongside the two-sided tests for any

[26] Corno et al. (2020) use a similar estimation strategy for the annual hazard rate into child marriage.

[27] The main difference between the preferred specification in equation (17) and the pre-specified logit is how censored data are accounted for. A limitation of the pre-specified logit is that it codes all adolescents who are under 18 and unmarried at the time of the survey as "not child married", thereby not accounting for the continued risk through to age 18.

effect. The annual child marriage hazard rate is reduced in the *Male arm*, with the estimated effects being statistically significant both at midline and endline.

Table 7: Treatment effects on probability of child marriage

	Annual Hazard Rate		Annual Hazard Rate		Logit Probability	
	Preferred		*Alternative*		*Pre-specified*	
	Midline	Endline	Midline	Endline	Midline	Endline
	(1)	(2)	(3)	(4)	(5)	(6)
Female vs. Control	0.004	-0.013	0.021	-0.011	0.013	-0.025
p-val $F \neq C$	(0.721)	(0.280)	(0.004) ***	(0.238)	(0.671)	(0.493)
	[0.767]	[0.341]	[0.003] ***	[0.294]	[0.705]	[0.550]
p-val $F < C$	(0.639)	(0.140)	(0.998)	(0.119)	(0.665)	(0.247)
	[0.603]	[0.159]	[1.000]	[0.141]	[0.665]	[0.285]
Male vs. Control	-0.018	-0.017	-0.030	-0.019	-0.041	-0.053
p-val $M \neq C$	(0.036) **	(0.107)	(0.000) ***	(0.024) **	(0.027) **	(0.083) *
	[0.048] **	[0.150]	[0.000] ***	[0.046] **	[0.048] **	[0.131]
p-val $M < C$	(0.018) **	(0.054) *	(0.000) ***	(0.012) **	(0.014) **	(0.042) **
	[0.020] **	[0.065] *	[0.000] ***	[0.012] **	[0.012] **	[0.046] **
Female+Male vs. Control	-0.007	-0.017	-0.011	-0.024	-0.015	-0.052
p-val $F{+}M \neq C$	(0.440)	(0.105)	(0.049) **	(0.004) ***	(0.498)	(0.081) *
	[0.461]	[0.119]	[0.060] *	[0.010] **	[0.488]	[0.092] *
p-val $F{+}M < C$	(0.220)	(0.052) *	(0.024) **	(0.002) ***	(0.249)	(0.041) **
	[0.221]	[0.060] *	[0.031] **	[0.004] ***	[0.241]	[0.045] **
Female vs. Male	0.022	0.004	0.051	0.008	0.054	0.028
p-val $F > M$	(0.016) **	(0.346)	(0.000) ***	(0.157)	(0.028) **	(0.204)
	[0.029] **	[0.374]	[0.000] ***	[0.191]	[0.045] **	[0.250]
Female+Male vs. Male	0.011	0.000	0.019	-0.005	0.026	0.002
p-val $F{+}M > M$	(0.094) *	(0.498)	(0.000) ***	(0.768)	(0.069) *	(0.474)
	[0.069] *	[0.446]	[0.069] *	[0.446]	[0.069] *	[0.446]
Female+Male vs. Female	-0.012	-0.004	-0.032	-0.013	-0.028	-0.026
p-val $F{+}M < F$	(0.162)	(0.347)	(0.000) ***	(0.048) **	(0.180)	(0.212)
	[0.180]	[0.377]	[0.000] ***	[0.059] *	[0.194]	[0.258]
Observations	1,641	2,159	2,990	2,843	828	798
Control Mean	0.029	0.042	0.044	0.053	0.062	0.123

Notes: The table presents treatment effects on the probability of child marriage for girl adolescents from our sample households. Marriage outcomes are as reported by the adolescent themselves, as pre-specified. Reported are estimations for midline and endline. Columns (1) to (2) reports estimated effects on the average hazard rate for entry into child marriage, using a discrete approximation of a censored duration model, estimated from equation (17). Data is an adolescent-year panel, where each adolescent contributes one observation for each post-baseline at-risk year, that is, between 13 and 17. The dependent variable is a binary variable. For a girl who marries by the time of the survey (and under the age of 18), the dependent variable is coded as unity in the year of marriage, and she then exits the data. A girl who reaches the age of 18 unmarried by the time of the survey also exits the data. A girl who is unmarried by the time to survey but still under age 18 is right censored in the preferred specification. Columns (3) to (4) reports an alternative specification where censored observations are coded as the cohort-specific, age-specific, and treatment arm-specific probability of marriage between their current age and below the 18-year threshold. Fixed effects for each age at-risk of marriage, baseline age and randomization strata are included. Columns (5) to (6) reports post-estimated marginal treatment effects for girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16), with "child-marriage" as outcome variable – i.e a dummy variable that takes on the value of one if the adolescent is observed to marry below the age of 18 – for midline and endline respectively. One-sided p-values for marginal treatment effects in accordance with the model predictions are based on standard errors clustered at village level (unit of randomization), and are indicated in parentheses. Corresponding p-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" indicates the average annual probability of child marriage – over cohorts (columns 1 to 4) – in the control group.

In our preferred specification there is a 1.8 percentage points reduction in

the average annual probability of child marriage by midline (p-value<0.05 in the one-sided test) while at endline – 18 months after the interventions – there is a 1.7 percentage points reduction (p-value<0.1 in the one-sided test). The point estimates for the impact on the average annual probability of child marriage in the *Female+Male arm* are also negative, but only significant at endline, indicating a 1.7 percentage points reduction (p-value<0.1 in the one-sided test). In contrast, for the *Female arm*, the estimates do not indicate any consistent child marriage hazard reducing effects.

The lower panel tests the hypothesis that the identity of the information recipient matters, specifically that the child marriage hazard should be the lowest in the *Male arm* and the highest in the *Female arm*, with the joint *Female+Male arm* being in-between. A difference between these two individually-targeted arms is confirmed at midline where we find that, in our preferred specification, the average annual probability of child marriage is 2.2 percentage points lower in the *Male arm* than in the *Female arm* (p-value<0.05 in the relevant one-sided tests). Similarly, the average annual child marriage hazard is also 1.1 percentage points lower in the *Male arm* compared to the *Female+Male arm* (p-value<0.10 in the relevant one-sided tests). In contrast, and in line with the model's prediction, the child marriage hazard is at point estimate 1.2 percentage points higher in the *Female arm* compared to the *Female+Male arm*, but the difference is not statistically significant. The estimated differences across treatment arms at endline are either effectively zero or have the expected sign. The differences are however generally smaller, more noisily estimated, and not statistically significant. The results from the pre-specified logit model in columns (5) and (6) are qualitatively similar.

8 Alternative explanations

In this section we consider alternative explanations for the IPV results following the provision of information, via the intervention, to fathers, mothers or both jointly. A first alternative explanation for increased IPV following the intervention is that IPV towards the mother is the result of backlash from the father, generated

by the mothers' participation in the intervention, which may threaten his male identity as a decision-maker about marriages. Since fathers are reported to be the final decision-maker in 79%-88% of households at baseline, they may plausibly use IPV as an instrument to reassert control. If backlash were driving our IPV results, however, we would specifically expect IPV to be high in the *Female* arm, as fathers are aware of the participation of mothers in the intervention, and they are excluded from participation in the *Female* arm. Table C12 shows that this is not the case.

A second alternative explanation is that fathers who received the intervention may use IPV instrumentally to force the marriage timing decision to align with their own preferences (i.e. towards marriage delay). If this were the case, however, we would expect child marriages delays to be equally likely in the *Male* and *Female+Male* arms (as her being informed in addition to him would not affect the decision outcome). The lower panel of Table 7 show that this is not the case.

Another alternative explanation for the higher IPV results in the *Female+Male* arm is that, by having both partners participate in the intervention, the mothers' participation in decision-making about marriage is increased. Table C12 shows that we see no such effects in the *Female+Male* arm.

A final alternative explanation, akin to the work presented in Lowe and McKelway (2021) is that when both spouses receive information jointly, both can veto the marriage delay decision, leading to increased IPV. This also implies, however, that we should see the lowest marriage delay in the *Female+Male* arm, as compared to the other treatment arms. We do not oberve this in Table 7.

9 Conclusion

We develop and test a model in which intimate partner violence arises from disagreements over household decisions, shaped by who holds private information and how it is shared. We leverage an RCT in rural Pakistan that varied whether men, women, or both parents were targeted in an edutainment intervention. Consistent with the model, belief updating is similar when directly informed alone or jointly,

IPV is higher when both are informed, and marriage delay is greatest when fathers are informed alone. These findings highlight the strategic role of intra-household communication in shaping both conflict and decision outcomes. Gender-targeted interventions can therefore have divergent and sometimes unintended effects, underscoring the need to account for household dynamics in program design.

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Supplemental Appendix

A Model Appendix

In this appendix we provide proofs of Claims 1 - 3 (Section A.1) and and further details on commitment A.2.

A.1 Proofs

To do so it is helpful to partition the set households J, based on their preference profile $\boldsymbol{\sigma}_j \equiv (\sigma_{1j}, \sigma_{2j})$, into preference classes.

