Listen to Her

Gender Differences in Information Diffusion within the Household

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Abstract

We study how economic information diffuses within the household, leveraging an information-provision experiment with a representative sample of households from Germany. A random sample of household members received information on their household's position in the income distribution. When provided with information directly, there are no gender differences in how individuals update their beliefs. However, we find significant gender differences in how the information diffuses within the household. When only the husband received information, it also impacted the wife's beliefs, but when only the wife received it, the husband's beliefs remained unchanged.

Keywords: household economics, information diffusion, gender, survey, experiment.
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1 Introduction

About half a century ago, the UK government changed the allocation of subsidies for families with children, directing them towards mothers instead of fathers. According to the economic models of the time, such a policy should have no impact. The central tenet of these models was that the household functions as an integrated unit in which preferences are aligned, and the information is available to all household members (Samuelson, 1956; Becker, 1981). This basic assumption, however, has been criticized as unrealistic. Empirical evidence supports this criticism: providing child allowance to mothers rather than fathers led to spending patterns more in line with the policy's intention of covering necessities, like clothing, for the family's children (Lundberg and Pollak, 1996; Lundberg, Pollak and Wales, 1997; Ward-Batts, 2008). Subsequent results have corroborated the view that households do not necessarily function as an integrated unit with common preferences over monetary resources – and that women's spending choices are deemed to be more beneficial to the family's children than men's. This is a prominent reason that cash transfer programs to the poor, more often than not, target women as the beneficiaries (Duflo, 2003; Almås et al., 2018; Armand et al., 2020; Field et al., 2021).

There has been a growing interest in economic research aimed at understanding how households function in the real world (e.g., Lundberg and Pollak, 1996; Ashraf, 2009; Chiappori and Mazzocco, 2017). The focus has been on how households manage resources such as consumption goods or money. A highly relevant question that has received comparably little attention so far is how households manage *information*. Arguably, information is at least as important a resource as money because restrictions on information available to spouses can have significant consequences on their decision-making in the household. The importance of information in intra-household decision-making has long been emphasized in the sociological literature (e.g., Dwyer and Bruce, 1988; Zelizer, 2005), while the common assumption in economics is that households pool their information, in particular when interests are aligned (Chiappori, 1992; Lundberg and Pollak, 1996). In this paper, we challenge this assumption and provide novel evidence on gender differences in how economic information diffuses within the household.

Studying diffusion of information within the household presents some empirical challenges: we need a setting in which we can, first, observe both spouses independently and repeatedly in their natural environment and, second, manipulate decision-relevant information in an exogenous manner. For this purpose, we leverage existing data from a two-year survey experiment with

a representative sample of Germans (Fehr, Mollerstrom and Perez-Truglia, 2022).[1] Our survey concentrates on people's beliefs about their household's relative position in the income distribution. These beliefs are important for household decision-making as they have an impact on wellbeing in general (Luttmer, 2005; Perez-Truglia, 2020) and on various economic decisions, such as location choices (Bottan and Perez-Truglia, 2022) and preferences for redistribution (Meltzer and Richard, 1981; Alesina and Giuliano, 2011) in particular. Despite their relevance, households and individuals hold significant misperceptions about their relative income (Cruces, Perez-Truglia and Tetaz, 2013; Engelhardt and Wagener, 2017; Karadja, Mollerstrom and Seim, 2017; Fehr, Mollerstrom and Perez-Truglia, 2022).

In our baseline survey, we first elicited respondents' beliefs about their household's rank on the national and global income scale in an incentivized way. All adult members of a household were interviewed by professional interviewers in private, without the possibility of communicating with each other, so respondents could not share any information during the baseline survey even if they wanted to. After collecting the prior beliefs, half of the respondents received accurate information about their household's income rank. We randomized this information provision at the individual level to create variation within households. Thus, this resulted in households where both spouses, only the wife or husband, or nobody received the information, enabling us to examine how respondents learn from direct information provision and indirectly from the diffusion of information within the household.

A year later, we conducted a follow-up survey with the same respondents, where we again asked incentivized questions about the household's income rank. While there was no opportunity for spouses to communicate during the interviews, they had ample opportunity to discuss the information about income ranks in the year that passed between the two surveys if they chose to do so. Importantly, we did not provide any explicit incentives to share the information with other household members. In particular, we did not inform respondents that we would be asking questions about relative income again a year later. As a result, information sharing evolved endogenously, with respondents freely choosing to share information with other household members – a setting that is very common in everyday life for most households.

We start by documenting how individuals learn from information directly (i.e., when they receive it themselves). When spouses directly receive information about their true income ranks,

[1] In the original study (Fehr, Mollerstrom and Perez-Truglia, 2022), we measure how beliefs about relative income affect preferences for redistribution. In this follow-up work, we further analyze the data to explore gender differences in the diffusion of information.

the information has a significant and persistent effect on beliefs even after a whole year has passed. More importantly, men and women seem to incorporate the information to a similar degree when it is given directly to them. After one year, the learning rate is around 0.2 and does not differ statistically between women and men. More precisely, for each percentage point shock in the information given directly to a respondent, the perceived income rank as measured a year later is higher by about 0.22 percentage points for women and 0.16 for men (p-value = 0.391).

