Learning in the Household*

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Abstract

Do spouses pool useful information and learn from each other when they have incentives to do so? In an experiment with married couples in India, we vary whether individuals discover information themselves or must instead learn via a discussion about what their spouse discovered. Women treat their own and their husband's information the same. In contrast, men respond half as much to information discovered by their wife, even when it is perfectly communicated. When paired with strangers, *both* men and women heavily discount their partner's information relative to their own. We thus provide evidence of a gender difference in social learning (only) in the household.

Keywords: household, gender, communication, gender norms, experiment

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1 Introduction

Different members of a household often have access to independent information through their personal experiences and social networks. For example, two spouses might each have separate information about the efficacy of vaccines, the returns to an investment, or the right school to which to send their child. Standard models of household decision-making assume that all such information is pooled within the household.

We study how well spouses actually learn from each other when they have incentives to do so. In a lab experiment with 400 married couples in Chennai, India, participants play a simple learning game, guessing the share of red balls in an urn. Before guessing, they receive two noisy signals—two sets of draws with replacement—from the urn. In a control condition, participants privately draw both signals themselves and play alone. Men and women have similar performance and self-confidence in this condition.

In the treatment conditions, each spouse instead privately draws only one signal. The couple then has a chance to pool information through a face-to-face discussion, after which each spouse makes a private guess. Couples play multiple rounds of the experiment, facing different treatments in randomized order. Some treatments ensure that relevant information is shared, reducing communication frictions. One guess made in the experiment is randomly chosen to be paid off based on its accuracy, and the payoff is split equally between the spouses, creating incentives to pool information. Guesses made after discussion are kept private, even if selected for payment.

The key test is whether participants' private guesses are equally sensitive to information they discovered themselves and to information discovered by their spouse, as implied by information pooling. We estimate how much the average guess changes in response to an additional draw of a red—as opposed to white—ball, and call this the "weight" placed on signals.

Our main result is that men put substantially less weight on information collected by their wives, while women place equal weight on information collected themselves and by their husbands. Pooling across the treatment rounds, men are 46% less sensitive to signals drawn by their wives ($p < 0.01$). In contrast, women are only 10% less sensitive to signals drawn by their husbands, and we cannot reject that women treat their own and their spouses' information the same ($p = 0.38$). This difference in effects between husbands and wives is statistically significant ($p = 0.04$).

Breaking the results down by the different treatment conditions reveals that men's discounting of their wives' information is not due to communication frictions. In a treatment in which the experimenter directly informs each participant of their spouse's signals, men discount those signals by a striking 83% ($p < 0.01$). Lack of communication or mistrust between spouses thus cannot explain husbands' behavior. Rather, husbands treat information their wives gathered as innately less informative than information they gathered themselves.

Does the difference in spouses' learning from each other reflect a more general gender difference in learning from others? To test this, we re-analyze Experiment 1 from Conlon et al. (2022), where 500 adults at the same lab played the same experiment in pairs of mixed- and same-gender strangers. Here, we cannot reject equal under-weighting by men and women ($p = 0.61$). *Both* put substantially less weight on information discovered by their randomly-assigned partner.[1] Our results imply that husbands treat their wife's information as they would a stranger's. Wives instead put more weight on their husband's information than on strangers' information. Controlling for observable characteristics such as the players' relative age, marital status, relative ability, or confidence does not explain away the differences between husbands and wives, or between spouses and pairs of strangers.

Since men and women treat strangers' information similarly, the asymmetry in learning between wives and husbands is not due to gender differences *per se* (e.g., in self-confidence, assertiveness, or competitiveness; Niederle and Vesterlund, 2011; Exley and Kessler, 2022; Exley et al., 2020). Instead, the marital context itself appears to generate gender differences in behavior, perhaps due to norms of wives deferring to their husbands. Indeed, we find that measures of household decision-making significantly predict the weight placed on information, with spouses with greater decision-making power at home placing lower weight on their spouse's signal relative to their own. Having more power at home might cause individuals to ignore valuable information held by their spouse, which makes both spouses worse off. However, perhaps surprisingly, we do not find significant under-weighting of wives' information in joint guesses (as opposed to

[1] As argued in Conlon et al. (2022), this underweighting of others' information cannot be explained by factors such as confusion, social signaling, reputational concerns, competitive behavior, differences in ability or confidence, mistrust of the experimenter, propensity to contribute information (Coffman, 2014), or reluctance to ask for or provide information (Chandrasekhar et al., 2019). Instead, it suggests a form of ownership effects over information, related to Hartzmark et al. (2021).

individual guesses), which we also elicited to capture a joint household decision.

Our study contributes to the literature on household decision-making, particularly in developing countries. Standard models of household decision-making assume that spouses have identical beliefs but may have differing preferences (Chiappori and Mazzocco, 2017). Several recent papers have relaxed the assumption of perfect information pooling, exploring situations where one spouse may have strategic reasons to hide information from the other (e.g., Ashraf, 2009; Ashraf et al., 2014; Ambler, 2015; Lowe and McKelway, 2022). Others have measured information asymmetries (Afzal et al., 2022) and tested whether information is transmitted within the household (e.g., Fehr et al., n.d.; Ashraf et al., 2021; Apedo-Amah et al., 2020). To our knowledge, our paper is the first to study how couples pool information when their incentives are fully aligned.

Second, our study adds to the literature on the role of gender in group judgments and decision-making. Existing evidence shows that women are less likely to contribute their ideas, particularly in stereotypically-male tasks (Coffman, 2014; Cooper and Kagel, 2016) and in mixed-gender groups (Bordalo et al., 2019; Chen and Houser, 2019). When women do contribute information, they are often perceived as less competent or worse communicators, even conditional on ability (Beaman and Dillon, 2018; Coffman et al., 2021a; Mengel et al., 2019). We show that—in a task with no gender differences in performance or confidence—gender differences in learning can emerge in the household context, even when there are no gender differences outside it. This echoes Abbink et al. (2020), who show that women in Bangladesh are more likely than men to delegate risky lab decisions to their spouse, despite no gender differences when playing with strangers.

2 Setting, Recruitment, and Study Sample

The experiments were conducted at the Behavioral Development Lab in Chennai, India, between June and December 2019. We recruited participants on a rolling basis, with about 2 to 5 pairs of people completing the experiment on a given day. Recruitment stopped when we reached our pre-specified target of 400 couples and 500 unrelated individuals (250 men and 250 women) who completed the experiment.

Recruitment of couples. We recruited couples from low- to middle-income communities within a reasonable travel time of the lab. Surveyors went door-to-door to advertise an academic study on 'how decisions are made in the household'. Potential participants were informed that they would spend 2 to 3 hours at the study office and could expect to earn Rs. 300-560 ($4-7.75) per couple, plus a payment of Rs. 100 ($1.40) to cover travel expenses. Participants were required to be 'married couples' who could come to the lab together.[2] No more specific information was provided at this point.

Recruitment of strangers. Our 'strangers' sample (also described in Conlon et al. 2022 as 'Experiment 1') participated in a separate set of experimental sessions, where they played in both mixed- and same-gender pairs. We recruited individuals unknown to each other prior to our study from the same neighborhoods as the couples sample. Recruiters followed the same procedure as for the couples sample, with the exception that participants were recruited individually.

Descriptive statistics. Table A.I shows average characteristics for the two samples. The average couple has been married for about 12 years, and husbands are about 5 years older than wives (Columns 1 and 2). Average education is similar across spouses at about 8 years, though husbands are somewhat more numerate than wives. They are also much more likely to work outside the household (100% vs. 42%) and thus earn about 5 times more than wives on average. Our secondary sample of strangers (Columns 3 and 4) is similar to the couples on demographics except that they also include single adults of both genders (although a majority are married). They have similar education levels, ages, literacy, numeracy, and labor-market participation relative to the couples.

3 Experimental Design

Our goal was to study how well spouses learn from each other in a simple setting where both spouses would benefit from pooling information. The experimental design allows for a simple test of whether a participant is equally sensitive to their own and their partner's signals. Crucially, studying learning in the lab allows us to align the incentives of the spouses. Existing work shows that differences in preferences create strategic motives to hide information and can undermine credible communication between spouses (Ashraf et al., 2014, 2021). In our experiment, with payoffs split equally between spouses, there are no strategic reasons to withhold information; instead, there

[2] In practice, by 'married couples' we mean cohabiting couples who identified as married. Given the cultural context, it was inappropriate to ask people to reveal other forms of romantic relationships. It is also uncommon in our study context for same-sex couples to publicly identify as such, and thus our sample consists entirely of couples consisting of one man and one woman.

are clear incentives to pool information. In addition, studying learning in the lab allows us to control each spouse's private information set and to calculate what the "right" answer is.[3] With some assumptions, this allows us to say whether learning is better or worse under different treatments. We also deliberately study a domain without strong gender stereotypes and with similar ability across genders. Arguably, these design choices all make learning from one's partner easier and more likely.[4]

Figure 1 illustrates the experimental design. Participants play five rounds of a balls-and-urns task (Benjamin, 2019). The goal in each round is to guess the number of red balls in an urn containing 20 balls. Participants are informed, with the help of Figure A.I(a), that the number of red balls is drawn uniformly from 4 to 16 in each round. In each round, participants can learn two signals about the composition of the urn. Each signal is a set of independent draws (that is, with replacement) of balls from the urn, either drawn privately by the participant themselves or by their partner. The number of draws in each signal is randomized—either 1, 5, or 9 draws—creating variation in how informed each participant is. After receiving each set of draws—or potentially learning them through a discussion with their partner—participants privately guess the number of red balls in the urn.

We create incentives for participants to pool information and make accurate guesses by rewarding one randomly-chosen guess from each pair for its accuracy. We use easy-to-understand incentives: the closer their guess is to the truth, the more participants are paid. More precisely, as illustrated in Figure A.I(b), participants earn Rs. 210 if the guess is exactly correct, and lose Rs. 30 for each ball that their guess is away from the truth (though the guess cannot earn less than Rs. 0). The maximal pay of Rs. 210 per pair is about \$3 and Rs. 30 is about \$0.40. These incentives are substantial when compared to average daily earnings per capita of about Rs. 350 (\$5).

To ensure that incentives to pool information are aligned within the pair, we divide the payoff equally between the two participants irrespective of who made the guess that is chosen for scoring. Each participant receives their half in a separate envelope at the end of the experiment.[5] Each person thus has an incentive to make every guess from

[3] More precisely, we can calculate what the expected-earnings maximizing guess made by a rational Bayesian would be when presented with the same signals.

[4] See Conlon et al. (2022) for a further discussion of the design and particularly its strengths and weaknesses as a social learning task.

[5] Of course, married couples—but not strangers—might redistribute the earnings after leaving the experiment. Even so, each partner should be at least weakly better off by pooling information.

their team as accurate as possible. Neglecting to ask your partner for information or withholding information from your partner reduces your own expected payoff.

Any private guesses made after discussion were not revealed, even if selected for payment. This ensures that participants have incentives to guess what they truly think, without worrying about revealing potential disagreement to their spouse.

Comprehension of the experimental instructions was excellent, as measured by the comprehension checks reported in Table A.II. Husbands and wives each answered about 87% of questions correctly on the first attempt.

3.1 Experimental treatments

Figure 1(b) shows the structure of the *Individual* (control) condition and each treatment condition. Participants first play, in randomized order, one round of the *Individual* condition and one round of the *Discussion* treatment.

***Individual* condition.** In this condition, the participant first draws a set of balls from the urn, then guesses how many red balls are in the urn. Then, they draw a second set of balls from the urn and make a second (and final) guess. All drawing and guessing is done privately, with no opportunity to share information. This serves as a control condition—a benchmark against which we compare the other treatments.

***Discussion* treatment.** Each person first makes one set of draws followed by a private guess, exactly as in the *Individual* condition. Next, the pair is asked to hold a face-to-face discussion and decide on a joint guess. After their discussion and joint guess, each person makes one final, private guess. The pair can take as long as they like for the unstructured, face-to-face discussion. They are aware that they will enter a joint guess after the discussion and will then each make a private guess. Thus, they have an incentive to pool information with their partner.