Households with the same six-tuple of preferred options by spouse 1 and 2 at L, P and H, that is $\{d_{ij}(k)\}_{i=1,2}^{k=L,P,K}$, are said to belong to the same preference "class". Given Assumptions 1 and 3 there are ten possible preference classes, which we can denote by $C^0, ..., C^9$. For instance, $\boldsymbol{\sigma}_j \in C^0$ if $\sigma_{1j} > \underline{\sigma}(H)$ and $\sigma_{2j} > \underline{\sigma}(H)$ whereby both spouses prefer early marriage even at state H. The ten possible preference profile classes are displayed in Table A1 where, in each panel, row i details the preferred options for spouse $i = 1, 2$. The monotonicities in (5) are reflected in row- and column monotonicity respectively. Figure A1 illustrates the ten possible classes of preference profiles.

Table A1: Preference profiles classes

Class C^0		
L	P	H
0	0	0
0	0	0

Class C^1		
L	P	H
0	0	1
0	0	0

Class C^2		
L	P	H
0	1	1
0	0	0

Class C^3		
L	P	H
1	1	1
0	0	0

Class C^4		
L	P	H
0	0	1
0	0	1

Class C^5		
L	P	H
0	1	1
0	0	1

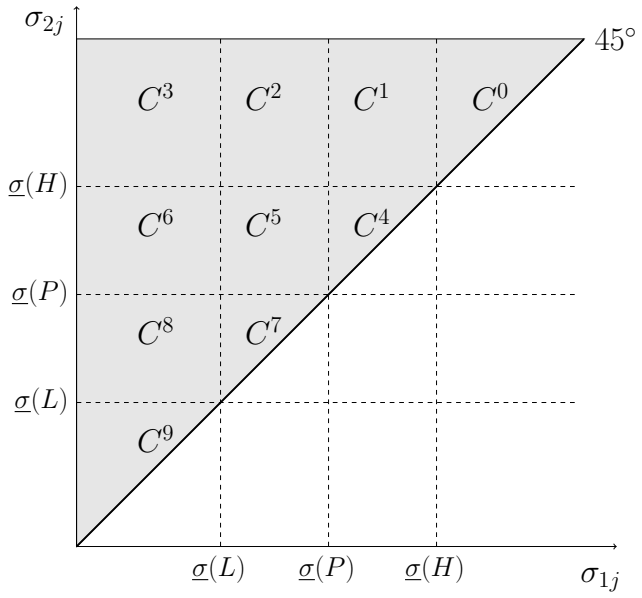
Class C^6		
L	P	H
1	1	1
0	0	1

Class C^7		
L	P	H
0	1	1
0	1	1

Class C^8		
L	P	H
1	1	1
0	1	1

Class C^9		
L	P	H
1	1	1
1	1	1

Figure A1: Preference profiles classes



Proof of Claim 1. Truthful reporting is privately optimal for each spouse when they *agree* on the course of action at each of the two possible states $s \in S$. Truthful reporting is also privately optimal when they *disagree* at both states. Hence truthful reporting will be privately optimal for *both* spouses at $\boldsymbol{\sigma}_j$ in C^0, C^3, C^4, C^5, C^7, and C^9. Conversely, at $\boldsymbol{\sigma}_j$ in C^1, C^2, C^6 and C^8, *some* spouse will have an incentive to report non-truthfully.

Consider first the case where $\iota = \{1\}$, that is spouse 1 (father) is privately informed. At $\boldsymbol{\sigma}_j$ in C^1 and C^2, spouse 2 will prefer early marriage for *any* beliefs they may hold. Given this, it is optimal for spouse 1 to communicate truthfully at these profiles. At $\boldsymbol{\sigma}_j$ in C^6 and C^8 spouse 1 prefers to delay even if the state is L whereas spouse 2's preferred option depends on their beliefs. At $\boldsymbol{\sigma}_j \in C^8$ the partner also prefers to delay on the prior P. Spouse 1 then optimally adopts the uninformative strategy $\boldsymbol{\phi}^*_{1j} = (1, 1)$ (always reporting $\widetilde{s}_{1j} = H$) as doing so ensures that partner retains their prior belief and continues to support delayed marriage. At $\boldsymbol{\sigma}_j \in C^6$ spouse 2 prefers early marriage on the prior P. In this case we can confirm that the optimal strategy for spouse 1 is to disclose L with the lowest probability compatible with spouse 2 preferring to delay upon receiving

$\widetilde{s}_{1j} = H$. Note that from (6), spouse 2's posterior beliefs upon receiving $\widetilde{s}_{1j} = H$ satisfies

$$\mu_{2j} = \Pr\left(s = H | \widetilde{s}_{1j} = H; \boldsymbol{\phi}_{1j}\right) = \frac{\mu}{\mu + (1-\mu)\,\phi^*_{1j}}, \tag{A1}$$

where we used that spouse 1's communication strategy takes the form $\boldsymbol{\phi}_{1j} = \left(\phi^*_{1j}, 1\right)$. For spouse 2 to prefer to delay it must be that $(1-\mu_{2j})\,\pi_L + \mu_{2j}\pi_H \geq \sigma_{2j}\rho$, or, substituting using (A1) and rearranging,

$$\frac{\mu}{\mu + (1-\mu)\,\phi^*_{1j}} \geq \frac{\sigma_{2j}\rho - \pi_L}{\pi_H - \pi_L}. \tag{A2}$$

Given that, $\boldsymbol{\sigma}_j \in C^6$, spouse 2 prefers early marriage on the prior and delayed marriage at H, (A2) will hold with equality for a unique ϕ^*_{1j} in unit interval. To see this, consider the generic case where spouse 2 strictly prefer delay and early marriage at P and H respectively, that is $\underline{\sigma}(P) < \sigma_{2j} < \underline{\sigma}(H)$. Then (A2) holds with strict inequality at $\phi_{1j} = 0$ since $\pi_H > \sigma_{2j}\rho$, and is strictly violated at $\phi_{1j} = 1$ since $\pi_P < \sigma_{2j}\rho$. Since the left hand side of (A2) is strictly decreasing in ϕ_{1j}, (A2) will therefore hold with equality at a unique $\phi^*_{1j} \in (0,1)$. Solving (A2) as equality for ϕ^*_{1j} gives the term in the bracket in (8). In the limiting cases where spouse 2 is indifferent between early and delayed marriage either at P or H, ϕ^*_{1j} will limit to 1 and 0 respectively.

Consider then spouse 1's expected utility (3) when spouse 2 supports delay upon receiving $\widetilde{s}_{1j} = H$. The expected return satisfies $E\left[r_j|\boldsymbol{\phi}_{1j}\right] = (1-\mu)\,\pi_L\left[\alpha + (1-\alpha)\,\phi^*_{1j}\right] + \mu\pi_H$ since they will delay marriage (i) for certain at state $s = H$, (ii) for certain at state $s = L$ if spouse 1 has the final say, and (iii) with probability ϕ^*_{1j} at state $s = L$ if spouse 2 has the final say. Using the same delay-probabilities, the expected stigma satisfies $E\left[z_j|\boldsymbol{\phi}_{1j}\right] = \rho\left\{(1-\mu)\left[\alpha + (1-\alpha)\,\phi^*_{1j}\right] + \mu\right\}$. Hence, combining, spouse 1's expected utility satisfies

$$E\left[u_{1j}|\boldsymbol{\phi}_{1j}\right] = (1-\alpha)\,(1-\mu)\,(\pi_L - \sigma_{1j}\rho)\,\phi^*_{1j} + \alpha\,(1-\mu)\,(\pi_L - \sigma_{1j}\rho) + \mu\,(\pi_H - \sigma_{1j}\rho), \tag{A3}$$

which is increasing in ϕ^*_{1j} since $\sigma_{1j} < \pi_L/\rho = \underline{\sigma}(L)$. Hence spouse 1 optimal ϕ^*_{1j}

is indeed the largest compatible with spouse 2 agreeing to delay upon receiving $\widetilde{s}_{1j} = H$. For Corollary 1, note that if spouse 1 has a cost γ_1 of lying, this adds the term $-\gamma_1 (1-\mu) \phi^*_{1j}$ to their expected utility in (A3) which is then increasing in ϕ^*_{1j} if and only the condition stated in the corollary holds.