In contrast, we find stark gender differences in how information diffuses within the household, with the pass-through of information from wives to husbands being substantially lower than from husbands to wives. If husbands received information about the true income rank directly but not their wives, we observe a pass-through to his wife's belief that is about as strong as if the wife received the information directly. However, if a wife receives the information directly, we see no effect on the husband's belief. The difference in the rates of indirect learning (0.19 for women vs. -0.01 for men) is large and statistically significant (p-value = 0.040). Our findings indicate that this asymmetry is not due to different communication and information acquisition patterns of women and men.

We contribute to an emerging literature on information flows within households. The bulk of this literature is concerned with decision situations in which incentives are non-aligned, and preferences differ, such as fertility decisions (Ashraf, Field and Lee, 2014; Apedo-Amah, Djebbari and Ziparo, 2020; Ashraf et al., 2022).[2] The evidence from these experiments shows that information in such settings only sometimes flows freely and that information barriers can result in inefficient behavior (e.g., Ashraf, 2009; Ashraf, Field and Lee, 2014; Ashraf et al., 2022). For instance, Ashraf et al. (2022) conducted an information intervention in which they either informed husbands or wives about maternal health risks. Consistent with our findings, they find that the information spills over from husbands to wives but not in the other direction. We contribute to this literature by studying a real-world situation in which incentives are aligned, which is arguably one of the more common settings in practice, yet one that has received little attention.

A notable exception is a study by Conlon et al. (2022) that focuses, as we do, on a situation with aligned preferences. In their laboratory experiment with 400 married couples from Chennai, India, the husband or wife gets signals about the number of differently colored balls in an urn. They can pass this information on to their spouse, and the spouse can subsequently use it to make an

[2]More generally, there is some evidence suggesting that there are gender differences in how information flows outside households (e.g., Beaman, Dillon and Lori Beaman, 2018; Cullen and Perez-Truglia, 2018; BenYishay et al., 2020).

optimal guess about the color of the ball that is drawn next. Despite the explicit incentives to share this information, and consistent with our own findings, Conlon et al. (2022) document pronounced gender differences in information diffusion: while wives took the information discovered by their husbands into full consideration, husbands failed to do the same with information revealed to their wives. We complement the work of Conlon et al. (2022) in several important ways. First, different from their stylized setting (participants received information by drawing balls from an urn), our setting is one of endogenously and naturally-occurring information diffusion over a long time. Our subjects could naturally share the information in their daily lives during a whole year, but we did not provide any explicit incentives to do so. Second, rather than studying beliefs about an abstract object (the colors of balls from an urn), we study a belief that households arguably care about above and beyond the context of our experiment: their relative income. Third, we show that the gender differences in information diffusion hold across very different cultural and economic contexts. Gender norms are, for example, less pronounced in Germany than in India: according to the World Values Survey, 52% of Indians agree with the statement that men should have more rights to a job than women if jobs are scarce, while only 15% of Germans agree with the same statement. There are also significant differences in education between the two countries: according to World Bank Data, less than 30 percent of the Indian population enrolls in tertiary education, for example, compared to over 70 percent in Germany.[3] Together, our findings contribute to a more complete picture of information sharing in the household and suggest that gendered barriers to information flows are widespread and robust, even in settings with aligned interests.

2 Research Design and Data

We implemented two tailor-made survey modules in the Innovation Sample of the German Socio-Economic Panel (SOEP-IS). The SOEP-IS is a comprehensive longitudinal study that surveys a representative sample of the German population on a wide range of topics once a year. It is the ideal test-bed for our research question and offers several advantages over other survey modes. First, all household members above 16 are interviewed by professional interviewers in computer-assisted interviews that were conducted in person. Second, we can follow them up with little attrition a year later. Third, the face-to-face interviews provide significant control, minimize non-response and allow us to clarify misunderstandings on the spot. Important for our purposes, it also prevents

[3]This education gap is also reflected in the two study samples. The average years of schooling are 7.99 among the Chennai couples and 11.64 in our German sample.

information look-up and communication between household members during and between the interviews within a wave because the interviews were conducted in private with each member of a household. Fourth, we have access to a rich set of measures of socio-economic indicators. Fifth, the SOEP team implements various safeguards to ensure high data quality, such as pre-testing new items and conducting plausibility and consistency checks after data collection (for more details, see Goebel et al., 2019).

Baseline Survey: At the beginning of the baseline survey, we asked respondents to assess their household rank in the income distribution. Specifically, we asked respondents to state their perceived rank in the national (i.e., German) and global income distribution, in randomized order. Due to the fact that estimates of the global income distribution are only available on the per-capita, pre-tax level, we explained and informed all respondents about their per-capita pre-tax household income based on their stated absolute household income. They then stated their rank in the national and global income distributions, respectively, on a scale from 0 (poorest percentile) to 100 (richest percentile) in private (i.e., without the interviewer seeing the tablet screen – this was done in order to avoid a social desirability bias impacting answers). We incentivized both assessments of income rank for accuracy, and respondents received €20 for each assessment that was correct to the closest percentile (ensuring that it was optimal for them to answer truthfully). About 10-15 minutes later, in the baseline survey, after respondents had answered several questions unrelated to our research, we randomized half of the respondents into a treatment providing them with accurate information about their true income rank in the national and global income distributions. The information briefly explained the source of the information and then revealed the share of people that are poorer at the national and global levels. This information was read out by the interviewer, who additionally visualized this information with customized graphs to ease understanding (see Appendix Figure A1 for a screenshot). The other half of the respondents received no information.