Comparing each participant's final guesses in the *Individual* condition to their final guesses in the *Discussion* treatment reveals how much they react to information that they uncovered themselves relative to information that is discovered by their partner and potentially learned from them via discussion. By design, participants have access to the exact same number of draws to inform their final private guess in these two conditions, provided they share information.

To test whether any potential underweighting of others' information is caused by communication frictions (i.e., information is never communicated between partners) or by inefficient use of communicated information, we implement two additional treatments to mitigate communication frictions. Participants play these along with a second round of the *Discussion* treatment in randomized order.

***Informed of Partner's Draws* treatment.** This treatment is identical to the *Discussion* treatment except that after each participant receives their first set of draws and enters their first guess, they are told their partner's draws (both number and composition) directly by the experimenter, e.g., "Your spouse had five draws, of which three were red and two were white." They then make an additional private guess, which can incorporate both sets of draws, before moving on to the discussion, joint guess, and final private guess. A greater weight placed on one's partner's signal in this treatment compared to the *Discussion* treatment indicates a lack of communication or mistrust between spouses in the face-to-face discussion.[6]

***Informed of Partner's Guess* treatment.** This treatment is identical to the *Informed of Partner's Draws* treatment except that the experimenter tells each person their partner's private guess (based on their own draws only) rather than their partner's draws. The experimenter also shares the number of draws on which this guess was based, e.g., "Your spouse had 5 draws and, after seeing these draws, they guessed that the urn contains 12 red balls." Thus, while in the *Informed of Partner's Draws* treatment we directly transmit the signal received by one's partner, in the *Informed of Partner's Guess* treatment we transmit the action (guess) taken based on that signal. When observing actions, beliefs about others' competence might affect how these actions are interpreted and how much is learned about the signals.

Strangers experiment. To learn whether spouses pool information differently than teams of comparable strangers, and whether any gender differences between spouses are specific to the marital context, we repeat the experiment with pairs of strangers—who are quasi-randomly assigned to each other—with similar demographics. The pairs of strangers play the same five rounds of the task as above, the order of which was similarly randomized. However, participants play one of the two *Discussion* treatment

[6]Comparing the guess made after informing each participant of their partner's draws (but before discussion) with the final guess in the *Individual* condition cleanly tests whether information is used identically regardless of the source. Comparing the post-discussion guesses in the *Informed of Partner's Draws* and *Discussion* treatments holds fixed joint deliberation while testing whether communication frictions in discussion inhibit information pooling.

rounds—picked at random—in same-gender pairs and the other four rounds in mixed-gender pairs. This allows us to also test whether mixed-gender environments themselves create gender differences in behavior, as in Babcock et al. (2017).

3.2 Individual performance and confidence

In both samples, men and women perform equally well in the *Individual* condition. Figure A.II Panel A plots participants' average performance—the expected earnings from their guesses—in the *Individual* condition against the number of draws they received. Reassuringly, expected earnings increase with the number of draws, implying that participants learn from more signals. The difference between men's and women's earnings is insignificant at each number of draws. Overall, men and women have nearly identical expected earnings (Rs. 122 vs. Rs. 120, $p = 0.33$). In 48% of couples, the wife outperforms the husband. Panel B shows that average guesses for both husbands and wives are quite close to those a risk-neutral Bayesian would make following the same draws.

Men and women are both—equally—overconfident about their own ability, as reported in Figure A.II and Table A.I. After completing the experimental rounds, we asked participants to privately predict their own and their partner's average expected earnings.[7] Men correctly believe that their wives are as good as they are, but intriguingly, women *incorrectly* predict that their husbands are better than them. Women's inflated views of their husband's ability relative to their own do not extend to other men; when asked about their male partners in the strangers experiment, or about men versus women 'in general,' women do not think that men outperform women.

Altogether, we interpret these facts as suggesting that our experimental task is not particularly gendered. Men and women are equally good and, with the exception of wives' beliefs about their husbands, largely believe that they are equally good. This is worth noting since recent literature has shown that the gender stereotype of particular tasks affects beliefs (Bordalo et al., 2019), belief-updating (Coffman et al., 2021b), and contributions to problem-solving (Coffman, 2014; Coffman et al., 2021a).

[7]These predictions were incentivized. Each participant's prediction of either their own or their partner's earnings was randomly picked to be paid off. Participants earned Rs. 50 for a prediction within Rs. 30 of the truth, and nothing otherwise. It was not revealed to participants which guess was paid off. A participant's guesses were not revealed to their partner.

4 Results: Learning from Own vs. Others' Information

4.1 Empirical framework

We test whether participants respond differently to information gathered themselves and by their partner, and whether this varies with gender. Let $\textit{First Signal}_{irt}$ and $\textit{Second Signal}_{irt}$ be the net number of red draws (i.e., red minus white draws) in the first and second signal, respectively, for individual i in round number $r \in \{1, 2, 3, 4, 5\}$ and treatment/control condition t. We estimate the following equation by OLS:

$$\begin{aligned} \textit{Guess}_{irt} = \alpha + \beta_1 \cdot \textit{First Signal}_{irt} + \beta_2 \cdot \textit{Second Signal}_{irt} \\ + \boldsymbol{\beta_3} \cdot \mathbf{T}_{irt} \cdot \textit{Second Signal}_{irt} + \epsilon_{irt} \end{aligned} \tag{1}$$

where $\textit{Guess}_{irt}$ is i's private guess of the number of red balls in round number r and condition t. β_1 captures the "weight" that participants put on their first set of draws, averaging across all treatments.[8] β_2 is the weight they put on their second signal in the *Individual* condition, when they gather the signal themselves. $\mathbf{T}_{irt}$ is a vector of indicators for whether a particular guess corresponds to the *Discussion*, *Informed of Draws*, or *Informed of Guess* treatments or, in a pooled analysis, any of these treatment conditions. When breaking down effects by treatment condition, we allow for arbitrary order effects by including round-number dummies interacted with $\textit{Second Signal}_{irt}$. Standard errors are clustered at the pair level.

Our key parameter of interest is $\boldsymbol{\beta}_3$, which captures the *additional* weight placed on the second set of signals when they are drawn by one's partner. With perfect information-pooling, it should not matter whether the signals were drawn oneself (as in the *Individual* condition) or by one's partner (as in the *Discussion* or *Informed* treatments), i.e., $\boldsymbol{\beta}_3 = 0$.[9] If instead $\boldsymbol{\beta}_3 < 0$, then participants in the corresponding

[8] We average across all rounds and conditions for *First Signal* since the treatment only applies to the second set of signals. In a robustness check (Table A.III), we allow β_1 to vary by treatment. This does not change our conclusions. Throughout the analysis, we do not include participants' first private guess within each round, since this occurred before they had a chance to learn about their partner's signal.

[9] A partial exception to this benchmark is for participants' pre-discussion guess in the *Informed of Guess* treatment. Here, participants do not have direct information about their partner's signal and must instead (try to) back it out from their guess. However, in practice, weights on partners' signals

treatment do not fully learn their partner's information or under-weight it relative to their own.

Our analysis does not assume that participants are Bayesian. Even if participants deviate from Bayesian updating in the many ways documented in the literature, they should still respond similarly to their own signals and their partner's signals, since the order of receiving the signals, the average number of draws and the prior are held equal across treatments by the experiment. Our test is robust to arbitrary differences across husbands and wives in their risk preferences as well as their ability to update their beliefs accurately—in accordance with Bayes' Rule—when playing alone.

4.2 Couples experiment

Figure 2 plots the average weight—summing up β_2 and β_3 from Equation 1—that participants place on their second signal. The grey bars represent the weight participants put on their own signal in the control (i.e., *Individual*) condition while the blue bars show the weight put on their partner's signal (pooling across the *Discussion* and *Informed* treatments) in their final private guesses. The corresponding regression results for husbands and wives are shown in Columns 1 and 3 of Table 1.

Husbands' guesses are much less sensitive to signals collected by their wives compared to their own signals. They put 46 percent less weight on the second signal in the treatment conditions, collected by their wives, than on the corresponding signal in the *Individual* condition (0.29 vs. 0.54, $p < 0.01$). This implies husbands do not learn efficiently from their wives: they either fail to learn their wife's signal in the first place (communication frictions) or discount it upon learning it (information-processing frictions).[10]

Column 2 of Table 1 breaks down this result by the different treatment conditions, while controlling for order effects. Strikingly, husbands discount their wives' signals just as much (in fact, slightly more: 83 percent vs. 60 percent, $p = 0.09$) when they are (additionally) informed of them by the experimenter compared to when they must learn them through a discussion with their wife.[11] By design, this cannot be explained

in the pre- and post-discussion guesses in the *Informed of Guess* treatment look very similar.

[10]Recall that Figure A.II Panel B showed that, in the *Individual* condition, participants are slightly less sensitive to their own signal than a risk-neutral Bayesian would be. Thus, when husbands are even less sensitive to their wife's signal, they move further away from a Bayesian benchmark.

[11]Note that these effects are even larger than the pooled estimate. This discrepancy is explained by

by a failure to communicate or by husbands mistrusting their wives. Instead, it appears that husbands process information discovered by their wives differently than their own information. Similarly, husbands put very little weight on their wives' signal in the *Informed of Partner's Guess* treatment.[12]

Wives, in stark contrast to husbands, do *not* significantly under-weight their spouse's information relative to their own (Column 3 of Table 1). They place about 10 percent lower weight on their husband's information in the pooled treatment conditions compared to their own information in the *Individual* condition ($p = 0.38$). Unlike husbands, wives are thus able to learn and process their spouse's signal as effectively as their own. Husbands and wives significantly differ in the 'discount' they place on each others' information ($p = 0.04$). Column 4 of Table 1 shows that wives do not significantly discount their husbands' information in any treatment, and the difference in husbands' and wives' discounting of each others' information is significant in each treatment.

Is discounting of wives' signals costly for husbands? Table A.V regresses expected earnings on the number of draws in each signal (which was randomized across rounds). Husbands (Column 1) earn significantly less per additional draw in the *Discussion* and *Informed* treatments than in the *Individual* condition ($p < 0.05$ for all treatments). In contrast, the differences for wives are small in magnitude and insignificant (Column 2).

These results suggest that wives' higher weights on their spouse's information may be driven by gender differences in learning (e.g., women may not under-weight others' information in general) or by something specific to gender norms in marriage in our study context (e.g., "women should defer to their husbands"). We turn to the strangers experiment to disentangle these competing explanations.

4.3 Strangers experiment

Figure 2 and Table 1 also report the weights that men and women place on the second signal when partnered with strangers. Compared to their own signals, men put

the controls for the order effects, which are not possible to include in the pooled specification, since the order of treatments was not fully randomized (see Figure 1). In either case, husbands' discounting of their wives' information is substantial and statistically significant.

[12]For ease of presentation, we pool the pre- and post-discussion guesses for the two *Informed* treatments in the main analysis. Disaggregated estimates for all guesses are shown in Table A.IV and Figure A.III. These reveal that husbands' discounting of their wives' information in the *Informed* treatments is large and significant both before and after discussion with their wives.

56% less weight on signals drawn by a stranger ($p < 0.01$, Column 5 of Table 1). Men's discounting of their partner's signals is very similar across the *Discussion* and *Informed* treatments (Column 6). Men place 12% less weight on their partner's signals when the partner is a woman, but this difference is not statistically significant ($p = 0.59$).

The same figure tells a very similar story for women's guesses. In contrast to wives, who put equal weight on their own and their husbands' signals, women paired with a stranger heavily discount their partner's signals by 48% ($p < 0.01$, Column 7). We cannot reject that men and women discount strangers' information by equal amounts ($p = 0.61$). Women discount their partner's information significantly in each treatment, with the exception of the *Discussion* treatment, where they discount the partner's information by a substantial 36%, but the effect is only marginally significant ($p = 0.11$). In none of the treatments can we reject equal discounting by men and women when paired with strangers. Women put 10% more weight on the signals of other women, but this difference is not statistically significant ($p = 0.62$).