An corresponding set of arguments apply when spouse 2 is privately informed, $\iota = \{2\}$. At $\boldsymbol{\sigma}_j$ in C^6 and C^8, spouse 1 will prefer delayed marriage for *any* beliefs they may hold. Given this, it is optimal for spouse 2 to communicate truthfully at these profiles. At $\boldsymbol{\sigma}_j$ in C^1 and C^2 spouse 2 prefers early marriage even if the state is H whereas spouse 1's preferred option depends on their beliefs. At $\boldsymbol{\sigma}_j \in C^1$ the partner also prefers early marriage on the prior P. Spouse 2 then optimally adopts the uninformative strategy $\boldsymbol{\phi}^*_{1j} = (0, 0)$ (always reporting $\widetilde{s}_{1j} = L$) as doing so ensures that the partner retains their prior belief and continues to support early marriage. At profile $\boldsymbol{\sigma}_j \in C^2$ spouse 1 prefers early marriage on the prior. In this case spouse 2 will instead disclose state H with the lowest probability compatible with the partner preferring early marriage upon receiving $\widetilde{s}_{2j} = L$. The uniquely implied probability is the first term in the bracketed expression in (9). #

Proof of Claim 2. Preference profiles $\boldsymbol{\sigma}_j$ in C^0, C^4, C^7, and C^9 are uninteresting as, not only will any spouse communicate truthfully at these profiles (Claim 1), the spouses will also *always agree* on a course of action. Profiles in C^3 are also uninteresting as the spouses will in this case *always disagree* irrespective of what information is available to whom. Conversely, at profiles in C^1, C^2, C^5, C^6, and C^8 whether a disagreement occurs or not will depend on what information is available and to whom.

For the latter five classes, Table A2 lists the equilibrium probabilities of disagreements, $E[\delta_j | s, \iota, \boldsymbol{\sigma}_j]$, by state s and information recipient set ι, and where the expectation is taken over any potential message sent. For instance, spouse 1, in any household j, if they privately learn that $s = H$, will disclose this truthfully (Claim 1), but whether a disagreement will occur depends of the household's preference profile. If $\boldsymbol{\sigma}_j \in C^1$, the information will lead them to disagree. In contrast, if $\boldsymbol{\sigma}_j \in C^5$, the information will lead them to agree to delay.

Table A2: The probability of disagreement by state, information recipient and preference profile class.

Preference Profile Class	C^1	C^2	C^5	C^6	C^8
Neither Informed (Prior, $\iota = \varnothing$)	0	1	1	1	0
High Probability of Benefit, $s = H$					
Father Informed ($\iota = \{1\}$)	1	1	0	0	0
Mother Informed ($\iota = \{2\}$)	0	ϕ^*_{2j}	0	0	0
Both Informed ($\iota = \{1, 2\}$)	1	1	0	0	0
Low Probability of Benefit, $s = L$					
Father Informed ($\iota = \{1\}$)	0	0	0	$1 - \phi^*_{1j}$	0
Mother Informed ($\iota = \{2\}$)	0	0	0	1	1
Both Informed ($\iota = \{1, 2\}$)	0	0	0	1	1

Claim 2 then follows directly from Table A2. For instance, aggregating by taking the expectation over $\boldsymbol{\sigma}_j$ will for *any* distribution of $\boldsymbol{\sigma}_j$ imply a higher aggregate frequency of disagreements when both spouses are informed that $s = H$ compared to when the same information is privately received by spouse 2. Specifically, in any household with $\boldsymbol{\sigma}_j \in C^1$, a disagreement will occur if both spouses are informed that $s = H$, but will not occur if only spouse 2 is informed. Similarly, in any household with $\boldsymbol{\sigma}_j \in C^2$, a disagreement will occur if both spouses are informed that $s = H$, but will occur with a positive probability ϕ^*_{2j} if only spouse 2 is informed. The equalities and inequalities in (11) and (12) follow in this way directly from Table A2. #

Proof of Claim 3. The effect of information on households' decision can be determined by combining the privately optimal communication strategies described in Claim 1 with the preference profiles listed in Table A1. Table A3 outlines the effect of information by information recipient set ι, information s, and by preference profile class C^j. Each panel only lists the preference profiles for which there is a non-zero effect for at least *some* information recipient. For instance, if $\boldsymbol{\sigma}_j \in C^1$ and spouse 1 privately receives the information that $s = H$, the probability of household j delaying marriage increases from zero under the prior P to α under $\iota \in \{1\}$, thus increasing by α.

Table A3: Effect of information on the probability of marriage delay, by state, information recipient and preference profile class.

High Probability of Benefit, $s = H$					
Preference Profile Class	C^1	C^2	C^4	C^5	C^6
Father Informed ($\iota = \{1\}$)	α	0	1	$1-\alpha$	$1-\alpha$
Mother Informed ($\iota = \{2\}$)	0	$-\alpha(1-\phi^*_{2j})$	1	$1-\alpha$	$1-\alpha$
Both Informed ($\iota = \{1,2\}$)	α	0	1	$1-\alpha$	$1-\alpha$
Low Probability of Benefit, $s = L$					
Preference Profile Class	C^2	C^5	C^6	C^7	C^8
Father Informed ($\iota = \{1\}$)	$-\alpha$	$-\alpha$	$(1-\alpha)\phi^*_{1j}$	-1	0
Mother Informed ($\iota = \{2\}$)	$-\alpha$	$-\alpha$	0	-1	$\alpha - 1$
Both Informed ($\iota = \{1,2\}$)	$-\alpha$	$-\alpha$	0	-1	$\alpha - 1$

Consider first state $s = H$. If spouse 1 learns that $s = H$, the probability of delay increases at profiles in C^1, C^4, C^5, C^6. If, in contrast, spouse 2 learns that $s = H$, the same increases in the delay probability occur at profiles in C^4, C^5, and C^6. However, no increase occurs at $\boldsymbol{\sigma}_j \in C^1$ and at $\boldsymbol{\sigma}_j \in C^2$ a decrease occurs as spouse 2 persuades their partner of an early marriage with positive probability $1 - \phi^*_{2j}$. If both spouses learn that $s = H$, implement their preferred option at that state if they have the final say (Assumption 4). The effect in this case is the same as when spouse 1 is privately informed. The effects of $s = L$ can be deduced in a corresponding way.

Claim 3 follows directly from the entries in Table A3. For instance, in state $s = H$, taking expectation over $\boldsymbol{\sigma}_j$, the effect of spouse 1 being privately informed ($\iota = \{1\}$) increases the aggregate delay frequency more than if spouse 2 is privately informed ($\iota = \{2\}$). Moreover, the aggregate effect when $\iota = \{1\}$ is, for any distribution of preferences, strictly positive whereas the aggregate effect when $\iota = \{2\}$ is ambiguous. The case of $s = L$ deduced in a corresponding way. #

A.2 Commitment

We outline here further details of how our framework can be related to recent contributions on commitment in persuasion games, notably by Lin and Liu (2024) and Best and Quigley (2024).

Lin and Liu (2024) develop the notion of "credible" persuasion by assuming that the informed sender can only commit to a *distribution* of messages, capturing settings where message frequencies are observable. This can sharply limit persuasion, especially when the sender and receiver have preferences that are strongly misaligned. In contrast, they show that the full commitment equilibrium is also credible when both have the same preference modularity and the decision is binary. This holds in our setting as *all* parents perceive the same complementarity between the state s and decision $d_j \in \{0, 1\}$. To see this, note that the expected utility of parent i in household j at decision d_j and state s can, using (3), be written as $\widetilde{u}_{ij}(d_j, s) \equiv \Pr(r_j = 1|d_j, s) - \sigma_{ij} \Pr(z_j = 1|d_j)$. Their preferences are supermodular if $\widetilde{u}_{ij}(1, H) + \widetilde{u}_{ij}(0, L) > \widetilde{u}_{ij}(0, H) + \widetilde{u}_{ij}(1, L)$ which, by Assumptions 1 and 2, is trivially true since $\pi_H > \pi_L$. Hence, in our setting it is not necessary for the informed parent to be able to commit to a communication strategy - their persuasion remains credible if they can only commit to an observable message distribution. The intuition for this is simple. Consider the case of a privately informed father who persuades the mother (specifically, $\sigma_{1j} < \underline{\sigma}(L)$ and $\underline{\sigma}(P) < \sigma_{2j} < \underline{\sigma}(H)$) to delay marriage by sometimes misreporting state L as being H whilst always reporting H truthfully. This is credible as he would not gain from reporting H *more* frequently at state L and *not* always disclosing the H-state as that would induce the mother to favor marriage delay in cases where delaying is less valuable.

Best and Quigley (2024) note that reputation can serve as implicit commitment. They study persuasion in a setting where a seller with private information about the quality of each sold item interacts with a sequence of buyers. They show that if each buyer observes a suitable coarse summary statistic—such as a public "badge" based on aggregated noisy feedback on previous sales—then any persuasion equilibrium can be supported as a perfect Bayesian equilibrium by incentivizing the seller to maintain their reputation. Marriage, being a long-term relationship, can allow for reputation-building through repeated interaction. Hence consider how reputation could support persuasion in the current setting.