Follow-up Survey: One year later, we implemented our second survey module with the same sample of respondents. The setup of the follow-up survey closely followed the setup of the baseline survey. That is, we first collected information on household income and the number of household members and explained what per-capita household income is. We then asked respondents to state their rank in the national and global income distributions in private and assess how certain they are about their statements. Again, we rewarded accurate predictions (but this time, we only paid

€10 for each accurate prediction). The main difference to the baseline survey was that we did not provide information on the true income rank in either context in the follow-up survey. Instead, we elicited respondents' willingness to pay (WTP) for information about their true rank in the national and global income distributions using a list-price version of the Becker-DeGroot-Marschak method (Becker, DeGroot and Marschak, 1964).[4] Finally, we asked treated respondents whether they had shared the information on the true income rank that they received in the baseline survey with anyone in the household during the past year. We asked all respondents whether they had looked for information about the distribution of national and global income.

Data: Out data consist of the two survey modules that we implemented in the 2017 and 2018 waves of the SOEP-IS. A total of 1,392 respondents took part in the baseline survey, while 1,144 participated in the second survey (82 percent of the 1,392 respondents in the baseline survey). The lower participation rate in the second survey (82 percent) may raise a concern that providing information on the household income rank in the baseline survey could have affected the decision to participate in the second survey. However, this is not the case, as there is no significant difference in the attrition rates between respondents in the control group (17 percent attrition) and respondents in the treatment group in the baseline survey (19 percent attrition, p-value=0.432 for t-test of proportions). In Appendix Table A1, we present several specifications showing that treatment status does not predict participation in the follow-up survey. In Appendix Table A2, we repeat this exercise for treatment effects in the pooled sample, as well as for female and male respondents separately. Moreover, and as expected, the observable pre-treatment characteristics are balanced across treatment and control groups. Appendix Table A3 presents the results for the pooled sample and separately for men and women (for more details, see Section A.4 in the Appendix).

3 Empirical Strategy

We want to estimate the direct and indirect impact of information provision on beliefs about income ranks one year later. For this purpose, we do not distinguish between beliefs about national and global income ranks, as we will explain below. We define T_i as a treatment indicator variable taking

[4]For both pieces of information, we presented five scenarios in which respondents had to decide between receiving information about their true rank in the income distribution and receiving a monetary reward that incrementally increased from 10 cents to 10 euros. Respondents made their decision in private, and we informed them that one randomly selected decision for each piece of information (national and global) would be implemented. Possible payments, and information provisions, were made at the end of the survey.

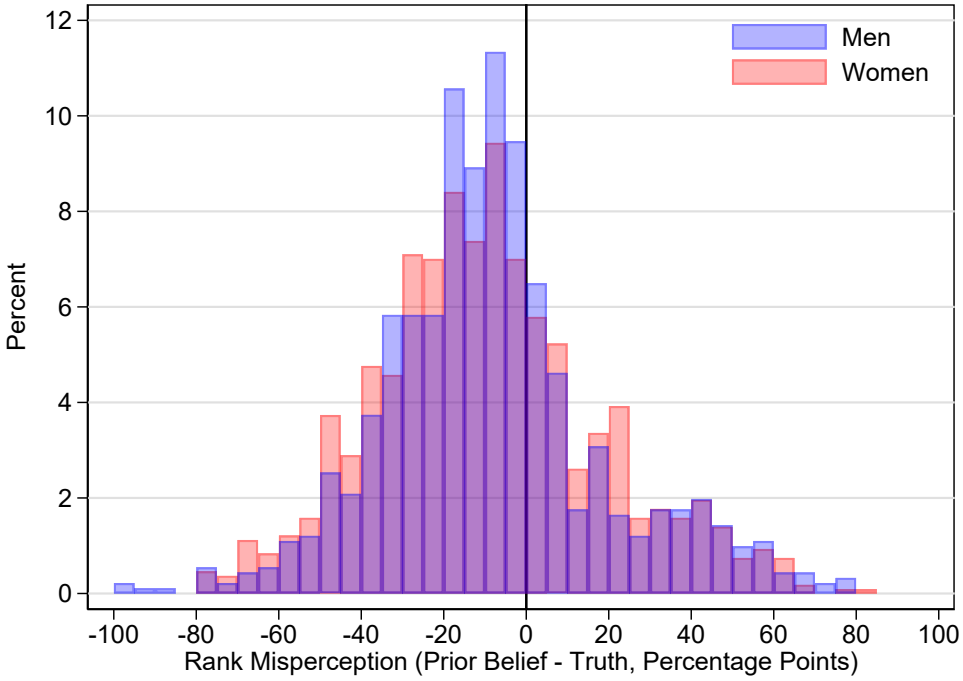
on the value 1 if a respondent received direct information on their households' income rank in the baseline survey and 0 otherwise. Let $T_i^{indirect}$ be an indicator variable that takes the value 1 if the respondent did not receive the information directly but another member of their household did, and 0 otherwise. Let r_i^{prior} denote the perceived income rank in the baseline survey (i.e., the prior belief before receiving information) and r_i^{info} denote the information about the income rank that could be shown to the subject. Consequently, $r_i^{info} - r_i^{prior}$ is the potential treatment: i.e., the misperception about the income rank. A positive difference indicates underestimation, and a negative difference indicates an overestimation of the income rank. The direct information shock is given by $(r_i^{info} - r_i^{prior}) \cdot T_i$, while the indirect information shock is given by $(r_i^{info} - r_i^{prior}) \cdot T_i^{indirect}$. We use the following specification to estimate the direct and indirect rates of learning:

$$\begin{aligned} r_i^{posterior} = \alpha^{direct}(r_i^{info} - r_i^{prior}) \cdot T_i + \alpha^{indirect}(r_i^{info} - r_i^{prior}) \cdot T_i^{indirect} \\ +\beta_1(r_i^{info} - r_i^{prior}) + \beta_2 X_i + \epsilon_i \end{aligned} \tag{1}$$

The dependent variable, $r_i^{posterior}$, is the posterior belief about the income rank in the follow-up survey. The coefficients α^{direct} and $\alpha^{indirect}$ tell us how correcting misperceptions—directly or indirectly through the husband or wife—affect beliefs one year later. The parameter α^{direct} measures the direct learning rate, i.e., it is the effect of an additional percentage point of information shock given directly to individual i on the posterior belief of that individual. The parameter $\alpha^{indirect}$ measures the indirect rate of learning, i.e., the rate of pass-through between the information we gave to respondent i's spouse and the respondent i's belief one year later. X_i is a vector of control variables that include the demographic characteristics of the respondent and the household. We estimate equation (1) separately for female and male respondents and cluster standard errors at the household level.

For our baseline specification, we restrict our sample to single-member households and households consisting of two adult partners ($n = 989$). We include single-member households to improve the statistical power in the analysis of direct learning. We exclude households in which other adult household members besides the spouses were interviewed to avoid dealing with cases in which information can be transmitted from multiple household members (e.g., adult children, grandparents). We further restrict the sample to mixed-gender partners – same-sex households are a negligible share of the sample, and thus we do not have enough data to study them separately.

Figure 1: Misperceptions of Income Ranks – Women and Men



Notes: Distribution of misperceptions about income rank in the baseline survey for female (red) and male respondents (blue). Misperceptions are calculated as the difference between prior beliefs about income rank and true income rank. Positive (negative) differences correspond to overestimation (underestimation) of own income rank. Data from baseline, i.e., before the respondent (or their spouse) actually received any information ($n = 1,978$).

Finally, we observe beliefs about each respondent's income rank at the national and global levels. In the analysis, we pool these two responses, as differentiating between the two belief statements is inessential for our purposes. These restrictions result in $n = 1,978$ observations. In the Appendix Section A.6, we show that our results do not depend on any of the specification choices listed above.

4 Results

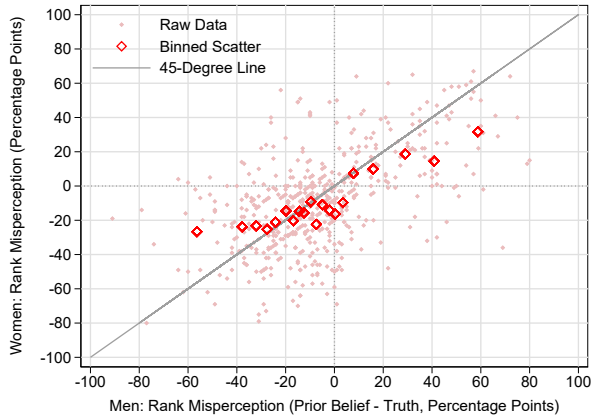
4.1 Misperceptions about Income Ranks

We start by observing that misperceptions of own household income rank are common among both women and men. Figure 1 shows the distribution of misperceptions (measured as perceived minus actual percentile) at baseline, separated by gender.[5] Both men and women harbor misperceptions. On average, women underestimate their rank by about 9 percentage points and men by about 10

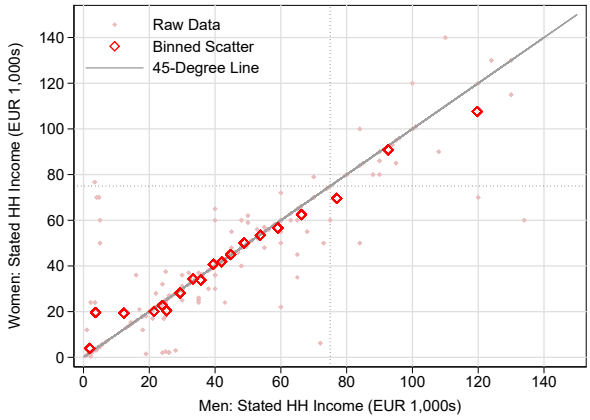
[5]Note that we use a different definition of misperceptions here than in our regression framework outlined above.