Are men and women behaving differently in the two samples? To formally test for gender differences between married couples and pairs of strangers, we pool the *Discussion* and both *Informed* treatments of both samples and estimate how the weights placed on one's partner's info vary by sample (couples vs. strangers) and by gender (Table A.VI). We see that men behave quite similarly when partnered with their wives versus with strangers. In contrast, women place significantly more weight on their partner's information when that partner is their husband.

Could sample selection explain the differences in women's guessing patterns across experiments? One might worry that participants are different across the two experiments given the difference in recruiting (individuals vs. couples). First, it is worth noting that married women show similar discounting of strangers' information as unmarried women (44% vs. 38%, $p = 0.7$). Still, one might be concerned that women in the strangers sample are more 'independent' than wives in the couples sample since they arrive at the lab on their own (which in turn might be associated with more discounting of others' information). We cannot fully rule out such differences, but Table A.VII shows that controlling for observable characteristics of participants (such as their marital status, their labor-force participation, daily earnings, self-confidence in the task, etc.) does not explain away the gender differences in guessing patterns across couples and strangers.

4.4 Individual vs. joint decisions

The private guesses discussed so far shed light on the extent to which information flows freely within households and whether spouses learn from each other. Our experiment also allows us to study how people make *joint decisions*. Specifically, after the face-to-face discussion between spouses, they were asked to enter a 'joint' guess before they were separated and asked to make their private guesses. If the joint guess was randomly picked to be paid out, payoffs were once again split equally between spouses.

It is ambiguous ex ante whether joint decisions will be better or worse than individual decisions. Joint guesses could be better than individual guesses because even if spouses disagree, a process of bargaining and compromise might improve performance. Alternatively, if joint decisions place excessive weight on an individual who has inaccurate beliefs—say, a husband who ignores his wife's information—joint decisions might be worse than providing all the information to one member and asking them to decide unilaterally.

Perhaps surprisingly given the above results, we find that couples' joint guesses put very similar weights on husbands' and wives' information (Figure A.Va). Joint decisions by couples put slightly more weight on wives' information compared to husbands' information in the *Discussion* treatment but do the opposite in the *Informed* treatments, though none of these differences is statistically significant. The weights on men and women among strangers look broadly similar to the weights among spouses (Figure A.Vb).

Our interpretation of these patterns is that group decisions in this case mitigate biases in individual decision-making. While the partners may not agree on the best guess—as evidenced by the fact that only half of participants make the same private final guess as the joint guess—a process of bargaining and compromise in this case ensures equal weights in the joint guess. Our results imply that, for decisions that are truly made jointly in the household, the standard assumption of information pooling may not be a bad one—at least as long as both spouses have aligned preferences. However, when household decisions are made by an individual—particularly by husbands in culturally similar contexts to India—information pooling may fail even when this makes both spouses worse off.

4.5 Variation across households

What explains the asymmetry in learning across genders (only) in couples? More generally, what determines the weight each spouse's signal receives? In this section, we report an exploratory analysis of heterogeneity across households, as well as a randomized experiment testing for the importance of social signaling.

First, we study the role of the relative power that each spouse typically has to make decisions in the household. We test whether, in couples where husbands tend to make most of the important household decisions, husbands' underlying information receives greater weight in shaping the beliefs of both spouses. Second, husbands were incorrectly perceived by their wives as being better at the task than them. A spouse perceived to be more competent might be more likely to dominate discussions, leading to more weight put on their signals. To test these hypotheses, we estimate the following regression specification:

$$\begin{aligned} Guess_{ij} &= \alpha + \beta_1 Husband\text{'s } Signal_{ij} + \beta_2 Wife\text{'s } Signal_{ij} \\ &\quad + \gamma_1 Husband\text{'s } Signal_{ij} \times \mathbf{X}_j + \gamma_2 Wife\text{'s } Signal_{ij} \times \mathbf{X}_j + \epsilon_{ij} \end{aligned} \tag{2}$$

where $Guess_{ij}$ is the private guess by participant i in couple j of the number of red balls in the urn. *Husband's Signal*$_{ij}$ and *Wife's Signal*$_{ij}$ are defined similarly to Equation 1 as the net number of red draws in the husband's and wife's signals, respectively. $\mathbf{X}_j$ is a vector of household characteristics that includes normalized indices of (i) the relative household decision-making power of the husband[13] and (ii) the relative ability of the husband at the experimental task.[14]

Table 2 shows the results for the *Discussion* treatment, pooling the guesses made by husbands and wives. The interaction of the husband's decision-making power with the husband's signal is positive and significant, while the interaction with the wife's signal is negative (though not significant). The key test is for the difference between

[13]The household decision-making power variable is constructed by taking the average answer couples gave to questions asking whether the husband primarily made decisions for the household regarding finances, education, health, shopping, travel, savings, and loans, whether he managed the money in the household, whether he was the primarily household decision-maker, and whether he earned more outside the household than the wife.

[14]The relative ability measure averages indicator variables for whether each spouse thinks the husband is better at the experimental task, whether he answered more comprehension questions, numeracy questions, and memory questions correctly, and whether he performed better (in first private guesses) at the task.

these two interaction coefficients, which is sizable and statistically significant (+0.11, $p = 0.03$). Thus, as the husband's decision-making power at home increases, relatively higher weight is placed on his signal relative to his wife's. Table A.VIII shows that this effect is driven equally by the guesses of husbands and wives. That is, the higher the decision-making power of a spouse, the higher the weight *both* spouses place on that spouse's information set, even in their own private beliefs. While only a correlation, this result hints at how underlying power relations within a couple affect not just (say) bargaining weights over actions, but also how knowledge within the household is weighted, along the lines of Hoff et al. (2017).

We find a similar pattern of results for relative ability. The higher the relative ability of a spouse at the experimental task, the more their exogenously-provided information is weighted. The difference in the interactions between husband's relative ability and husband's and wife's signals is again large and statistically significant (+0.20, $p = 0.001$) and the effect is again driven by both spouses.

Finally, we also investigated whether the physical presence of an experimenter during the discussion improved or instead worsened learning between husbands and wives. If so, this would suggest some role for social signaling to the experimenter in the weights placed on one's spouse's information. To test this, we randomized within-couple whether the experimenter was in the booth during the discussion in each round. Table A.IX shows no evidence that the experimenter's presence affects husbands' or wives' weighting of their spouses' signals.

5 Conclusion

Our findings imply that—even absent strategic motives—households may not pool information. Spouses may fail to learn from each other, even when this makes them both worse off. Moreover, this occurs in an asymmetric way by gender, despite considering a gender-neutral domain. We find that wives rationally weight their own and their husband's information equally, while husbands are much less sensitive to their wife's information. If these findings prove to be true more generally, then policy-makers who want to ensure that both spouses in a household acquire some knowledge should not assume that informing or training one spouse will suffice. Information provided to women may be particularly discounted, as in BenYishay et al. (2020).

Our study has numerous limitations that point to useful avenues for future research. First, it would be valuable to collect more data on differences in economically important beliefs within the household, as in, e.g., Fehr et al. (n.d.) and D'Acunto et al. (2021). Second, it will be important to study information pooling within the household using more natural field experiments and with higher stakes, as in Ashraf et al. (2021). Third, we studied a relatively gender-neutral domain in which men and women had similar ability and similar beliefs about own ability. Given the well-documented importance of gender stereotypes in beliefs and learning (e.g., Coffman et al., 2021a,b), it would be interesting to study if individuals weight their spouse's information more highly when it is in a domain congruent with the spouse's gender. Finally, it will be important to better understand the kinds of decisions in which the psychology we document matters most. In culturally similar settings, decisions that are made largely by husbands but to which wives have some relevant information are likely to see the least efficient use of information in decisions. Conversely, women might make better decisions when information aggregation within the household is helpful.

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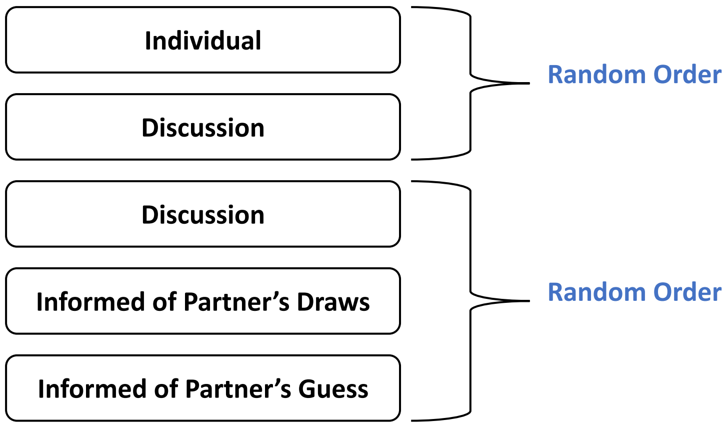
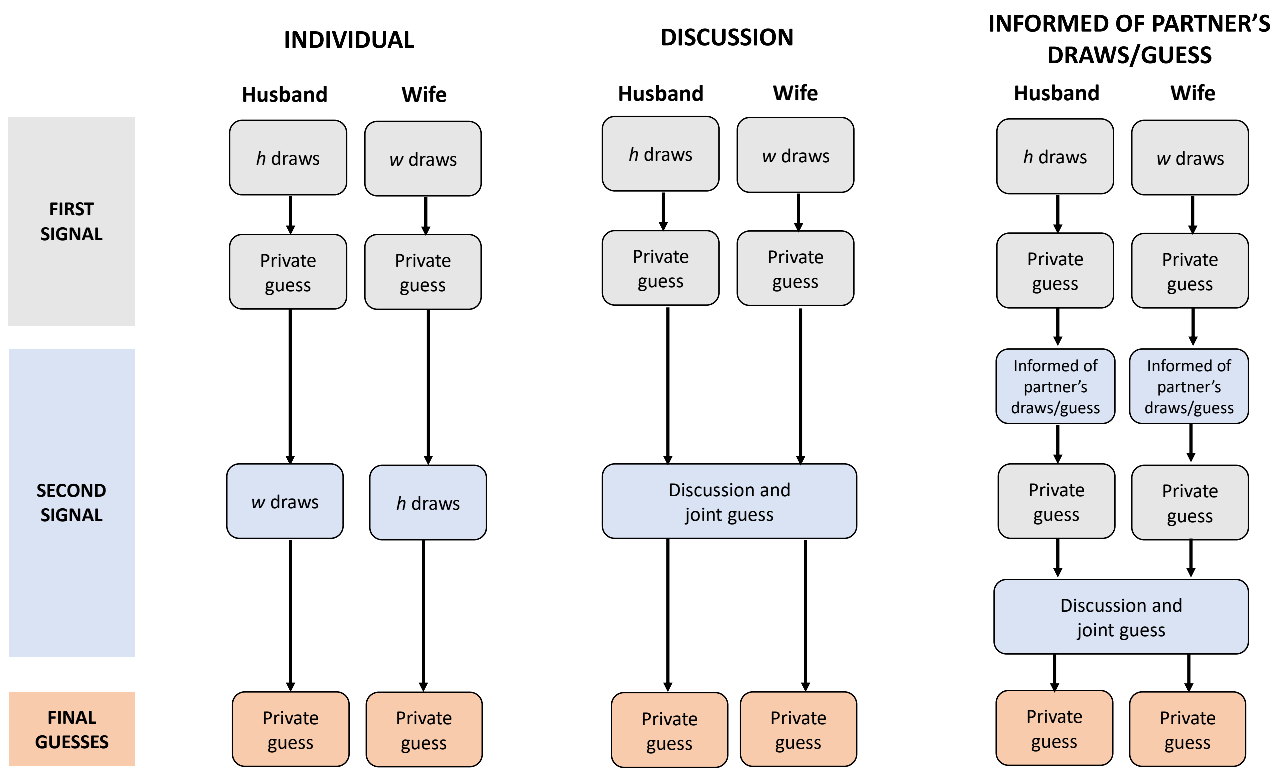
Figure 1: Experimental Design