For concreteness, consider again the case of an informed father who seeks to persuade the mother to delay marriage but assume now that the game is infinitely repeated with a new draw of the state in every period. (Arguably, couples are unlikely to play the specific marriage-timing game an infinite number of times, but can be expected to face similar joint-decision scenarios with private information on a regular basis.) A key feature is that the observed return r_j is only stochastically related to the state. The historical frequency of observable returns can then intuitively support his persuasion. To see this, suppose that the father, in every period, reports the state according to $\boldsymbol{\phi}^*_{1j} = \left(\phi^*_{1j}, 1\right)$ with $\phi^*_{1j} \in (0,1)$ defined as in (8). Using the Bayesian updated beliefs (6) the mother's expectation of a return ($r_j = 1$) after receiving an H-message and delaying will then be $\sigma_{2j}\rho \in (\pi_P, \pi_H)$. Suppose that the mother supports delay after H-messages only as long the observable average frequency of returns is at least $\sigma_{2j}\rho$. This is a best response as, at this critical frequency, she will be indifferent after an H-message but would prefer early marriage at any lower return frequency. The father at the same time has the incentive to limit his non-disclosure of the L-state to ϕ^*_{1j} in order to maintain his reputation for being (sufficiently) truthful – a deviation to a higher false reporting rate would lead to an observed return frequency lower than $\sigma_{2j}\rho$ and to the mother withdrawing her support for delay.

B Data Appendix

In this appendix we provide further details of the sample frame and of the IPV-related questions used.

B.1 Sample frame

Sampling and randomization was conducted in three stages. First, the local NGOs selected villages for inclusion in the study. To minimize the risk of contamination across villages, villages that had less than 1.6 kilometers between their outer boundaries were excluded, based on a mapping exercise conducted with the local NGOs and local government offices. This left 80 eligible villages from Sindh Province and 97 eligible villages from Punjab Province. Next, baseline village-level data were collected on key village characteristics including presence of and distance to primary and secondary boys/girls/mixed schools, presence of female teachers, distance to nearest town, presence of health center and tea shop, population size, and mobility of women in the village.

Next, a household listing exercise was conducted to obtain a census of households in each village that were eligible to participate in the study. The eligibility criteria were that households needed to have at least one unmarried adolescent son or daughter aged 13-17 years and needed to have at least one adult father or male caregiver and one adult mother or female caregiver in the household. Ages of adolescents were verified either through National Identity Card (NIC), or a Birth Registration Certificate (B-Form) where applicable.

B.2 Survey questions

Table B1 lists the questions that form the basis for the measurement of IPV incidence whilst Table B2 list the questions related to IPV justifiability.

Table B1: Survey questions IPV experiences

Emotional Violence
In the last three months, was your husband jealous or angry if you talked to other men?
In the last three months, did your husband frequently accuse you of being unfaithful?
In the last three months, did your husband not permit you to meet your female friends?
In the last three months, did your husband try to limit your contact with your family?
In the last three months, did your husband insist on knowing where you were at all times?
In the last three months, did your husband say or do something to humiliate you in front of others?
In the last three months, did your husband threaten to hurt or harm you or someone you care about?
In the last three months, did your husband insult you or make you feel bad about yourself?
Physical Violence
In the last three months, did your husband push you, shook you, or threw something at you?
In the last three months, did your husband slap you?
In the last three months, did your husband twist your arm or pull your hair?
In the last three months, did your husband kick you, drag you, or beat you up?
In the last three months, did your husband punch you with his fist or something that could hurt you?
In the last three months, did your husband try to choke you, or burn you on purpose?
In the last three months, did your husband threaten or attack you with a knife, gun, or other weapon?

Table B2: Survey questions attitudes IPV justifiability

In your opinion, are husbands justified in hitting their wife if ..
.. she goes out without telling him?
.. she neglects the children?
.. she argues with him?
.. she burns the food?
.. she neglects the in-laws?
.. she refuses to come to him (for sex) ?
.. she spends money on things he does not approve of?

C Empirical Appendix

In this appendix we provide further details on the sample summary statistics (C.1), results relating to beliefs (C.2), IPV impacts (C.3) and checks for IPV reporting bias (C.4) and alternative explanations (C.5).

C.1 Summary Statistics

Table C1: Summary statistics IPV & household decision-making

	(1) Midline	(2) Obs.	(3) Endline	(4) Obs.
Mother experienced any physical IPV in last 3 months	0.024 (0.154)	207	0.025 (0.157)	198
Mother experienced any physical or emotional IPV in last 3 months	0.106 (0.309)	207	0.096 (0.295)	198
Number of situations (out of 7) mother finds IPV justified	4.034 (2.174)	208	4.020 (2.060)	199
Number of situations (out of 7) father finds IPV justified	3.477 (1.976)	197	3.921 (2.087)	151
Mother has any involvement in decisions about daughter	0.937 (0.244)	206	0.975 (0.157)	199
Mothers' involvement (scale of 1-10) in decisions about daughter	3.808 (2.017)	206	4.133 (1.556)	199
Mother makes final decisions about daughter	0.209 (0.407)	206	0.125 (0.332)	200

Notes: Columns (1) and (3) show the means and standard deviations (in parentheses) of the variables for the control group in the midline and endline survey respectively. The variables are: binary variables that are equal to one if the mother reports physical IPV (Row 1) or any experience of IPV (Row 2) in the three months prior to the respective survey, and zero otherwise; count variables indicating the number of situations (out of seven) in which the mother (Row 3) or father (Row 4) finds that it is justified for a man to beat his wife. Rows 5, 6, and 7 are measured by asking the father to report on the involvement of household members in decisions about the daughter by dividing 10 tokens among household members, where the token allocation represents the extent of involvement in the decision. Based on this measure the variables are: binary variables that are equal to one if the father allocates a non-zero number of tokens to the mother, and zero otherwise (Row 5); count variables of the number of tokens allocated to the mother (Row 6); a binary variable equal to one if the father reports that the mother makes the final decision about the daughter, when asked who from all household members involved makes the final decision, and zero if he indicates any other household member (Row 7). Columns (2) and (4) report the number of observations for each variable.

Table C2: Summary statistics mother and father's characteristics

	(1) Min	(2) Mean	(3) Max	(4) SD	(5) Obs.
Father's age in years	17	46.73	76	8.86	796
Mother's age in years	18	42.23	70	7.77	810
Father's years of education	0	4.81	16	4.89	793
Mother's years of education	0	1.57	16	3.54	809

Notes: The minimum, mean, maximum, standard deviation, and number of observations for all respondent characteristics in our sample of households with daughters are reported in columns (1) to (5) respectively. We report age (Row 1 and 2) and education (Row 3 and 4) of both fathers (Row 1 and 3) and mothers (Row 2 and 4), as reported by the father.

C.2 Belief Updating

Table C3: Belief updating on spousal quality if daughter marries at age 18 (FDR corrections)

	Marriage at age 18				Marriage delay return age 16 to 18			
	Secondary School		High School		Secondary School		High School	
	Father	Mother	Father	Mother	Father	Mother	Father	Mother
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female vs. Control	0.077	0.104	0.054	0.115	-0.005	0.006	0.031	0.092
p-val $F \neq C$	(0.111)	(0.063) *	(0.284)	(0.034) **	(0.908)	(0.887)	(0.470)	(0.059) *
	[0.395]	[0.127]	[0.395]	[0.127]	[0.909]	[0.888]	[0.627]	[0.238]
p-val $F > C$	(0.056) *	(0.032) **	(0.142)	(0.017) **	(0.546)	(0.444)	(0.235)	(0.030) **
	[0.198]	[0.064] *	[0.198]	[0.064] *	[0.896]	[0.759]	[0.896]	[0.120]
Male vs. Control	0.115	0.103	0.072	0.141	-0.012	-0.041	0.038	0.142
p-val $M \neq C$	(0.019) **	(0.068) *	(0.152)	(0.010) ***	(0.778)	(0.289)	(0.397)	(0.002) ***
	[0.076] *	[0.091] *	[0.203]	[0.020] **	[0.779]	[0.290]	[0.530]	[0.009] ***
p-val $M > C$	(0.010) **	(0.034) **	(0.076) *	(0.005) ***	(0.611)	(0.855)	(0.199)	(0.001) ***
	[0.040] **	[0.046] **	[0.102]	[0.010] ***	[0.976]	[0.913]	[0.796]	[0.004] ***
Female+Male vs. Control	0.082	0.109	0.077	0.116	-0.018	0.024	0.070	0.123
p-val $F{+}M \neq C$	(0.082) *	(0.053) *	(0.124)	(0.031) **	(0.644)	(0.567)	(0.097) *	(0.009) ***
	[0.246]	[0.071] *	[0.246]	[0.062] *	[0.645]	[0.757]	[0.385]	[0.037] **
p-val $F{+}M > C$	(0.041) **	(0.027) **	(0.062) *	(0.015) **	(0.678)	(0.284)	(0.049) **	(0.005) ***
	[0.123]	[0.036] **	[0.123]	[0.030] **	[0.904]	[0.379]	[0.196]	[0.020] **
Female+Male vs. Male	-0.033		0.005		-0.006		0.032	
p-val $F{+}M \neq M$	(0.481)		(0.923)		(0.870)		(0.486)	
	[0.923]		[0.923]		[0.914]		[0.914]	
Female+Male vs. Female		0.005		0.001		0.017		0.031
p-val $F{+}M \neq F$		(0.928)		(0.984)		(0.667)		(0.547)
		[0.984]		[0.984]		[0.668]		[0.668]
Observations	769	814	769	814	769	814	769	814
Control Mean	0.597	0.566	0.265	0.254	0.214	0.205	0.199	0.180

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16). In Column 1-4, the dependent variable takes on value one if the respondent - father (columns 1 and 3) or mother (columns 2 and 4) - states that they expect that the future spouse of their daughter will have at least completed secondary (columns 1 and 2) – Grade 10 and above – or high school (columns 3 and 4) – Grade 12 and above – if she is married at 18 at midline. In Column 5-8, the dependent variable is the difference of the indicator that the father (column 5 and 7) or mother (column 6 and 8) expects that their daughter's future spouse will have at least completed secondary (columns 5 and 6) or high school (columns 7 and 8) if she is married at age 18 compared to age 16. In our sample, there are no respondents that expect the spouse's education level to be lower when marriage is delayed from age 16 to 18. Therefore, the dependent variable takes on either value 1, if expectations about the spouse's education improved, or 0 if the expectations stayed the same. This allows us to estimate this in a logit regression. Regressions include fixed effects for randomization strata. p-values from standard errors clustered at the village level (unit of randomization) on parentheses. Corresponding q-values correcting for false discovery rate within each family of schooling levels per respondent per treatment arm comparison test using the Benjamini-Hochberg procedure are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation. The row "control mean" indicates the percentage in the control group stating the above expectation.