Figure 2: Misperceptions of Income Ranks and Stated Household Income within Households

(a) Misperceptions



(b) Stated Household Income



Notes: Panel (a) shows the correlation between misperceptions about the income rank of women and men (within the household), and panel (b) shows the correlation of the stated household income of women and men (within the household). Misperceptions are calculated as the difference between prior beliefs about income rank and true income rank. Stated household income is the yearly gross household income measured in 1,000 Euros. Both figures show scatter plots of the raw data (light red) and binned scatterplots (red diamonds). For the binned scatterplot, we group the variables on the x-axis into 20 equally-sized bins and calculate the mean of the x and y variable within each bin. Both figures use data from the baseline survey, and we restrict the sample to 2-person, mixed-gender households ($n = 1,132$).

percentage points. This difference is small and statistically insignificant (t-test: $p = 0.410$). Similarly, we observe a marginally statistically significant ($p = 0.061$) but small difference in the absolute size of misperceptions between women (23.7 percentage points) and men (22.3 percentage points).[6]

Next, we compare perceptions between household members. Panel (a) of Figure 2 shows a binned scatterplot of misperceptions about the income rank, with wives on the y-axis and husbands on the x-axis. If husbands and wives misperceive their households' income rank to a similar extent, then we should observe that misperceptions line up at the 45-degree line. However, misperceptions do not perfectly line up at the 45-degree line, indicating substantial disagreement about income ranks between spouses. While the rank misperceptions within a household are correlated, the correlation is far from perfect ($\rho = 0.54$). In other words, husbands and wives tend to have rather different misperceptions.

One potential concern is that the differences in misperceptions about *relative* income are mechanically resulting from disagreements about the *absolute* income. To address this concern,

[6]The distribution of misperceptions for women and men does not differ statistically (Kolmogorov-Smirnov test, $p = 0.126$).

panel (b) of Figure 2 shows a binned scatterplot of the stated absolute household income for wives (y-axis) and their husbands (x-axis). In contrast to misperceptions of relative income, the stated absolute incomes line up almost perfectly on the 45-degree line, with a correlation coefficient of $\rho = 0.95$. This suggests that spouses largely agree about their absolute income, so misperceptions about relative income cannot be attributed to disagreement about absolute income.

4.2 Direct and Indirect Effects of Information on Posterior Beliefs

Figure 3 presents coefficient plots from estimating regression equation (1), separately for women and men (see Appendix Table A4 for more details). In Panel (a) of Figure 3, we show the main result: the estimates for direct and indirect learning rates. First, we see that the coefficient for direct learning is 0.22 percentage points for women and 0.16 percentage points for men. That is, for each percentage point that we correct a respondent's misperception by directly providing information on the actual income ranks to them, this respondent updated their posterior by between 0.16 and 0.22 percentage points.[7] Importantly, the difference between these two estimates (0.16 and 0.22) is not only small but also statistically insignificant ($p = 0.391$).[8] The observed direct learning rate is sizable, considering that we measure posteriors about a year later. Generally, the learning rate should be lower than the perfect pass-through rate (i.e., $\alpha < 1$), even if measured immediately after the information provision. From a Bayesian perspective, respondents form posterior beliefs by taking a weighted average between the signal provided to them and their prior beliefs. Thus, if respondents find the information untrustworthy or feel very sure about their prior beliefs, they should update their beliefs only partially. Moreover, a host of evidence shows that the effect of information typically declines over the course of a few months (e.g., Cavallo, Cruces and Perez-Truglia, 2017; Bottan and Perez-Truglia, 2022).

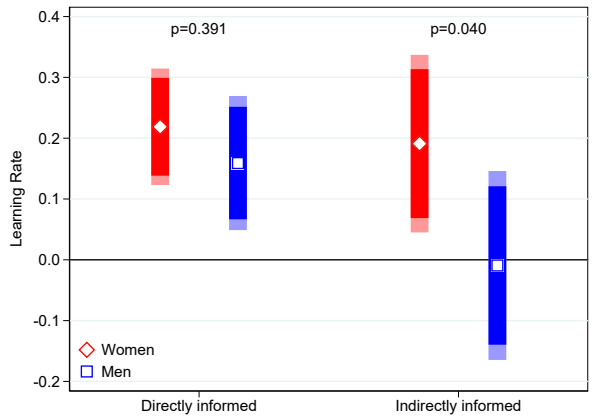
While there is no difference in how men and women treat information that was revealed to them directly, information provided to their spouses generates a different picture. When a wife received the information about the actual income ranks through her husband, the effect on her belief about income rank one year later was almost as strong as if she was directly informed (0.19

[7] In Appendix Table A4, we also present specifications that only account for direct information pass-through. These estimates reveal very similar learning rates between women (0.17 percentage points, column 3) and men (0.16, column 5). Compared to our baseline specification that conditions on indirect information pass-through, the direct learning rate for women is lower (0.17 vs. 0.22), which illustrates the importance of accounting for indirect information pass-through in our setting.