Panel A: Overall Design



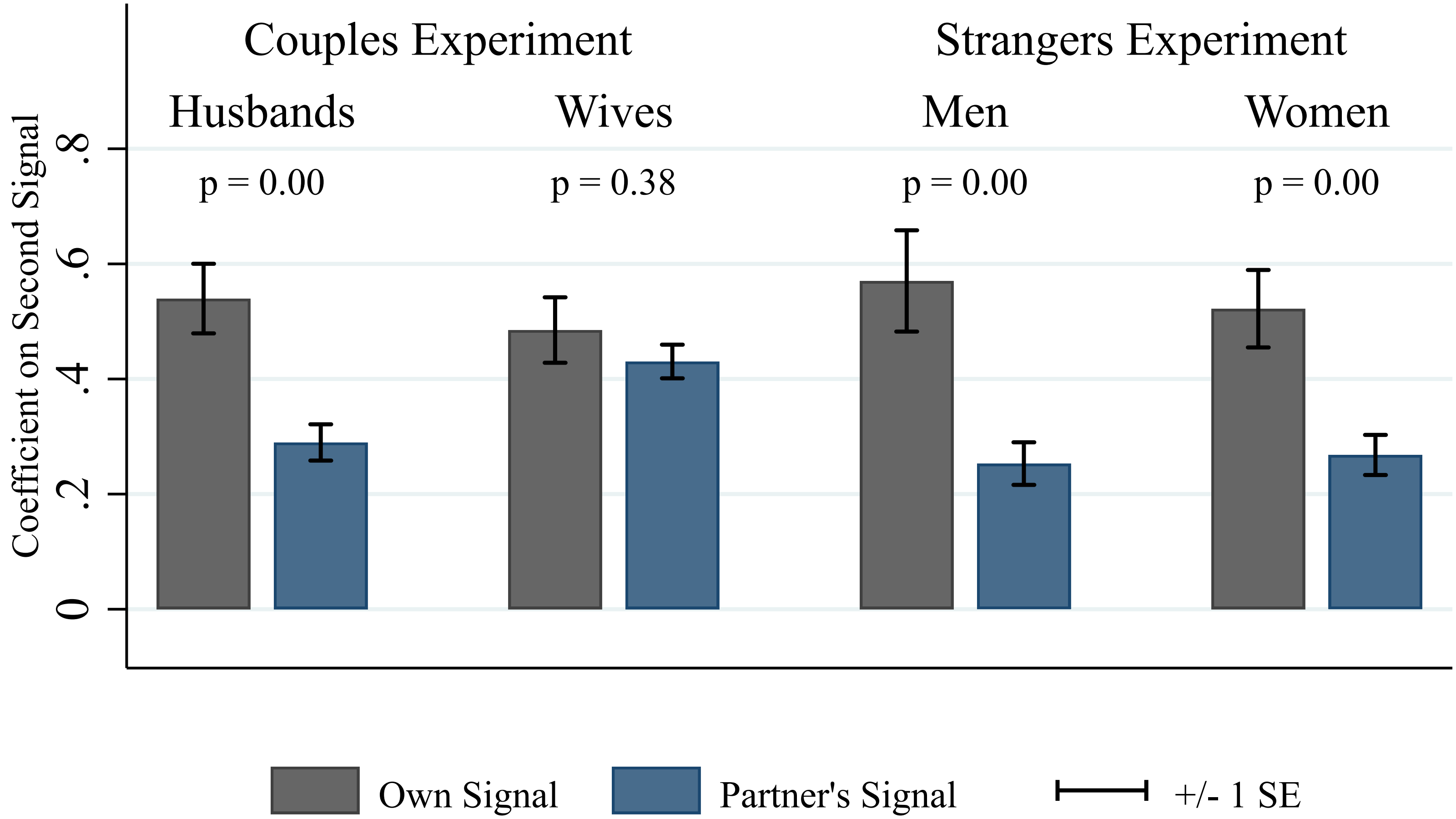
Panel B: Structure of *Individual*, *Discussion*, and *Informed* conditions



Panel A shows the five rounds of the couples and strangers experiment. All couples and pairs of strangers complete all five rounds. The first two rounds consist of an *Individual* condition and *Discussion* treatment in randomized order. The final three rounds consist of a *Discussion*, *Informed of Partner's Guess*, and *Informed of Partner's Draws* treatment in randomized order.

Panel B describes the structure of the different conditions. In the *Individual* condition, each spouse gets two sets of private draws from the urn and makes a private guess after each set of draws. This is the only condition with no discussion. In the *Discussion* treatment, each spouse makes one set of draws followed by a private guess. The two spouses are then asked to discuss and make a joint guess. Next, each spouse makes a final private guess. The *Informed of Partner's Draws/Guess* treatments are identical to the *Discussion* treatment, except that they include additional information-sharing before the discussion and joint guess. In the *Informed of Partner's Draws* round, each spouse is informed about their partner's draws earlier in the round, and then asked to make a private guess. In the *Informed of Partner's Guess* round, each spouse is informed about their partner's guess earlier in the round, and then asked to make a private guess.

Figure 2: Weights on Own vs. Partner's Information



Notes: This figure shows the weights participants in the couples experiment put on their second signals across treatments. Separately for husbands and wives in the couples sample, and men and women in the strangers sample, we estimate Equation 1 by OLS. The gray bars labeled "Own Signal" show β_2, the weight participants put on their second signal in the *Individual* round, in which they gather this signal themselves. The blue bars labeled "Partner's Signal" show $\beta_2 + \beta_3$, the weight participants put on their second signal in the *Discussion* and *Informed* treatments, in which their partner gathered this signal.

Table 1: Couples' and Strangers' Weight on Own vs. Others' Information

	Couples				Strangers			
	Husbands		**Wives**		**Men**		**Women**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_1: First Signal	0.55***	0.55***	0.48***	0.48***	0.46***	0.46***	0.47***	0.47***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
β_2: Second Signal	0.54***	0.53***	0.49***	0.51***	0.57***	0.52***	0.52***	0.50***
	(0.06)	(0.08)	(0.06)	(0.07)	(0.09)	(0.11)	(0.07)	(0.10)
$\beta_{3,0}$: Second Signal X From Partner	-0.25***		-0.05		-0.32***		-0.25***	
	(0.07)		(0.06)		(0.10)		(0.08)	
$\beta_{3,1}$: Second Signal X Discussion		-0.32***		-0.04		-0.33***		-0.18
		(0.08)		(0.08)		(0.12)		(0.11)
$\beta_{3,2}$: Second Signal X Informed of Draws		-0.44***		0.06		-0.35**		-0.34**
		(0.12)		(0.11)		(0.15)		(0.14)
$\beta_{3,3}$: Second Signal X Informed of Guess		-0.51***		-0.11		-0.38**		-0.42***
		(0.11)		(0.12)		(0.16)		(0.14)
β^{pf}: Second Signal X Discussion X Partner Female						-0.06		0.05
						(0.11)		(0.11)
N	2,800	2,800	2,800	2,800	1,750	1,750	1,750	1,750
p-value: $\beta_{3,0}$ equal across genders			0.04				0.61	
p-value: $\beta_{3,1}$ equal across genders				0.02				0.38
p-value: $\beta_{3,2}$ equal across genders				0.00				0.98
p-value: $\beta_{3,3}$ equal across genders				0.02				0.81
p-value: $\beta_{3,1}$ to $\beta_{3,3}$ equal across genders				0.02				0.52

Notes: This table shows OLS estimates of Equation 1 for the couples experiment (Columns 1-4) and the strangers experiment (Columns 5-8), broken up by gender (Columns 1-2 and 5-6 for men, 3-4 and 7-8 for women). The dependent variable is participants' private guess (excluding first private guesses before any information about partners' signals was available). "First Signal" indicates the net number of red draws (i.e., red draws minus white draws) in the first signal. Similarly, "Second Signal" indicates the net number of red draws in the second signal. "Discussion" is an indicator that equals one for the final private guess in the *Discussion* treatment, when the second signal was drawn by the participant's partner and then (potentially) communicated to the participant through discussion. "Informed of Draws" indicates the second and third private guess in the *Informed of Partner's Draws* treatment, after the participant was directly told their partner's information (pooling the guesses the participant made before and after the discussion). "Informed of Guess" indicates the second and third private guess in the *Informed of Partner's Guess* treatment, after the participant was told their partner's first private guess (pooling the guesses the participant made before and after the discussion). Columns 2, 4, 6, and 8 include order fixed effects interacted with "Second Signal." Standard errors are clustered at the couple level. *, **, and *** indicate significance at the $p<0.10$, 0.05, and 0.01 levels.

Table 2: Heterogeneity Across Couples

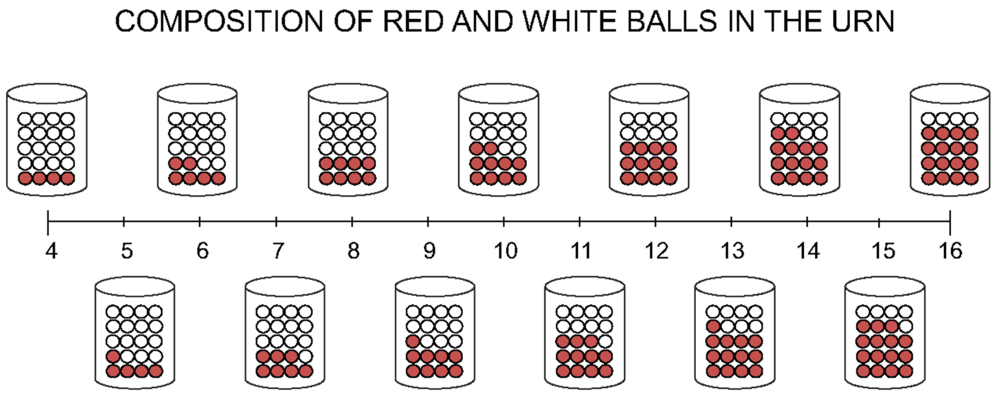
	(1)	(2)	(3)
Husband's Signal	0.54***	0.56***	0.56***
	(0.08)	(0.07)	(0.07)
Wife's Signal	0.36***	0.32***	0.33***
	(0.07)	(0.07)	(0.07)
H's X HHDM Index	0.06*		0.05
	(0.03)		(0.03)
W's X HHDM Index	-0.05		-0.03
	(0.03)		(0.03)
H's X Ability Index		0.07*	0.06
		(0.04)	(0.04)
W's X Ability Index		-0.13***	-0.13***
		(0.04)	(0.04)
Constant	10.22***	10.21***	10.21***
	(0.18)	(0.17)	(0.17)
N	2,400	2,400	2,400
p-value: HHDM Interactions Equal	0.035		0.090
p-value: Ability Interactions Equal		0.001	0.002

Notes: This table shows OLS estimates of Equation 2 for the couples experiment. The dependent variable is participants' private guess (excluding first private guesses before any information about partners' signals was available) in the *Discussion* treatments. "Husband's Signal" indicates the net number of red draws (i.e., red draws minus white draws) in the husband's signal. Similarly, "Wife's Signal" indicates the net number of red draws in the wife's signal. "HHDM Index" is constructed as follows: first, we take the average answer couples gave to questions asking whether the husband primarily made decisions for the household regarding finances, education, health, shopping, travel, savings, and loans, whether he managed the money in the household, whether he was the primarily household decision-maker, whether he earned more outside the household than the wife, and whether he was older than the wife. We then normalize this variable such that it has a mean of zero and standard deviation of one. "Ability Index" is constructed as follows: we take the average of indicators for whether the husband answered more comprehension questions correctly, whether each spouse thinks he is better at the experimental task, whether he actually performed better (in first private guesses) at the task, whether he correctly answered more numeracy questions, and whether he correctly answered more of the memory questions (about the number and color composition of his draws in the *Informed of Draws* treatment and about his previous guess in the *Informed of Guess* treatment) than his wife did. We then normalize this variable such that it has a mean of zero and standard deviation of one. All regressions include order fixed effects interacted with "Husband's Signal" and "Wife's Signal." Standard errors are clustered at the couple level. *, **, and *** indicate significance at the p<0.10, 0.05, and 0.01 levels.