Table C4: Belief updating on spousal quality if daughter marries at age 16

	Secondary School		High School	
	Father	Mother	Father	Mother
	(1)	(2)	(3)	(4)
Female vs. Control	0.082	0.097	0.025	0.024
p-val $F \neq C$	(0.121)	(0.083) *	(0.381)	(0.428)
	[0.142]	[0.115]	[0.388]	[0.446]
p-val $F > C$	(0.061) *	(0.042) **	(0.190)	(0.214)
	[0.074] *	[0.055] *	[0.206]	[0.220]
Male vs. Control	0.128	0.143	0.037	-0.002
p-val $M \neq C$	(0.019) **	(0.010) **	(0.255)	(0.945)
	[0.044] **	[0.017] **	[0.309]	[0.954]
p-val $M > C$	(0.009) ***	(0.005) ***	(0.128)	(0.527)
	[0.024] **	[0.007] ***	[0.157]	[0.434]
Female+Male vs. Control	0.100	0.085	0.007	-0.007
p-val $F{+}M \neq C$	(0.048) **	(0.146)	(0.791)	(0.814)
	[0.061] *	[0.135]	[0.807]	[0.815]
p-val $F{+}M > C$	(0.024) **	(0.073) *	(0.395)	(0.593)
	[0.038] **	[0.077] *	[0.403]	[0.613]
Female+Male vs. Male	-0.028		-0.029	
p-val $F{+}M \neq M$	(0.587)		(0.366)	
	[0.585]		[0.424]	
Female+Male vs. Female		-0.012		-0.031
p-val $F{+}M \neq F$		(0.836)		(0.340)
		[0.867]		[0.382]
Observations	769	814	769	814
Control Mean	0.383	0.361	0.066	0.073

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16). The dependent variable takes on value one if the respondent - father (columns 1 and 3) or mother (columns 2 and 4) - states that they expect that the future spouse of their daughter will have at least completed secondary (columns 1 to 2) – Grade 10 and above – or high school (columns 3 to 4) – Grade 12 and above – if she is married at 16 at midline. Regressions in columns (1) to (2) include fixed effects for randomization strata. p-values from standard errors clustered at the village level (unit of randomization) on parentheses. Corresponding p-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation. The row "control mean" indicates the percentage in the control group stating the above expectation.

Table C5: Belief updating on spousal quality if daughter marries at age 16 (FDR corrections)

	Secondary School		High School	
	Father	Mother	Father	Mother
	(1)	(2)	(3)	(4)
Female vs. Control	0.082	0.097	0.025	0.024
p-val $F \neq C$	(0.121)	(0.083) *	(0.381)	(0.428)
	[0.243]	[0.302]	[0.381]	[0.571]
p-val $F > C$	(0.061) *	(0.042) **	(0.190)	(0.214)
	[0.122]	[0.150]	[0.190]	[0.286]
Male vs. Control	0.128	0.143	0.037	-0.002
p-val $M \neq C$	(0.019) **	(0.010) **	(0.255)	(0.945)
	[0.038] **	[0.042] **	[0.256]	[0.946]
p-val $M > C$	(0.009) ***	(0.005) ***	(0.128)	(0.527)
	[0.018] **	[0.020] **	[0.128]	[0.527]
Female+Male vs. Control	0.100	0.085	0.007	-0.007
p-val $F+M \neq C$	(0.048) **	(0.146)	(0.791)	(0.814)
	[0.096] *	[0.266]	[0.791]	[0.814]
p-val $F+M > C$	(0.024) **	(0.073) *	(0.395)	(0.593)
	[0.048] **	[0.134]	[0.395]	[0.593]
Female+Male vs. Male	-0.028		-0.029	
p-val $F+M \neq M$	(0.587)		(0.366)	
	[0.702]		[0.702]	
Female+Male vs. Female		-0.012		-0.031
p-val $F+M \neq F$		(0.836)		(0.340)
		[0.836]		[0.742]
Observations	769	814	769	814
Control Mean	0.383	0.361	0.066	0.073

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16). The dependent variable takes on value one if the respondent - father (columns 1 and 3) or mother (columns 2 and 4) - states that they expect that the future spouse of their daughter will have at least completed secondary (columns 1 and 2) – Grade 10 and above – or high school (columns 3 and 4) – Grade 12 and above – if she is married at 16 at midline. Regressions in columns (1) and (2) include fixed effects for randomization strata. p-values from standard errors clustered at the village level (unit of randomization) on parentheses. Corresponding q-values correcting for false discovery rate within each family of schooling levels per respondent per treatment arm comparison test using the Benjamini-Hochberg procedure are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation. The row "control mean" indicates the percentage in the control group stating the above expectation.

Table C6: Belief updating on spousal quality if daughter marries at age 20

	Marriage at age 20				Marriage delay return age 16 to 20			
	Secondary School		High School		Secondary School		High School	
	Father	Mother	Father	Mother	Father	Mother	Father	Mother
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female vs. Control	0.031	0.118	0.105	0.121	-0.051	0.020	0.082	0.097
p-val $F \neq C$	(0.435)	(0.030) **	(0.059) *	(0.029) **	(0.331)	(0.680)	(0.143)	(0.071) *
	[0.517]	[0.052] *	[0.098] *	[0.038] **	[0.340]	[0.697]	[0.180]	[0.083] *
p-val $F > C$	(0.217)	(0.015) **	(0.029) **	(0.014) **	(0.835)	(0.340)	(0.072) *	(0.036) **
	[0.273]	[0.026] **	[0.051] *	[0.017] **	[0.830]	[0.366]	[0.082] *	[0.039] **
Male vs. Control	0.056	0.160	0.121	0.150	-0.071	0.016	0.087	0.151
p-val $M \neq C$	(0.181)	(0.003) ***	(0.025) **	(0.009) ***	(0.156)	(0.732)	(0.132)	(0.004) ***
	[0.195]	[0.006] ***	[0.047] **	[0.020] **	[0.217]	[0.737]	[0.166]	[0.007] ***
p-val $M > C$	(0.091) *	(0.001) ***	(0.012) **	(0.005) ***	(0.922)	(0.366)	(0.066) *	(0.002) ***
	[0.124]	[0.001] ***	[0.029] **	[0.007] ***	[0.906]	[0.371]	[0.089] *	[0.005] ***
Female+Male vs. Control	0.067	0.132	0.097	0.100	-0.033	0.045	0.090	0.104
p-val $F{+}M \neq C$	(0.075) *	(0.011) **	(0.065) *	(0.075) *	(0.516)	(0.339)	(0.081) *	(0.045) **
	[0.106]	[0.019] **	[0.066] *	[0.089] *	[0.558]	[0.400]	[0.074] *	[0.067] *
p-val $F{+}M > C$	(0.037) **	(0.006) ***	(0.032) **	(0.037) **	(0.742)	(0.169)	(0.041) **	(0.022) **
	[0.057] *	[0.008] ***	[0.034] **	[0.036] **	[0.708]	[0.171]	[0.035] **	[0.026] **
Female+Male vs. Male	0.011		-0.024		0.038		0.002	
p-val $F{+}M \neq M$	(0.786)		(0.645)		(0.402)		(0.967)	
	[0.814]		[0.669]		[0.423]		[0.967]	
Female+Male vs. Female		0.013		-0.021		0.025		0.007
p-val $F{+}M \neq F$		(0.786)		(0.682)		(0.605)		(0.893)
		[0.805]		[0.713]		[0.586]		[0.922]
Observations	769	815	769	815	769	814	769	814
Control Mean	0.765	0.668	0.480	0.473	0.383	0.307	0.413	0.400

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16). In Column 1-4, the dependent variable takes on value one if the respondent - father (columns 1 and 3) or mother (columns 2 and 4) - states that they expect that the future spouse of their daughter will have at least completed secondary (columns 1 and 2) – Grade 10 and above – or high school (columns 3 and 4) – Grade 12 and above – if she is married at 20 at midline. In Column 5-8, the dependent variable is the difference of the indicator that the father (column 5 and 7) or mother (column 6 and 8) expects that their daughter's future spouse will have at least completed secondary (columns 5 and 6) or high school (columns 7 and 8) if she is married at age 20 compared to age 16. In our sample, there are no respondents that expect the spouse's education level to be lower when marriage is delayed from age 16 to 20. Therefore, the dependent variable takes on either value 1, if expectations about the spouse's education improved, or 0 if the expectations stayed the same. This allows us to estimate this in a logit regression. Regressions include fixed effects for randomization strata. p-values from standard errors clustered at the village level (unit of randomization) on parentheses. Corresponding p-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation. The row "control mean" indicates the percentage in the control group stating the above expectation.