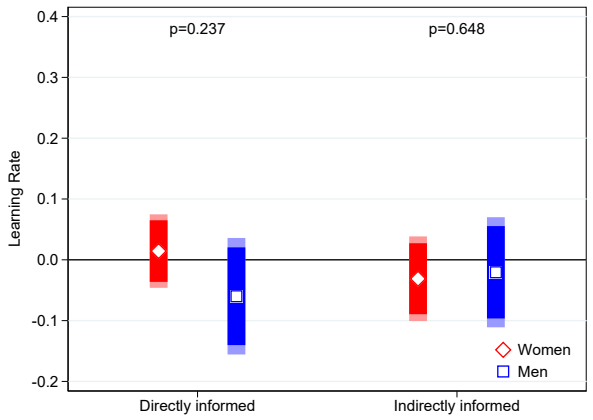
[8] To test for the difference in learning rates across gender, we present estimates from interacting all relevant variables with gender in Appendix Table A5.

Figure 3: Direct and Indirect Learning from the Information Shocks

(a) Posterior Beliefs



(b) Falsification Test: Prior Beliefs



Notes: Coefficient plots of learning rates from OLS regressions estimating the effect of information provision on beliefs about income rank one year later (posterior beliefs) as outlined in equation (1) in Section 3. The sample is restricted to single and two-person, mixed-gender households, and standard errors are clustered at the household level. Bands around coefficient estimates indicate 90% (light color) and 95% (intense color) confidence intervals. Panel (a) shows the effect of providing direct information to a respondent (α^{direct}) or indirect information through a respondent's partner ($\alpha^{indirect}$) on this respondent's beliefs about income rank one year after the intervention (posteriors). We estimate (α^{direct}) and ($\alpha^{indirect}$) separately for women, displayed in red (see Appendix Table A4, column (4), top panel for the estimates) and men, displayed in blue (see Appendix Table A4, column (6), top panel for the estimates). Panel (b) shows a falsification test estimating equation (1) using beliefs about income rank in the same year (prior beliefs). The estimates are displayed in Appendix Table A4, bottom panel, column (3) for women, and column (6) for men.

percentage points, $p = 0.010$). In strong contrast, when a husband was not directly informed about the true household income rank but his wife was, he did not adjust his beliefs one year later (-0.01 percentage points, $p = 0.906$). The difference in indirect learning rates between wives and husbands is sizable and statistically significant ($p = 0.040$).[9]

In Panel (b) of Figure 3, we test the robustness of these results through a falsification test. We measure the effect of direct and indirect information provision on prior beliefs about household income rank. Given that we elicited these beliefs before any information revelation on true household income rank, we expect to see no effect on these prior beliefs. This is exactly what we find: the direct and indirect placebo learning rate is close to zero, statistically insignificant, and precisely estimated in all specifications. In the Appendix, we further show that our results are robust to (i) using the full sample (Appendix Table A6), (ii) focusing only on 2-person households (Appendix Table A7), and (iii) not pooling the beliefs about national and global income ranks

[9]Consistent with these results, we find that direct information raises confidence in belief statements for both women and men, and some indication that receiving indirect information has a stronger impact on women's confidence in belief statement compared to men (see Appendix Table A10).

(Appendix Table A8).

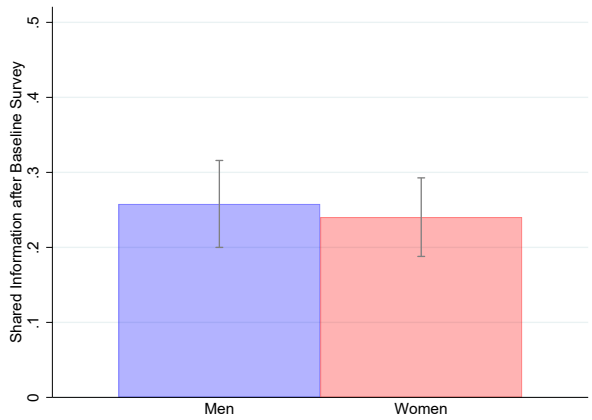
While the presented evidence consistently points to pronounced gender differences in information flows, a question is whether these differences are a specific feature of the household context or whether such differences occur more generally. To examine this question, we use the fact that the information treatment was delivered by a female or male interviewer. The interviewer read out the information and showed the respondent a customized graph on their tablet visualizing the information treatment (see Appendix Figure A1 for a sample screenshot). As interviewers are randomly assigned to households, it is also random whether households are interviewed by a male or female interviewer. The share of male and female interviewers is roughly balanced (55% vs. 45%, respectively). Focusing on direct information provision, we provide suggestive evidence that there is no difference in the reaction of men: they update their beliefs in a similar fashion regardless of whether the interviewer is female or male (0.16 vs. 0.12, Appendix Table A9, top panel). The difference between the two coefficients is small and not significant ($p = 0.129$). This suggests that our findings are more likely the result of within-household interactions than from a more general phenomenon where men neglect to incorporate information they receive from women.