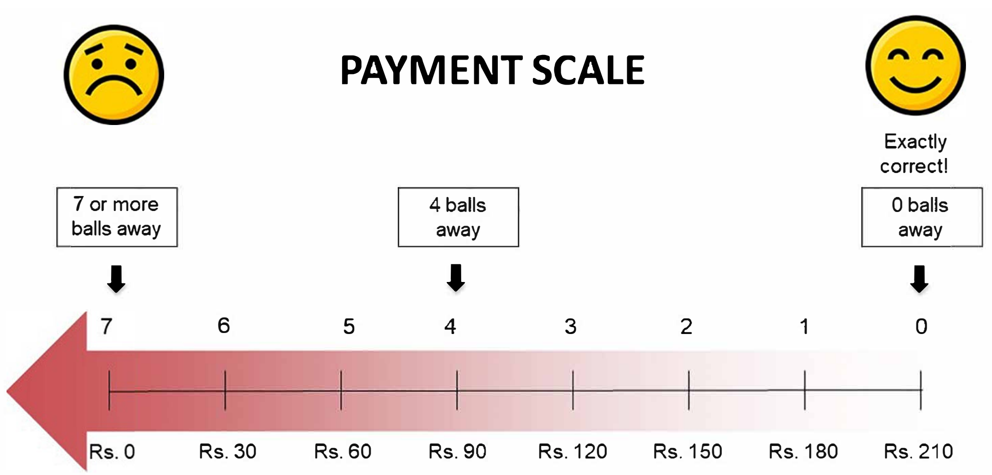
A Learning in the Household: Online Appendix

Figure A.I: Visual Aids

(a) **Guess Scale**



(b) **Payment Scale**



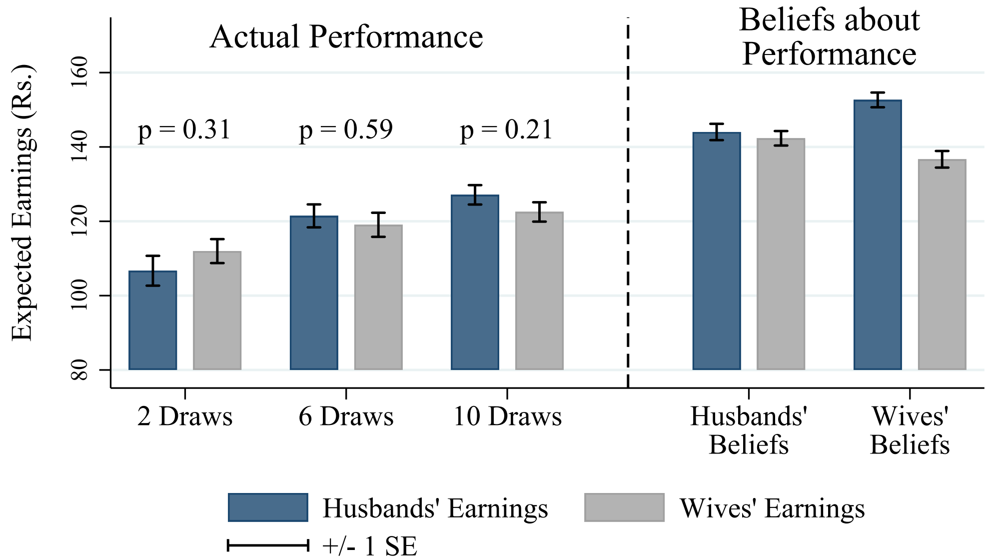
Notes: This figure shows the visual aids used to explain the experiment to study participants.

Panel A: The figure shows the scale which participants used to make their guesses. It shows the 13 possible urn compositions ranging from 4 to 16 red balls (among 20 balls in total). We induced common priors: participants were informed that in each round, each of these compositions was equally likely (probability 1/13 each). Participants guessed by placing a small token on top of the corresponding number.

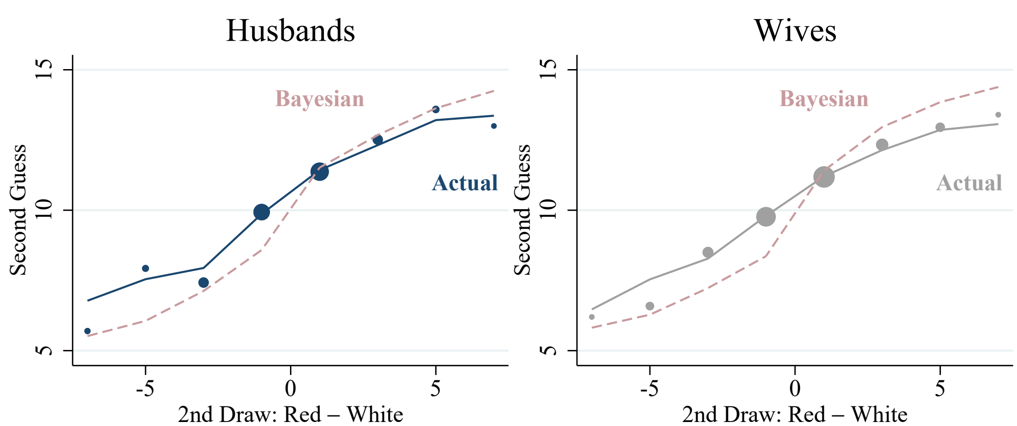
Panel B: The figure shows the scale used to explain the incentives for accurate guessing to participants. For each pair of participants, one of their guesses was randomly selected to determine the pair's payment. On top of their participation fee, each couple receives an amount in Rupees (Rs.) equal to $\max\{(210 - 30 \times |g - r|), 0\}$, where g is the guess and r the true number of red balls for the randomly-selected guess.

Figure A.II: Actual and Perceived Performance

Panel A: Average Expected Earnings Compared to Beliefs



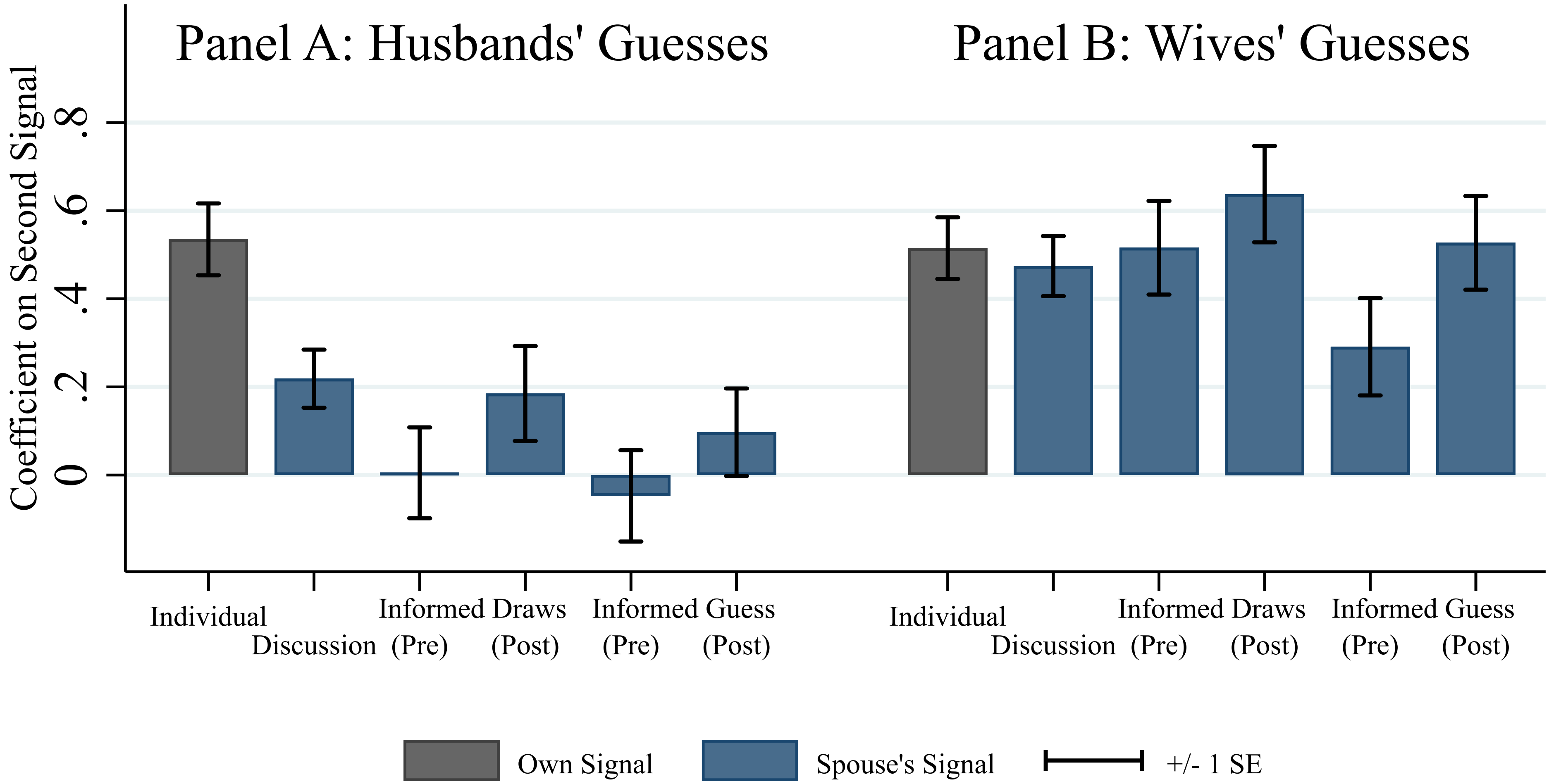
Panel B: Belief Updating Compared to Bayesian



Panel A shows spouses' actual and perceived performance in the game. The left panel shows the average expected earnings of the final guesses in the *Individual* condition by the total number of draws in the round. Blue and gray bars indicate the mean expected earnings for husbands and wives, respectively. Bands show ± one standard error. The right panel shows spouses' predictions of how much their own and their spouse's guesses would earn on average. These predictions were incentivized by a Rs. 50 reward for being within Rs. 30 of the actual average. Blue and grey bars show spouses' predictions of husbands' and wives' average expected earnings, respectively.