Table C7: Belief updating on spousal quality if daughter marries at age 20 (FDR corrections)

	Marriage at age 20				Marriage delay return age 16 to 20			
	Secondary School		High School		Secondary School		High School	
	Father	Mother	Father	Mother	Father	Mother	Father	Mother
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female vs. Control	0.031	0.118	0.105	0.121	-0.051	0.020	0.082	0.097
p-val $F \neq C$	(0.435)	(0.030) **	(0.059) *	(0.029) **	(0.331)	(0.680)	(0.143)	(0.071) *
	[0.580]	[0.061] *	[0.235]	[0.061] *	[0.331]	[0.733]	[0.313]	[0.284]
p-val $F > C$	(0.217)	(0.015) **	(0.029) **	(0.014) **	(0.835)	(0.340)	(0.072) *	(0.036) **
	[0.290]	[0.030] **	[0.116]	[0.030] **	[0.922]	[0.680]	[0.288]	[0.144]
Male vs. Control	0.056	0.160	0.121	0.150	-0.071	0.016	0.087	0.151
p-val $M \neq C$	(0.181)	(0.003) ***	(0.025) **	(0.009) ***	(0.156)	(0.732)	(0.132)	(0.004) ***
	[0.363]	[0.012] **	[0.100]	[0.012] **	[0.157]	[0.733]	[0.157]	[0.017] **
p-val $M > C$	(0.091) *	(0.001) ***	(0.012) **	(0.005) ***	(0.922)	(0.366)	(0.066) *	(0.002) ***
	[0.182]	[0.004] ***	[0.048] **	[0.007] ***	[0.999]	[0.488]	[0.264]	[0.008] ***
Female+Male vs. Control	0.067	0.132	0.097	0.100	-0.033	0.045	0.090	0.104
p-val $F{+}M \neq C$	(0.075) *	(0.011) **	(0.065) *	(0.075) *	(0.516)	(0.339)	(0.081) *	(0.045) **
	[0.100]	[0.036] **	[0.100]	[0.100]	[0.517]	[0.678]	[0.325]	[0.180]
p-val $F{+}M > C$	(0.037) **	(0.006) ***	(0.032) **	(0.037) **	(0.742)	(0.169)	(0.041) **	(0.022) **
	[0.050] *	[0.018] **	[0.050] *	[0.050] *	[0.817]	[0.338]	[0.164]	[0.088] *
Female+Male vs. Male	0.011		-0.024		0.038		0.002	
p-val $F{+}M \neq M$	(0.786)		(0.645)		(0.402)		(0.967)	
	[0.946]		[0.946]		[0.537]		[0.968]	
Female+Male vs. Female		0.013		-0.021		0.025		0.007
p-val $F{+}M \neq F$		(0.786)		(0.682)		(0.605)		(0.893)
		[0.786]		[0.786]		[0.921]		[0.921]
Observations	769	815	769	815	769	814	769	814
Control Mean	0.765	0.668	0.480	0.473	0.383	0.307	0.413	0.400

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16). In Column 1-4, the dependent variable takes on value one if the respondent - father (columns 1 and 3) or mother (columns 2 and 4) - states that they expect that the future spouse of their daughter will have at least completed secondary (columns 1 and 2) – Grade 10 and above – or high school (columns 3 and 4) – Grade 12 and above – if she is married at 20 at midline. In Column 5-8, the dependent variable is the difference of the indicator that the father (column 5 and 7) or mother (column 6 and 8) expects that their daughter's future spouse will have at least completed secondary (columns 5 and 6) or high school (columns 7 and 8) if she is married at age 20 compared to age 16. In our sample, there are no respondents that expect the spouse's education level to be lower when marriage is delayed from age 16 to 20. Therefore, the dependent variable takes on either value 1, if expectations about the spouse's education improved, or 0 if the expectations stayed the same. This allows us to estimate this in a logit regression. Regressions include fixed effects for randomization strata. p-values from standard errors clustered at the village level (unit of randomization) on parentheses. Corresponding q-values correcting for false discovery rate within each family of schooling levels per respondent per treatment arm comparison test using the Benjamini-Hochberg procedure are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation. The row "control mean" indicates the percentage in the control group stating the above expectation.

Table C8: Heterogeneous belief updating by spousal difference in preferences if daughter marries at age 18 (secondary school)

	Marriage at age 18				Marriage delay return age 16 to 18			
	Father's beliefs		Mother's beliefs		Father's beliefs		Mother's beliefs	
	Low	High	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female vs. Control	0.132	-0.003	0.063	0.176	0.050	-0.090	0.008	0.010
p-val F ≠ C	(0.029) **	(0.962)	(0.350)	(0.023) **	(0.332)	(0.182)	(0.870)	(0.884)
	[0.068] *	[0.965]	[0.384]	[0.030] **	[0.395]	[0.225]	[0.865]	[0.917]
p-val F > C	(0.014) **	(0.519)	(0.175)	(0.012) **	(0.166)	(0.909)	(0.435)	(0.442)
	[0.035] **	[0.501]	[0.179]	[0.015] **	[0.202]	[0.871]	[0.422]	[0.480]
p-val high ≠ low		<0.137>		<0.218>		<0.101>		<0.977>
Male vs. Control	0.157	0.053	0.076	0.155	-0.005	-0.025	-0.013	-0.074
p-val M ≠ C	(0.012) **	(0.436)	(0.240)	(0.035) **	(0.933)	(0.726)	(0.775)	(0.242)
	[0.034] **	[0.489]	[0.248]	[0.032] **	[0.943]	[0.753]	[0.788]	[0.260]
p-val M > C	(0.006) ***	(0.218)	(0.120)	(0.017) **	(0.533)	(0.637)	(0.612)	(0.879)
	[0.024] **	[0.262]	[0.098] *	[0.016] **	[0.544]	[0.615]	[0.601]	[0.879]
p-val high ≠ low		<0.251>		<0.357>		<0.819>		<0.441>
Female+Male vs. Control	0.126	0.023	0.130	0.085	0.031	-0.084	0.040	0.008
p-val F+M ≠ C	(0.045) **	(0.742)	(0.045) **	(0.297)	(0.545)	(0.210)	(0.424)	(0.906)
	[0.059] *	[0.757]	[0.046] **	[0.357]	[0.595]	[0.261]	[0.456]	[0.909]
p-val F+M > C	(0.023) **	(0.371)	(0.023) **	(0.149)	(0.272)	(0.895)	(0.212)	(0.453)
	[0.023] **	[0.441]	[0.020] **	[0.179]	[0.266]	[0.856]	[0.212]	[0.475]
p-val high ≠ low		<0.289>		<0.649>		<0.200>		<0.695>
Female+Male vs. Male	-0.032	-0.030			0.035	-0.059		
p-val F+M ≠ M	(0.607)	(0.673)			(0.489)	(0.298)		
	[0.606]	[0.669]			[0.501]	[0.249]		
Female+Male vs. Female			0.067	-0.091			0.033	-0.002
p-val F+M ≠ F			(0.274)	(0.220)			(0.502)	(0.971)
			[0.316]	[0.280]			[0.518]	[0.975]
p-val joint relevance of recipient	0.857	0.748	0.490	0.450	0.572	0.474	0.539	0.299
Observations	453	316	494	320	453	316	494	320
Control Mean	0.538	0.684	0.598	0.513	0.197	0.241	0.189	0.231

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents from logit regressions, separately for households where parents have below median (*low*, columns 1, 3, 5 and 7) or above median (*high*, columns 2, 4, 6 and 8) differences in preferences for norm compliance. In Column 1-4, the dependent variable takes on value one if the respondent - father (columns 1 and 2) or mother (columns 3 and 4) - states that they expect that the future spouse of their daughter will have at least completed secondary school if she is married at 18 at midline. In Column 5-8, the dependent variable is the difference of the indicator that the father (column 5 and 6) or mother (column 7 and 8) expects that their daughter's future spouse will have at least completed secondary school if she is married at age 18 compared to age 16. In our sample, there are no respondents that expect the spouse's education level to be lower when marriage is delayed from age 16 to 18. Therefore, the dependent variable takes on either value 1, if expectations about the spouse's education improved, or 0 if the expectations stayed the same. This allows us to estimate this in a logit regression. We indicate parents as having *low* differences in preferences when the number (out of 6) of questions about own norm compliance attitudes in Table 2 they answer differently at baseline (for Punjab Province we take parents' answers at midline), is below or equal to the median, and as having *high* differences in preferences when it is above the median. Regressions include fixed effects for randomization strata. *p*-values from standard errors clustered at the village level (unit of randomization) are reported in parentheses. Corresponding *p*-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "p-val joint relevance of recipient" indicates the *p*-value of the joint Wald test that the estimated marginal treatment effect in the *Female*, *Male* and *Female+Male* arm are all equal. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for. The row "control mean" indicates the percentage in the control group stating the above expectation.