We cannot address all possible channels that could explain why wives react to information revealed to their spouses, whereas husbands do not. However, we provide evidence on the role of two immediate candidates that could explain our finding of asymmetric information flows: the probability of sharing information and the demand for information acquisition. One possible reason could be that men are more likely to talk about the information than women because they are simply more interested in information about income ranks or, more generally, in financial matters. If this is the case, a husband would be unable to learn from his wife because she communicates less. However, we find that gender differences in intended communications do not appear to be the reason for the gendered information diffusion. In the follow-up survey, we asked all respondents who directly received information about income ranks in the baseline survey whether they could recall having shared the income rank information within the household. Panel (a) of Figure 4 shows that while a sizable share of respondents said they shared the information within the household, there is no evidence that wives and husbands differ in the propensity to report having done so (26 percent vs. 24 percent, $p = 0.310$).

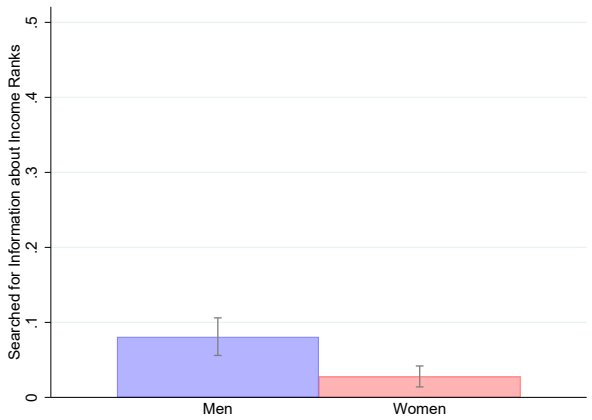
We also find no indication that women obtain the information about income ranks from other sources (see Panel (b) of Figure 4). First, only a minimal share of respondents said they looked for this information elsewhere (5 percent), and if anything, this share is lower for women than for

Figure 4: Information Sharing and Search in Households after the Baseline Survey

(a) Information Sharing w/in Households



(b) Information Search



Notes: Panel (a) shows share of women and men who said they shared their rank information from the baseline survey within their household after the baseline survey ($n = 433$, test of proportions, $p = 0.310$). Panel (b) shows share of women and men who said they searched for information about income ranks after the baseline survey ($n = 989$, test of proportions, $p < 0.01$).

men (3 percent vs. 8 percent, test of gender difference in propensity to say that they looked for information $p < 0.01$). Second, the genuine interest in information about income ranks is higher among men. Looking at respondents in untreated households (i.e., households in which nobody received information and thus no information diffusion can take place), we see that, if anything, the willingness to pay (WTP) for information is lower for women than for men (5.5 Euro vs. 6.55 Euro), albeit the difference is not statistically significant. If we look only at uninformed respondents in households with one informed member, we see that uninformed women have a significantly lower WTP than uninformed men (4.0 Euro vs. 7.0 Euro, $p = 0.014$, see Appendix Table A11). The lower WTP for women in households in which only their spouse was informed suggests that they are less interested in the information, possibly because they already received it from their husbands. Conversely, men are willing to pay a fairly large amount to obtain information that is (i) relatively easy to find online and (ii) potentially shared by their wives. However, despite their greater interest in information about relative income, their indirect learning rate is zero.

To summarize, we find evidence that women adjust their beliefs in response to both direct and indirect information, while men ignore the information if indirectly informed through their wives, but not when they are directly informed. This behavior cannot be traced to differences in information-sharing and acquisition patterns between women and men.

5 Conclusions

The fact that people underweight information discovered by others can lead to inefficient and faulty beliefs. This is true not only in society at large but also in a context where information diffusion should meet few barriers: one's own household. Using a representative sample of Germans, we show that this is indeed the case. We document that while providing information to husbands influences their wives' belief formation as much as if the information had been provided directly to the wife, the opposite is not true. In fact, husbands' beliefs do not react at all to the information provided to their wives. This indicates the existence of asymmetries in information sharing in the household in a naturally-occurring setting and despite common interests.

Our study focused on documenting gender-specific barriers to information flow within households and less on providing a comprehensive account of when and why these barriers exist. While we do provide some indications of the boundaries and underlying reasons for these barriers, important future work remains. It would definitely be valuable to explore further possible reasons for the gendered differences in information flows. For example, one interesting avenue would be further scrutinizing the role of spousal communication patterns (see e.g., Bjorkman Nyqvist, Jayachandran and Zipfel, 2023). It will also be necessary to extend the setting explored here to other types of beliefs (e.g., inflation expectations, effectiveness and safety of vaccines. etc) and other contexts (e.g., other developed and developing countries). Finally, we will ultimately also want to know if possible gender differences in belief updating, which we study here, also translates into differences in high-stakes behavior.