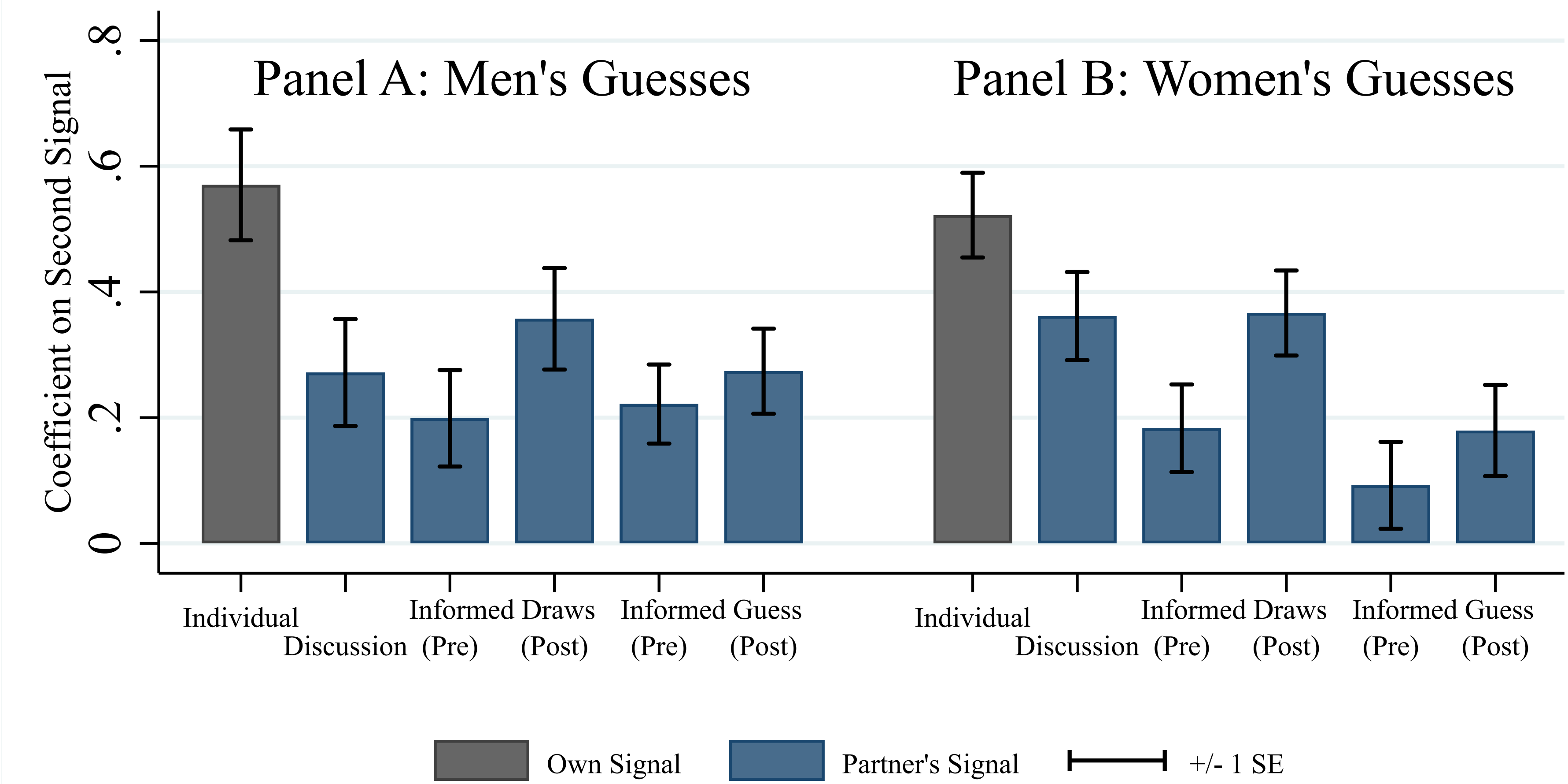
Panel B shows the average second private guess in the *Individual* condition depending on the net number of red draws (i.e., red draws minus white draws) in participants' second signal. The blue and grey curves show locally-weighted means (lowess) for husbands and wives, respectively. The dotted lines show the average of what a risk-neutral Bayesian would have guessed given the same signals.

Figure A.III: Weights on Own vs. Spouse's Information by Treatment



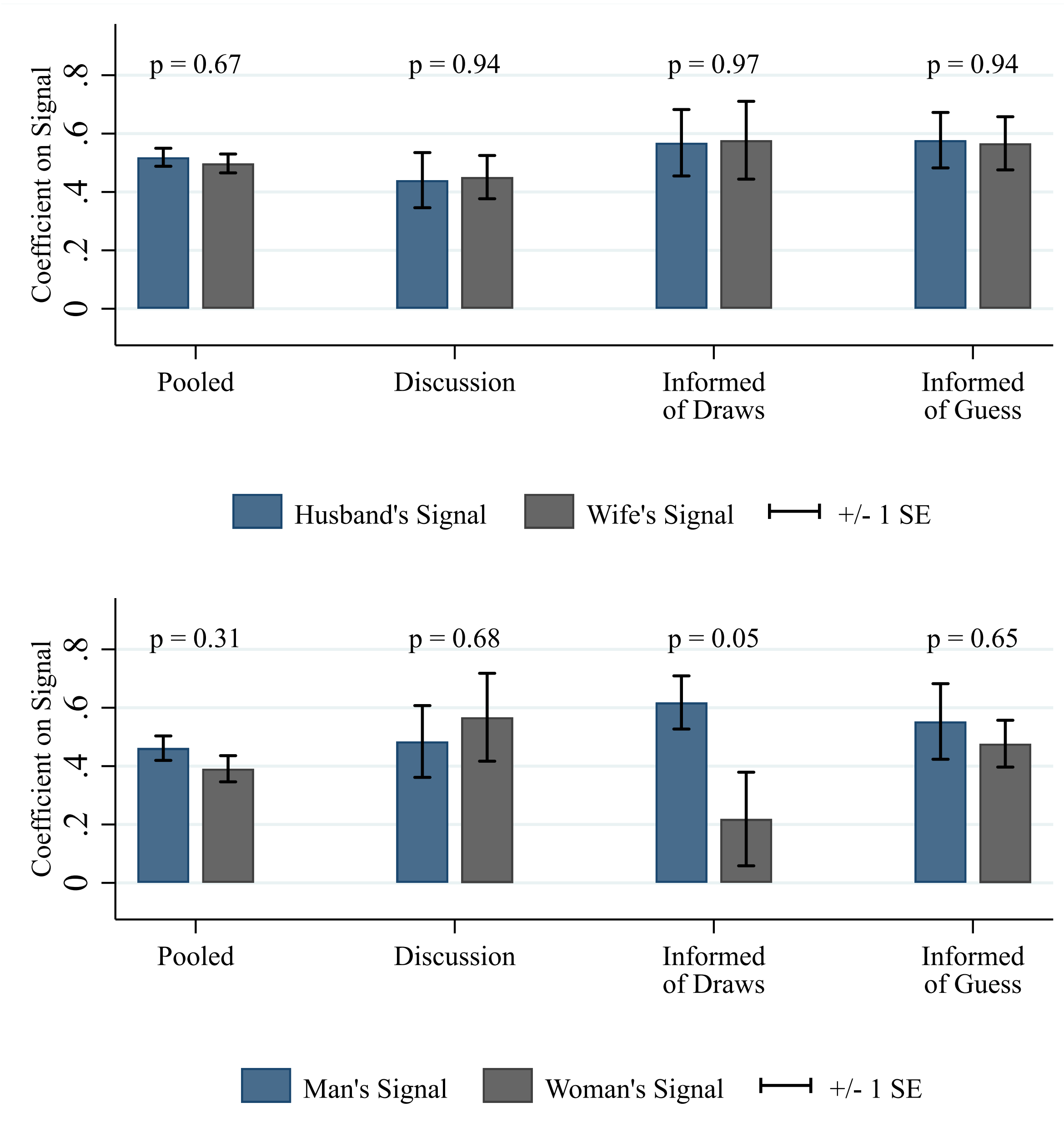
Notes: This figure shows the weights participants in the couples experiment put on their first and second signals across treatments. Separately for husbands and wives, we estimate equation 1 and then display the sum of $\beta_2 + \beta_{3t}$ for each of the following four types of private guesses: (a) *Individual*, where participants collect all information on their own; (b) *Discussion*, in which participants collect the first set of information on their own and the second set is only accessible via discussion; (c) *Informed of Partner's Draws*, where participants receive the second set of information directly from the experimenter but before any discussion with their partner (separately for the pre-discussion and post-discussion guesses in this treatment); (d) *Informed of Partner's Guess*, where participants are told the guess their partner made about the contents of the urn (as well as the number of draws that guess was based on) from the experimenter (separately for the pre-discussion and post-discussion guesses in this treatment). Both regressions include order fixed effects interacted with "First Signal" and "Second Signal."

Figure A.IV: Weights on Own vs. Partner's Information



Notes: This figure shows the weights participants in the strangers experiment put on their first and second signals across treatments. Separately for men and women, we estimate equation 1 and then display the sum of $\beta_2 + \beta_{3t}$ for each of the following four types of private guesses: (a) *Individual*, where participants collect all information on their own; (b) *Discussion*, in which participants collect the first set of information on their own and the second set is only accessible via discussion; (c) *Informed of Partner's Draws*, where participants receive the second set of information directly from the experimenter but before any discussion with their partner (separately for the pre-discussion and post-discussion guesses in this treatment); (d) *Informed of Partner's Guess*, where participants are told the guess their partner made about the contents of the urn (as well as the number of draws that guess was based on) from the experimenter (separately for the pre-discussion and post-discussion guesses in this treatment). Both regressions include order fixed effects interacted with "First Signal" and "Second Signal."

Figure A.V: Weights in Joint Decisions



Notes: Each pair of bars above shows OLS estimates of β_1 and β_2 in the following equation:

$$Joint\ Guess_{irt} = \alpha + \beta_1 \cdot Husband's\ Signal_{irt} + \beta_2 \cdot Wife's\ Signal_{irt} + \epsilon_{irt}$$

$Husband's\ Signal_{irt}$ is defined as the number of "net red draws" (i.e., red draws minus white draws) in the husband's set of signals. $Wife's\ Signal_{irt}$ is number of net red draws in the wife's set of signals. The left pairs of bars show, in order, estimates for joint guesses pooled across all treatments, in the two *Discussion* treatment rounds, in the *Informed of Partner's Draws* treatment and in the *Informed of Partner's Guess* treatment. Panel A shows estimates for the sample of married couples, and Panel B shows analogous estimates for the sample of mixed-gender pairs of strangers. Whiskers denote standard errors clustered at the couple/group level. All regressions other than the pooled regression include order fixed effects interacted with the husband's signal and with the wife's signal.

Table A.I: Sample Characteristics

	Couples		Strangers	
	Husbands	Wives	Men	Women
Marriage & Age				
Married	1.00	1.00	0.56	0.85
Years married | Married	12.33	12.23	13.00	15.09
	(8.47)	(8.45)	(7.65)	(8.66)
Reports being Household Decision Maker	0.57	0.69	0.00	0.00
Age	36.46	31.86	34.92	34.39
	(9.10)	(8.34)	(8.69)	(8.48)
Education				
Highest grade attended	7.86	8.11	7.77	7.26
	(3.31)	(3.29)	(3.54)	(3.44)
Read Tamil	0.86	0.83	0.77	0.75
Multiplied correctly	0.48	0.33	0.52	0.36
Work outside household				
Works (at least 1 day/week)	1.00	0.42	1.00	0.54
Daily work hours | Works	8.23	5.56	7.93	4.40
	(2.74)	(3.61)	(3.18)	(3.65)
Days working per week | Works	5.73	5.90	5.27	5.75
	(1.05)	(1.15)	(1.26)	(1.31)
Daily earnings (in Rs.) | Works	571	280	577	282
	(269)	(196)	(300)	(210)
Ability at task				
Actual ability (exp. earnings in Rs.)	122	120	117	119
	(37)	(36)	(37)	(38)
Belief of own ability (in Rs.)	144	137	139	144
	(44)	(45)	(45)	(46)
Belief of partner's ability (in Rs.)	142	153	123	123
	(39)	(40)	(47)	(53)
Who in general is better at the task?				
Men	0.21	0.22	0.13	0.14
Women	0.40	0.39	0.27	0.26
About the same	0.39	0.39	0.60	0.59
Number of participants	397	399	250	250

Notes: This table shows averages of key background characteristics for the couples and strangers samples. Standard deviations for non-binary variables are in parentheses. Columns 1 and 2 describe our main experimental sample of 400 married couples; Columns 3 and 4 describe our secondary sample of 500 individuals. "Highest grade attended" refers to the highest school grade attended out of 12. Tamil is the local language. "Multiplied correctly" equals 1 if the participant knew the answer to "What is 3×9?" " | " means "conditional on." Earnings are in Indian Rupees (US\$1 $\approx$ 70 Rupees). Actual ability refers to the expected earnings of participants' final guesses in the *Individual* round. Four people in the couples sample did not complete the demographic survey at the end of the experiment, so they are excluded from this table.