Table C9: Heterogeneous belief updating by spousal difference in preferences if daughter marries at age 20 (high school)

	Marriage at age 20				Marriage delay return age 16 to 20			
	Father's beliefs		Mother's beliefs		Father's beliefs		Mother's beliefs	
	Low	High	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female vs. Control	0.176	0.001	0.093	0.172	0.153	-0.023	0.097	0.102
p-val $F \neq C$	(0.011) **	(0.986)	(0.159)	(0.041) **	(0.038) **	(0.758)	(0.139)	(0.210)
	[0.029] **	[0.994]	[0.175]	[0.044] **	[0.069] *	[0.760]	[0.150]	[0.215]
p-val $F > C$	(0.005) ***	(0.493)	(0.080) *	(0.021) **	(0.019) **	(0.621)	(0.070) *	(0.105)
	[0.010] **	[0.488]	[0.085] *	[0.026] **	[0.031] **	[0.603]	[0.077] *	[0.102]
p-val high $\neq$ *low*		<0.053>*		<0.421>		<0.090>*		<0.962>
Male vs. Control	0.142	0.086	0.121	0.199	0.106	0.055	0.127	0.189
p-val $M \neq C$	(0.044) **	(0.237)	(0.074) *	(0.012) **	(0.141)	(0.492)	(0.028) **	(0.018) **
	[0.070] *	[0.308]	[0.107]	[0.023] **	[0.152]	[0.577]	[0.042] **	[0.030] **
p-val $M > C$	(0.022) **	(0.119)	(0.037) **	(0.006) ***	(0.071) *	(0.246)	(0.014) **	(0.009) ***
	[0.035] **	[0.178]	[0.054] *	[0.010] **	[0.078] *	[0.310]	[0.022] **	[0.016] **
p-val high $\neq$ *low*		<0.558>		<0.399>		<0.605>		<0.488>
Female+Male vs. Control	0.102	0.091	0.101	0.106	0.093	0.082	0.120	0.091
p-val $F{+}M \neq C$	(0.125)	(0.182)	(0.118)	(0.246)	(0.144)	(0.282)	(0.052) *	(0.301)
	[0.136]	[0.201]	[0.131]	[0.307]	[0.140]	[0.335]	[0.064] *	[0.365]
p-val $F{+}M > C$	(0.063) *	(0.091) *	(0.059) *	(0.123)	(0.072) *	(0.141)	(0.026) **	(0.151)
	[0.052] *	[0.111]	[0.052] *	[0.147]	[0.056] *	[0.180]	[0.029] **	[0.172]
p-val high $\neq$ *low*		<0.907>		<0.962>		<0.916>		<0.792>
Female+Male vs. Male	-0.040	0.005			-0.012	0.028		
p-val $F{+}M \neq M$	(0.542)	(0.941)			(0.848)	(0.722)		
	[0.552]	[0.933]	[0.793]			[0.755]		
Female+Male vs. Female			0.009	-0.066			0.022	-0.011
p-val $F{+}M \neq F$			(0.890)	(0.422)			(0.730)	(0.891)
			[0.896]	[0.451]			[0.746]	[0.886]
p-val joint relevance of recipient	0.512	0.392	0.910	0.495	0.661	0.349	0.888	0.353
Observations	453	316	495	320	453	316	494	320
Control Mean	0.427	0.557	0.496	0.436	0.368	0.481	0.409	0.385

Notes: The table reports post-estimated marginal treatment effects for fathers and mothers of girl adolescents from logit regressions, separately for households where parents have below median (*low*, columns 1, 3, 5 and 7) or above median (*high*, columns 2, 4, 6 and 8) differences in preferences for norm compliance. In Column 1-4, the dependent variable takes on value one if the respondent - father (columns 1 and 2) or mother (columns 3 and 4) - states that they expect that the future spouse of their daughter will have at least completed high school if she is married at 20 at midline. In Column 5-8, the dependent variable is the difference of the indicator that the father (column 5 and 6) or mother (column 7 and 8) expects that their daughter's future spouse will have at least completed high school if she is married at age 20 compared to age 16. In our sample, there are no respondents that expect the spouse's education level to be lower when marriage is delayed from age 16 to 20. Therefore, the dependent variable takes on either value 1, if expectations about the spouse's education improved, or 0 if the expectations stayed the same. This allows us to estimate this in a logit regression.We indicate parents as having *low* differences in preferences when the number (out of 6) of questions about own norm compliance attitudes in Table 2 they answer differently at baseline (for Punjab Province we take parents' answers at midline), is below or equal to the median, and as having *high* differences in preferences when it is above the median. Regressions include fixed effects for randomization strata. *p*-values from standard errors clustered at the village level (unit of randomization) are reported in parentheses. Corresponding *p*-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "p-val joint relevance of recipient" indicates the *p*-value of the joint Wald test that the estimated marginal treatment effect in the *Female*, *Male* and *Female+Male* arm are all equal. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for. The row "control mean" indicates the percentage in the control group stating the above expectation.

C.3 IPV impacts

Table C10: Treatment effects on incidence of emotional IPV

	Midline	Endline
	(1)	(2)
Female vs. Control	0.085	0.008
p-val $F \neq C$	(0.019) **	(0.836)
	[0.012] **	[0.809]
Male vs. Control	0.037	0.009
p-val $M \neq C$	(0.308)	(0.808)
	[0.297]	[0.762]
Female+Male vs. Control	0.098	0.017
p-val $F{+}M \neq C$	(0.013) **	(0.631)
	[0.015] **	[0.566]
Female+Male vs. Male	0.061	0.008
p-val $F{+}M > M$	(0.085) *	(0.411)
	[0.098]*	[0.438]
Female+Male vs. Female	0.012	0.009
p-val $F{+}M > F$	(0.391)	(0.405)
	[0.415]	[0.402]
Observations	816	775
Control Mean	0.106	0.091

Notes: The table reports post-estimated marginal treatment effects for mothers of girl adolescents ($\eta + \rho$) from the pre-specified logit regression in equation (16). The dependent variables takes on value one if the mother experienced any type of emotional IPV in the three months prior to the midline survey (column 1), or endline survey (column 2), perpetrated by their husband. A detailed overview of the survey questions that ask women about IPV experiences can be found in Table B1 in Appendix B.2. Standard errors are clustered at the village level, which is our level of randomization. Two-sided p-values and one-sided p-values in accordance with the model predictions are reported in parentheses. Corresponding p-values from randomization inference following Young (2019) with 1,000 permutations are reported in square brackets. Dummies for randomization strata are excluded due to strata perfect prediction of the outcome variable. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation. The row "control mean" indicates the percentage of women in the control group that report to have experienced emotional IPV in the last 3 months.

C.4 IPV Reporting Bias

An important concern with survey measures of IPV is under- or over-reporting of incidences, which may bias the results. This is a concern especially when an intervention is targeted directly at changing outcomes of IPV (Chan, 2011). The intervention in case did not specifically address IPV, which mitigates concerns for direct experimenter demand effects. However, the intervention may have indirectly changed women's perceptions of violence and community norms around it. Given that we find that physical IPV is particularly high in the *Female+Male* arm, we need to carefully consider potential bias stemming from women that attended the

intervention in this treatment arm becoming more inclined to report an incidence of violence, without experiencing an actual increase in incidences. This would mean that the intervention increased reporting of violence, but not the true occurrence of violence. We perform several checks to consider such reporting biases below.

IPV attitudes. Firstly, there may be an upward bias on the observed treatment effects in the *Female+Male* arm if the intervention changed women's attitudes towards IPV in such a way that they perceive less social acceptability and taboo around IPV. Suitable proxies for this can be the extent to which women consider IPV to be justified or common in their community, and beliefs women have about the probability that the community undertakes some form of action if someone reports IPV. Hence, if we find that the intervention decreases women's reports of justifiability and commonness of IPV, or increases expected community action, this may indicate a perceived reduction of social acceptability of IPV – making it easier for women to come forward when they experience IPV, raising concerns for reporting bias. Marginal treatment effects on these outcome variables for mothers of an adolescent girl are reported in columns (1) to (6) of Table C11. Note that in the lower panel of Table C11, instead of direct implication from the Bayesian persuasion framework, we report comparisons between treatment arms in line with the model's IPV predictions. This follows from the logic that our framework indirectly implies that we should not see differences in IPV attitudes between the treatment arms that could explain the observed IPV impacts. We find no treatment effects on perceived justifiability, commonness, or expected community action, at any treatment arm, neither at midline nor at endline.