Table A.II: Comprehension and Memory

Question	Couples		Strangers	
	Husbands	Wives	Men	Women
A. Basic Design				
Number of balls	0.95	0.97	0.98	0.96
Colors of balls	1.00	0.99	1.00	1.00
B. Common Prior				
Possible < 4 red	0.92	0.93	0.92	0.94
Possible > 16 red	0.95	0.94	0.94	0.93
Who chooses number of red balls	0.84	0.87	0.79	0.83
Likelihood of each number	0.85	0.87	0.78	0.79
C. Signals				
More draws better	0.90	0.93	0.85	0.92
4 draws possible	0.76	0.80	0.73	0.80
How number draws differs	0.55	0.58	0.46	0.49
How spouse's draws differ	0.63	0.65	0.57	0.66
D. Incentives				
Payment if 1 off	0.92	0.89	0.90	0.91
Payment if way off	0.89	0.85	0.85	0.86
Payment if 4 off	0.92	0.89	0.91	0.92
E. Memory				
Correctly remembered own guess	0.94	0.95	0.92	0.92
Correctly remembered # of own draws	0.99	0.97	0.96	0.97
Correctly remembered # of own red draws	0.84	0.86	0.85	0.86

Notes: This table shows summary statistics of participants comprehension of the task and their memory of previous draws and guesses. Columns 1 and 2 show our main experimental sample of 400 married couples. Columns 3 and 4 show our secondary sample of 500 individuals. The questions asked were as follows:

- **Panel A:** shows answers to questions "How many balls are in the urn?" (correct answer: 20) and "What colors are the balls?" (red and white).
- **Panel B:** "Is it possible to have less than 4 /more than 16 red balls?" (no); "Who chooses how many balls are red?" (the computer); and "Are some numbers more likely than others?" (no).
- **Panel C:** "Do you learn more from one draw or five draws?" (five); "Can you get exactly 4 draws in any round?" (no); "Will you have the same or different numbers of draws across rounds?" (could be same or different); and "Will your partner have the same or different number to you?" (could be same or different).
- **Panel D:** shows the fraction of people who could correctly indicate their payment on the scale if their guess was 1, 11, or 4 balls off.
- **Panel E:** shows the proportion of participants who correctly remember their own guess and draws in the *Informed of Partner's Guess* and *Informed of Partner's Draws* rounds when these questions were asked.

Table A.III: Couples' and Strangers' Weight on Own vs. Others' Information - First Signal Also Interacted With Treatment

	Couples				Strangers			
	Husbands		Wives		Men		Women	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_1: First Signal	0.45***	0.47***	0.41***	0.37***	0.35***	0.46***	0.42***	0.38***
	(0.05)	(0.06)	(0.06)	(0.07)	(0.08)	(0.08)	(0.07)	(0.10)
$\beta_{3,0}$: First Signal X Not Individual Round	0.11**		0.09		0.14		0.05	
	(0.06)		(0.06)		(0.09)		(0.08)	
$\beta_{3,1}$: First Signal X Discussion		0.07		-0.00		0.22*		0.01
		(0.08)		(0.08)		(0.12)		(0.12)
$\beta_{3,2}$: First Signal X Informed of Draws		0.13		-0.02		0.03		0.05
		(0.11)		(0.11)		(0.14)		(0.14)
$\beta_{3,3}$: First Signal X Informed of Guess		0.11		-0.12		0.04		0.05
		(0.11)		(0.11)		(0.13)		(0.13)
β^{pf}: First Signal X Discussion X Partner Female						-0.10		0.22**
						(0.10)		(0.10)
β_2: Second Signal	0.56***	0.55***	0.50***	0.54***	0.60***	0.53***	0.53***	0.51***
	(0.06)	(0.08)	(0.06)	(0.07)	(0.09)	(0.11)	(0.07)	(0.10)
$\beta_{3,0}$: Second Signal X From Partner	-0.27***		-0.08		-0.35***		-0.26***	
	(0.07)		(0.06)		(0.10)		(0.08)	
$\beta_{3,1}$: Second Signal X Discussion		-0.33***		-0.04		-0.36***		-0.18
		(0.08)		(0.09)		(0.13)		(0.12)
$\beta_{3,2}$: Second Signal X Informed of Draws		-0.47***		0.06		-0.33**		-0.35**
		(0.12)		(0.12)		(0.16)		(0.15)
$\beta_{3,3}$: Second Signal X Informed of Guess		-0.53***		-0.08		-0.37**		-0.44***
		(0.11)		(0.12)		(0.16)		(0.14)
β^{pf}: Second Signal X Discussion X Partner Female						-0.04		0.02
						(0.11)		(0.11)
N	2,800	2,800	2,800	2,800	1,750	1,750	1,750	1,750
p-value: $\beta_{3,0}$ equal across genders			0.06				0.49	
p-value: $\beta_{3,1}$ equal across genders				0.02				0.30
p-value: $\beta_{3,2}$ equal across genders				0.00				0.94
p-value: $\beta_{3,3}$ equal across genders				0.01				0.73
p-value: $\beta_{3,1}$ to $\beta_{3,3}$ equal across genders				0.03				0.33

Notes: This table shows OLS estimates of an extension of Equation 1 for the couples experiment (Columns 1-2) and the strangers experiment (Columns 3-4), broken up by gender (Columns 1 and 3 for men, 2 and 4 for women). The dependent variable is participants' private guess (excluding first private guesses before any information about partners' signals was available). "First Signal" indicates the net number of red draws (i.e., red draws minus white draws) in the first signal. Similarly, "Second Signal" indicates the net number of red draws in the second signal. "Discussion" is an indicator that equals one for the final private guess in the *Discussion* round, when the second signal was drawn by the participant's partner and then (potentially) communicated to the participant through discussion. "Informed of Draws" indicates the second and third private guess in the *Informed of Partner's Draws* round, after the participant was directly told their partner's information (pooling the guesses the participant makes before and after the discussion). "Informed of Guess" indicates the second and third private guess in the *Informed of Partner's Guess* round, after the participant was told their partner's first private guess (pooling the guesses the participant makes before and after the discussion). All regressions include order fixed effects interacted with "First Signal" and "Second Signal." Standard errors are clustered at the couple level. *, **, and *** indicate significance at the p<0.10, 0.05, and 0.01 levels.

Table A.IV: Couples' and Strangers' Weight on Own vs. Others' Information: Disaggregating Pre- and Post-Discussion Guesses

	Couples		Strangers	
	Husbands (1)	Wives (2)	Men (3)	Women (4)
β_1: First Signal	0.55***	0.48***	0.46***	0.47***
	(0.03)	(0.03)	(0.03)	(0.03)
β_2: Second Signal	0.53***	0.51***	0.52***	0.50***
	(0.08)	(0.07)	(0.11)	(0.10)
$\beta_{3,1}$: Second Signal X Discussion	-0.32***	-0.04	-0.33***	-0.18
	(0.08)	(0.08)	(0.12)	(0.11)
$\beta_{3,2}$: Second Signal X Informed of Draws (Pre)	-0.53***	0.00	-0.42***	-0.43***
	(0.12)	(0.12)	(0.16)	(0.15)
$\beta_{3,3}$: Second Signal X Informed of Draws (Post)	-0.35***	0.12	-0.27	-0.25*
	(0.12)	(0.12)	(0.16)	(0.15)
$\beta_{3,2}$: Second Signal X Informed of Draws (Pre)	-0.58***	-0.22*	-0.40**	-0.47***
	(0.12)	(0.12)	(0.16)	(0.15)
$\beta_{3,3}$: Second Signal X Informed of Guess (Post)	-0.44***	0.01	-0.35**	-0.38**
	(0.12)	(0.12)	(0.16)	(0.15)
β^{pf}: Second Signal X Discussion X Partner Female			-0.06	0.05
			(0.11)	(0.11)
N	2,800	2,800	1,750	1,750
p-value: $\beta_{3,0}$ equal across genders		0.04		0.61
p-value: $\beta_{3,1}$ equal across genders		0.02		0.38
p-value: $\beta_{3,2}$ equal across genders		0.00		1.00
p-value: $\beta_{3,3}$ equal across genders		0.01		0.96
p-value: $\beta_{3,4}$ equal across genders		0.04		0.75
p-value: $\beta_{3,5}$ equal across genders		0.01		0.88
p-value: $\beta_{3,1}$ to $\beta_{3,5}$ equal across genders		0.06		0.79

Notes: This table shows OLS estimates of Equation 1 for the couples experiment (Columns 1-2) and the strangers experiment (Columns 3-4), broken up by gender (Columns 1 and 3 for men, 2 and 4 for women). The dependent variable is participants' private guess (excluding first private guesses before any information about partners' signals was available). "First Signal" indicates the net number of red draws (i.e., red draws minus white draws) in the first signal. Similarly, "Second Signal" indicates the net number of red draws in the second signal. "Discussion" is an indicator that equals one for the final private guess in the *Discussion* round, when the second signal was drawn by the participant's partner and then (potentially) communicated to the participant through discussion. "Informed of Draws (Pre)" and "Informed of Draws (Post)" indicate the pre-discussion and post-discussion private guess, respectively, in the *Informed of Partner's Draws* round, after the participant was directly told their partner's information. "Informed of Guess (Pre)" and "Informed of Guess (Post)" indicate the pre-discussion and post-discussion private guess, respectively, in the *Informed of Partner's Guess* round, after the participant was told their partner's first private guess. All regressions include order fixed effects interacted with "Second Signal." Standard errors are clustered at the couple level. *, **, and *** indicate significance at the p<0.10, 0.05, and 0.01 levels.

Table A.V: Earnings

	Couples		**Strangers**	
	Husbands (1)	Wives (2)	Men (3)	Women (4)
β_1:# First Draws	2.13***	2.33***	2.95***	2.45***
	(0.69)	(0.71)	(0.94)	(0.93)
β_2:# Second Draws	1.83**	2.15***	2.83**	2.57**
	(0.76)	(0.77)	(1.15)	(1.03)
$\beta_{3,1}$:# Second Draws X	-1.38**	-0.14	-2.40***	-1.61**
Discussion	(0.54)	(0.55)	(0.79)	(0.79)
$\beta_{3,1}^{pf}$:# Second Draws X			-0.41	-0.28
Discussion X Partner Female			(0.76)	(0.66)
$\beta_{3,2}$:# Second Draws X	-2.54***	0.11	-2.27**	-2.31**
Informed of Draws	(0.73)	(0.77)	(0.97)	(0.95)
$\beta_{3,3}$:# Second Draws X	-2.73***	-0.03	-2.45**	-2.86***
Informed of Guess	(0.73)	(0.81)	(0.97)	(0.99)
N	2,800	2,800	2,000	2,000
p-value: $\beta_{3,1}$ equal across genders	0.33		0.78	
p-value: $\beta_{3,2}$ equal across genders	0.05		0.85	
p-value: $\beta_{3,3}$ equal across genders	0.01		0.78	

Notes: This table shows OLS estimates from regressions including data from the couples experiment (Columns 1-2) or the strangers experiment (Columns 3-4), broken up by gender (Columns 1 and 3 for men, 2 and 4 for women). The dependent variable is the expected earnings of participants' private guess (excluding first private guesses before any information about partners' signals was available). "# First Draws" indicates the number of draws the participant made from the urn for their first signal. Similarly, "# Second Draws" indicates the number of draws in the second signal. "Discussion" is an indicator that equals one for the final private guess in the *Discussion* round, when the second signal was drawn by the participant's partner and then (potentially) communicated to the participant through discussion. "Informed of Draws" indicates the second and third private guess in the *Informed of Partner's Draws* round, after the participant was directly told their partner's information (pooling the guesses the participant makes before and after the discussion). "Informed of Guess" indicates the second and third private guess in the *Informed of Partner's Guess* round, after the participant was told their partner's first private guess (pooling the guesses the participant makes before and after the discussion). All regressions include order fixed effects interacted with "# First Draws" and "# Second Draws." Standard errors are clustered at the couple level. *, **, and *** indicate significance at the $p<0.10$, 0.05, and 0.01 levels.

Table A.VI: Testing for Differences Between Couples and Strangers

	All rounds		**Informed of Partner's Draws**				**Informed of Partner's Guess**				**Discussion rounds**	
	(Pre- & Post-Disc.)		(Pre-Discussion)		(Post-Discussion)		(Pre-Discussion)		(Post-Discussion)		(Post-Discussion)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Own Signal	0.53***	0.48***	0.51***	0.46***	0.45***	0.32***	0.51***	0.42***	0.42***	0.34***	0.54***	0.57***
	(0.02)	(0.04)	(0.07)	(0.09)	(0.06)	(0.08)	(0.06)	(0.08)	(0.06)	(0.08)	(0.03)	(0.05)
Partner's Signal	0.27***	0.25***	0.17*	0.15	0.36***	0.34***	0.15*	0.18*	0.27***	0.24**	0.28***	0.21***
	(0.02)	(0.04)	(0.07)	(0.09)	(0.07)	(0.10)	(0.07)	(0.08)	(0.07)	(0.08)	(0.04)	(0.06)
Partner's Signal X Guesser Is Woman	0.09**	0.02	0.10	-0.04	0.10	-0.00	0.01	-0.12	0.08	-0.07	0.12*	0.16*
	(0.03)	(0.05)	(0.07)	(0.11)	(0.07)	(0.11)	(0.07)	(0.09)	(0.07)	(0.10)	(0.05)	(0.08)
Partner's Signal X Guesser Is Husband In Couple		0.04		0.02		0.01		-0.06		0.04		0.12
		(0.05)		(0.10)		(0.11)		(0.09)		(0.09)		(0.08)
Partner's Signal X Guesser Is Wife In Couple		0.16***		0.28**		0.21*		0.15		0.29**		0.06
		(0.05)		(0.10)		(0.09)		(0.09)		(0.09)		(0.06)
N	7800	7800	7800	7800	7800	7800	7800	7800	7800	7800	2600	2600

Notes: This table shows OLS regressions in which the dependent variable is a person's individual guess. All regressions pool data from both the couples and strangers sample.

- In Columns 1 and 2, the sample includes all final guesses made by both men and women in the two *Discussion* rounds plus the pre- and post-discussion guesses from the *Informed of Partner's Draws* and *Informed of Partner's Guess* rounds.
- Columns 3 and 4 show results for the pre-discussion *Informed of Partner's Draws* round guesses alone, and Columns 5 and 6 show results from the post-discussion *Informed of Partner's Draws* round alone. Columns 7 to 10 similarly show results for pre- and then post-discussion guesses in the *Informed of Partner's Guess* round alone. Columns 11 and 12 show results from the *Discussion* round guesses (after the joint discussion) alone.
- "Own Net Red" refers to the net red minus white draws in the set the person guessing drew him or herself, and "Partner's Net Red" to the same in the set the guesser's partner drew. "Guesser Is Woman" equals one if the guesser is a woman, and "Guesser Is Wife In Couple" equals one if the person guessing is a woman *and* is in the couples sample, i.e., is playing with her husband.
- The regressions also include controls for Own Net Red interacted with "Guesser Is Woman" and "Guesser Is Wife In Couple" (coefficients not shown). Regressions for individual treatments are stacked and estimated jointly including controls for round order effects.

Table A.VII: Explaining Differences Between Couples and Strangers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Own Signal	0.48***	0.50***	0.48***	0.54***	0.56***	0.47***	0.33***	0.43***	0.45***	0.46***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.09)
Partner's Signal	0.25***	0.23***	0.26***	0.20***	0.10	0.24***	0.08	0.30***	0.30***	-0.08
	(0.04)	(0.04)	(0.04)	(0.04)	(0.06)	(0.04)	(0.06)	(0.05)	(0.05)	(0.09)
Partner's Signal X Guesser Is Husband In Couple	0.04 (0.05)	0.02 (0.05)	0.05 (0.05)	0.04 (0.05)	0.11* (0.05)	0.04 (0.05)	0.03 (0.05)	0.04 (0.05)	0.04 (0.05)	0.07 (0.06)
Partner's Signal X Guesser Is Woman	0.02 (0.05)	0.02 (0.05)	0.03 (0.05)	0.01 (0.05)	0.02 (0.05)	0.02 (0.05)	0.01 (0.05)	-0.02 (0.05)	-0.02 (0.05)	-0.03 (0.06)
Partner's Signal X Guesser Is Wife In Couple	0.16*** (0.05)	0.18*** (0.05)	0.17*** (0.05)	0.16*** (0.05)	0.20*** (0.05)	0.16*** (0.05)	0.16*** (0.04)	0.16*** (0.05)	0.16*** (0.05)	0.19*** (0.05)
Partner's Signal X Guesser Is Older		0.04 (0.04)								0.05 (0.04)
Partner's Signal X Guesser Thinks Sole HHDM			-0.06 (0.04)							-0.04 (0.04)
Partner's Signal X Partner Better				0.09** (0.03)						0.09** (0.03)
Partner's Signal X Guesser Thinks Partner Better					0.15** (0.05)					0.14** (0.05)
Partner's Signal X Guesser Is Married						0.00 (0.05)				0.02 (0.05)
Partner's Signal X Guesser Comprehension index							0.19*** (0.05)			0.19*** (0.05)
Partner's Signal X Daily Earnings								-0.00 (0.00)		-0.00 (0.00)
Partner's Signal X Daily Work Hours									-0.01 (0.00)	-0.00 (0.01)
Constant	10.69***	10.69***	10.69***	10.69***	10.69***	10.69***	10.68***	10.69***	10.69***	10.69***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
N	7800	7800	7800	7800	7800	7800	7800	7800	7800	7800

Notes: This table shows OLS regressions where the dependent variable is a person's individual guess. All regressions pool data from both the couples and strangers sample and include all final guesses made by both men and women in the two *Discussion* treatment rounds plus the pre- and post-discussion guesses from the *Informed of Partner's Draws* and *Informed of Partner's Guess* treatments.

- Column 1 repeats the specification in Column 2 from Table A.VI. The other columns add interactions between Partner's Net Red and other variables, to test whether heterogeneity along these variables explains the difference between wives and others.
- When we add an interaction between Partner's Net Red and a variable, we control for the corresponding interaction(s) with Own Net Red (coefficients not shown).
- "Guesser Is Older" means the person guessing is older than their partner. "Guesser Thinks Sole HHDM" means the guesser considers themselves the sole decision maker in their household. "Partner Better" indicates that the guesser's partner earns more from their guesses on average; "Guesser Thinks Partner Better" indicates that the guesser thinks this is so. "Guesser Is Married" indicates that the guesser is married; this is always one in the couples sample, but not in the strangers sample. "Comprehension index" is the fraction of comprehension questions the guesser answered correctly, normalized by subtracting the mean and dividing by the standard deviation of the entire sample. "Daily Earnings" and "Daily Work Hours" measure the earnings that participants gain and hours of work per day in jobs outside the home. All these variables were measured in both the couples and strangers sample.

Table A.VIII: Heterogeneity Across Couples

	Pooled (1)	Husbands (2)	Wives (3)	Joint (4)
Husband's Signal	0.56***	0.64***	0.57***	0.46***
	(0.07)	(0.08)	(0.08)	(0.09)
Wife's Signal	0.33***	0.20***	0.37***	0.41***
	(0.07)	(0.08)	(0.08)	(0.08)
H's X HHDM Index	0.05	0.05	0.07	0.04
	(0.03)	(0.04)	(0.04)	(0.04)
W's X HHDM Index	-0.03	-0.03	-0.03	-0.03
	(0.03)	(0.04)	(0.04)	(0.04)
H's X Ability Index	0.06	0.06	0.04	0.09**
	(0.04)	(0.05)	(0.04)	(0.04)
W's X Ability Index	-0.13***	-0.07	-0.15***	-0.17***
	(0.04)	(0.05)	(0.04)	(0.04)
Constant	10.21***	9.94***	10.36***	10.33***
	(0.17)	(0.19)	(0.20)	(0.21)
N	2,400	800	800	800
p-value: HHDM Interactions Equal	0.090	0.165	0.097	0.204
p-value: Ability Interactions Equal	0.002	0.105	0.007	0.000

Notes: This table shows OLS estimates of Equation 2 for the couples experiment. The dependent variable is participants' private guess (excluding first private guesses before any information about partners' signals was available) in the *Discussion* rounds. Columns 2, 3, and 4 include only the husbands', wives', and joint guesses, respectively, while Column 1 pools all of these. "Husband's Signal" indicates the net number of red draws (i.e., red draws minus white draws) in the husband's signal. Similarly, "Wife's Signal" indicates the net number of red draws in the wife's signal. "HHDM Index" is constructed as follows: first, we take the average answer couples gave to questions asking whether the husband primarily made decisions for the household regarding finances, education, health, shopping, travel, savings, and loans, whether he managed the money in the household, whether he was the primarily household decision-maker, whether he earned more outside the household than the wife, and whether he was older than the wife. We then normalize this variable such that it has a mean of zero and standard deviation of one. "Ability Index" is constructed as follows: we take the average of indicators for whether the husband answered more comprehension questions correctly, whether each spouse thinks he is better at the experimental task, whether he actually performed better (in first private guesses) at the task, whether he correctly answered more numeracy questions correctly, and whether he correctly answered more of the memory questions (about the number and color composition of his draws in the *Informed of Draws* round and about his previous guess in the *Informed of Guess* round) than his wife did. We then normalize this variable such that it has a mean of zero and standard deviation of one. All regressions include order fixed effects interacted with "Husband's Signal" and "Wife's Signal." Standard errors are clustered at the couple level. *, **, and *** indicate significance at the $p<0.10$, 0.05, and 0.01 levels.

Table A.IX: The Effect of Public vs Private Discussions on Spouse's Post-Discussion Guesses

	All Rounds		Discussion		Informed of Draws		Informed of Guess	
	H	W	H	W	H	W	H	W
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Own Signal	0.67***	0.42***	0.66***	0.47***	0.77***	0.42***	0.43***	0.40***
	(0.09)	(0.08)	(0.10)	(0.08)	(0.10)	(0.09)	(0.07)	(0.13)
Spouse's Signal	0.21***	0.58***	0.24***	0.62***	0.11	0.56***	0.41***	0.46***
	(0.08)	(0.09)	(0.08)	(0.10)	(0.13)	(0.09)	(0.12)	(0.08)
Own Signal X	-0.07	-0.05	-0.04	-0.18**	-0.21*	0.09	0.02	0.08
Public Discussion	(0.06)	(0.06)	(0.08)	(0.08)	(0.12)	(0.13)	(0.10)	(0.12)
Spouse's Signal X	0.01	-0.05	-0.07	-0.12	0.24*	0.07	-0.06	-0.08
Public Discussion	(0.06)	(0.06)	(0.08)	(0.09)	(0.13)	(0.12)	(0.13)	(0.12)
N	1,600	1,600	800	800	400	400	400	400
p-value: Interactions Equal	0.361	0.956	0.835	0.630	0.026	0.894	0.651	0.393

Notes: This table shows OLS estimates where dependent variable is participants' post-discussion private guess in the couples experiment, pooling husbands and wives. Columns 1, 3, 5, and 7 include only husbands' guesses, while the remaining columns include only wives' guesses.

- "Own Signal" indicates the net number of red draws (i.e., red draws minus white draws) in the participants's own signal. Similarly, "Spouse's Signal" indicates the net number of red draws in their spouse's signal.
- "Public Discussion" is a dummy variable indicating whether an experimenter was randomized to sit in on the discussion.
- All regressions include interactions between "Own Signal" and "Spouse's Signal" with round-order fixed effects.
- Standard errors are clustered at the couple level. *, **, and *** indicate significance at the p<0.10, 0.05, and 0.01 levels.
- All regressions include order fixed effects interacted with "Own Signal" and "Spouse's Signal."