Understanding of Violence. Secondly, the intervention may have increased women's understanding of what is meant by violence, making them more likely to report an event as violence. If this is the case, we would expect reports of other violence in the village to also increase for women who have attended the intervention. Columns (7) and (8) of Table C11 report treatment effects on women's reports of verbal and physical attack in the village, at midline and endline respec-

tively. We observe no significant treatment effects on reports of either form of violence. There is a marginally significantly positive effect on women reporting verbal attacks but only in the *Male* arm and not in any of the two arms where the mothers themselves were targeted in the information intervention. This effect thus goes in the opposite direction to what we should be concerned about in light of our results.

Table C11: Treatment effects on women's attitudes, beliefs and reporting of IPV

	IPV Justifiability		IPV Commonness		Community Action		Other violence		Non-response	
	Midline	Endline	Midline	Endline	Midline	Endline	Midline	Endline	Midline	Endline
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Female vs. Control	-0.117	0.077	0.048	0.114	0.029	-0.047	0.004	-0.018	-0.000	0.005
p-val $F \neq C$	(0.561)	(0.694)	(0.636)	(0.240)	(0.634)	(0.469)	(0.854)	(0.666)	(0.997)	(0.560)
	[0.868]	[0.868]	[0.868]	[0.868]	[0.868]	[0.868]	[0.949]	[0.868]	[0.998]	[0.868]
Male vs. Control	-0.074	-0.143	0.051	0.120	0.031	-0.031	0.052	0.051	0.005	0.005
p-val $M \neq C$	(0.672)	(0.541)	(0.619)	(0.265)	(0.588)	(0.644)	(0.059)*	(0.342)	(0.625)	(0.521)
	[0.672]	[0.672]	[0.672]	[0.672]	[0.672]	[0.672]	[0.588]	[0.672]	[0.672]	[0.672]
Female+Male vs. Control	-0.183	-0.235	0.050	0.074	0.022	-0.045	0.013	-0.031	-0.005	0.023
p-val $F+M \neq C$	(0.354)	(0.286)	(0.628)	(0.496)	(0.672)	(0.482)	(0.563)	(0.451)	(0.315)	(0.085)*
	[0.672]	[0.672]	[0.672]	[0.672]	[0.672]	[0.672]	[0.672]	[0.672]	[0.672]	[0.672]
Female+Male vs. Male	-0.109	-0.092	-0.000	-0.047	-0.009	-0.014	-0.039	-0.082	-0.010	0.018
p-val $F+M \neq M$	(0.554)	(0.704)	(0.998)	(0.668)	(0.876)	(0.826)	(0.200)	(0.101)	(0.317)	(0.222)
	[0.974]	[0.974]	[0.998]	[0.974]	[0.974]	[0.974]	[0.740]	[0.740]	[0.793]	[0.740]
Female+Male vs. Female	-0.066	-0.312	0.003	-0.040	-0.007	0.002	0.009	-0.013	-0.005	0.019
p-val $F+M \neq F$	(0.756)	(0.129)	(0.980)	(0.682)	(0.907)	(0.972)	(0.724)	(0.714)	(0.315)	(0.192)
	[0.980]	[0.959]	[0.980]	[0.980]	[0.980]	[0.980]	[0.980]	[0.980]	[0.980]	[0.959]
Observations	820	785	820	785	820	785	820	785	836	836
Control Mean	4.034	4.020	1.890	1.799	0.462	0.518	0.058	0.126	0.005	0.005

Notes: Table reports post-estimated marginal treatment effects for girl adolescents ($\eta + \rho$) from the pre-specified regression in equation (16) on variables relevant for reporting bias in our IPV data, at midline (columns 1, 3, 5, 7 and 9) and endline (columns 2, 4, 6, 8 and 10). Columns (1) to (4) report marginal treatment effects from OLS regressions. The dependent variable in columns (1) and (2) is the number of situations (out of seven) in which women finds that it is justified for a man to beat his wife (see Table B2 in the Appendix). The dependent variable in columns (3) to (4) is how common women perceive a man beating his wife to be in the community, as an average of the same seven situations asked on a 5-point scale running from very rare (1) to very common (5). Columns (5) to (8) report marginal effects from logit estimations. In columns (5) to (6), the dependent variable is a binary variable that takes on the value one if a woman expects any action from the community when they find out about a man beating his wife, and zero if she expects no action to be taken. The dependent variable in columns (7)to (8) is a binary variable that takes on the value one if a woman reports any incidence of verbal or physical attack in the community. The dependent variable in columns (9) to (10) is a binary variable that takes on value one if the woman did not answer the IPV module, while she did answer other parts of the survey. Columns (9) to (10) report marginal treatment effects from OLS regressions, as estimating a logit model is not possible due to a low rate of non-response to the IPV module and insufficient variation. Standard errors are reported in parentheses and clustered at the village level, which is our level of randomization. In square brackets, sharpened q-values correcting for false discovery rate using the Benjamini–Hochberg procedure are reported (Benjamini and Hochberg, 1995; Anderson, 2008). Dummies for randomization strata are included in columns (1) to (4), and excluded in columns (5) to (10) due to strata perfect prediction of the outcome variable. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation.

Trust in enumerators. Lastly, women may be more likely to report an incidence of violence when they trust the enumerator and feel more comfortable during the survey. Because women who participated in the intervention had more contact

moments with NGO staff than women who did not receive the intervention, they could be more inclined to report an incidence of IPV, which would be a concern for reporting bias in our results. If indeed women in the *Female* and *Female+Male* treatment arm have larger trust in enumerators, we would expect those women to also be less likely to attrit, or refuse to answer the specific IPV questions in the survey. As noted in Section 4.1, attrition is not differential between experimental arms. Columns (9) and (10) in Table C11 further show that the non-response rate to the IPV module by women who have answered the rest of the survey is not different in any treatment arm relative to the control group.

We thus find no evidence of the intervention having impacted women's attitudes or beliefs about IPV and other violence. Moreover, the intervention does not seem to have impacted women's trust in enumerators. Although our survey measures of IPV are likely prone to general under-reporting, we can confidently conclude, based on the checks above, that inaccuracies in reporting of IPV are not differential between experimental arms. This suggests that it is unlikely that reporting bias explains our IPV results.

C.5 Alternative Explanations

Table C12: Treatment effects on parents' involvement in decisions

	Involvement in decisions in general				Involvement in decisions about daughter			
	Mother's involvement		Father's involvement		Mother's involvement		Father's involvement	
	Midline	Endline	Midline	Endline	Midline	Endline	Midline	Endline
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female vs. Control	-0.375	-0.327	0.082	0.072	-0.316	-0.356	0.063	0.049
p-val $F \neq C$	(0.053) *	(0.043) **	(0.696)	(0.670)	(0.130)	(0.042) **	(0.783)	(0.775)
	[0.141]	[0.141]	[0.784]	[0.784]	[0.261]	[0.141]	[0.784]	[0.784]
Male vs. Control	-0.102	0.035	-0.065	-0.054	-0.079	0.050	-0.052	-0.014
p-val $M \neq C$	(0.602)	(0.800)	(0.738)	(0.702)	(0.698)	(0.745)	(0.799)	(0.926)
	[0.914]	[0.914]	[0.914]	[0.914]	[0.914]	[0.914]	[0.914]	[0.926]
Female+Male vs. Control	0.129	0.054	-0.294	-0.185	0.114	0.094	-0.268	-0.162
p-val $F{+}M \neq C$	(0.516)	(0.685)	(0.168)	(0.191)	(0.590)	(0.475)	(0.239)	(0.259)
	[0.674]	[0.685]	[0.519]	[0.519]	[0.674]	[0.674]	[0.519]	[0.519]
Observations	810	789	810	783	810	789	810	783
Control Mean	3.802	4.103	5.561	4.999	3.808	4.133	5.495	5.015

Notes: Table reports post-estimated marginal treatment effects for girl adolescents ($\eta + \rho$) from the pre-specified OLS regression in equation (16) on parents' involvement in household decisions, at midline (columns 1, 3, 5 and 7) and endline (columns 2, 4, 6 and 8). Fathers were asked to report the involvement of all household members in decisions about budget and savings, food, and the education and health of the adolescent, by distributing 10 tokens between the household members. The dependent variable in columns (1) to (4) is the number of tokens allocated to the mother (columns 1 to 2) and father (columns 3 to 4) averaged over all topics of household decisions. The dependent variable in columns (5) to (8) is the number of tokens allocated to the mother (columns 5 to 6) and father (columns 7 to 8) averaged over household decisions about the adolescent's health and education. Standard errors are clustered at the village level, which is our level of randomization. Two-sided p-values are reported in parentheses. In square brackets, sharpened q-values correcting for false discovery rate using the Benjamini–Hochberg procedure are reported (Benjamini and Hochberg, 1995; Anderson, 2008). Dummies for randomization strata are included in all columns. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "observations" indicates the number of households with an adolescent girl that the marginal effects are estimated for using post-estimation.