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Appendix – For Online Publication Only

Listen to Her: Gender Differences in Information Diffusion within the Household

Dietmar Fehr, Johanna Mollerstrom, and Ricardo Perez-Truglia

A.1 Data

This study is based on data from SOEP INNOVATION SAMPLE (soep-is.2020; 10.5684/soep.is.2020), which is available for the research community as scientific use file (SUF). To get access to the SUF you have to sign a data distribution contract with the SOEP. For more details, see the website of the Research Data Center SOEP by visiting the following URL: https://www.diw.de/en/diw_01.c.601584.en/data_access.html (for questions, you can reach out to soepmail@diw.de). Once your contract is approved you will receive a link to an online form to request the data. Here you request the latest SOEP Innovation Sample 20xx (2020 as of the time this README file was written). You will then receive an individualized download link for the SUF (and passwords for the data on your mobile phone).

A.2 Replication Package

The replication package is available at: https://doi.org/10.17605/OSF.IO/3A9C5

Setup: We used STATA (version 17) to prepare and analyze the data and we provide two do-file to reproduce the analysis. If you have a newer version of Stata, you may want to add "version 17" at the beginning to ensure compatibility. There are some commands used in the code, "coefplot" and "estout," that do not come pre-installed with Stata. If you are connected to the Internet, you can install these two commands by entering "ssc install coefplot" and "ssc install estout" in the Stata command window.

Instructions: First, download all the data files referenced above and put all the data files (*.dta) and do-files (*.do) into the same folder. The data we use in our analysis is contained in the following data files (you may want to delete the other files that come with the data distribution).

- inno.dta: this contains the data from our tailor-made survey modules.
- p.dta: person-related information
- pgen.dta: person-related information generated from the answers in the personal questionnaire.
- pbrutto.dta: person-related information generated by the interviewers during fieldwork.
- hbrutto.dta: household-related information generated by the interviewers during fieldwork.
- h.dta: household-related information
- intv.dta: interviewer-related information

Second, we provide two do-files:

- prepare_working_file.do: this file generates the variables used in the analysis from the raw data
- Figures&Tables.do: this file creates all figures and tables in the paper and replication package

To prepare the "working file" you should first open and run the "prepare_working_file.do" in Stata. This do-file will generate the variables used in the analysis from the raw data and create a new data file that will be saved in the same folder: "working_file_intra_aux.dta." This data file will be used to produce all figures and tables in the main text and the analysis in this replication package. The Stata code for this analysis is contained in "Figures&Tables.do," which also includes comments indicating which portion of the code generates which table/figure. The mapping of the code outcome to the figures and tables in the manuscript (and appendix) is as follows. Figures are named "Fig_#_description," where # refers to the running numbering and "description" refers to the content, e.g., misperceptions_pooled_female_vs_male. Tables are named "Table_#_description," where # refers to the running numbering and "description" refers to the content, e.g., Pooled_Peer_Treatment_Gender_Spouses. The programs were last run top to bottom on February 15, 2023.

A.3 Information Treatment

Appendix Figure A1 provides an example screenshot (translated from German) of the treatment providing information about actual income rank at the national level. The interviewer first read out some general information on the data sources and then told the respondent the share of people in Germany with less per-capita gross household income. In addition, the interviewer showed and explained a visualization of this information. Information about actual global income rank was presented analogously.

A.4 Attrition and Balance Checks

In the analysis, we measure the effects of treatment on beliefs about income rank one year later (i.e., in the follow-up survey. A potential concern is that the treatment may have affected the decision to participate in the follow-up survey. Appendix Tables A1 and A2 provide further assurances that the attrition was random. In Appendix Table A1, we examine whether treatment status predicts participation in the follow-up survey. Column (1) shows that this is not the case. As it is possible that some household members are treated while others are not, we also control for the indirect treatment. The results are displayed in column (2) and indicate that it neither affects participation in the follow-up survey. We present a similar analysis in columns (3) and (4). Here, we consider information about national and global income rank separately. Again, the coefficient estimates are small and insignificant. In Appendix Table A2, we repeat this exercise for treatment effects but also look at women and men. The results are very similar to what we have seen in Appendix Table A1. Finally, in Appendix Table A3, we show that observable characteristics are balanced across treatment and control in the pooled sample (column 1), for female respondents (column 2), and for male respondents (column 3).

A.5 Main Result

Appendix Table A4 presents the regression underlying the results presented in Figure 3. The top panel shows the direct and indirect effects of information provision on beliefs in the pooled sample. The estimates for the pooled sample in columns (1–2) illustrate that information about income ranks does move perceptions one year later and that there is a substantial diffusion of information within the household. The learning rate for direct information is 0.16 ($p < 0.01$, column 1), indicating

that for each percentage point shock in the information given directly to the respondent, the perceived income rank a year later is higher by about 0.16 percentage points. Column (2) shows the indirect learning effects in the pooled sample. The coefficient of 0.11 implies that for each percentage point shock in the information given to another member of a respondent's household, the posterior belief a year later is 0.11 percentage points closer to the actual ranks. This indirect effect of information pass-through also illustrates the importance of accounting for information diffusion within households. The coefficient estimate of 0.195 for the direct learning rate suggests that we underestimate the direct impact substantially if the indirect effects are not taken into account. In columns (3–6), we present our main result and show that the indirect information diffusion effect is entirely driven by women with a male partner who directly received information about the true income ranks of the household. First, we see that the direct learning rate is similar for women and men (0.17 vs. 0.16), if we do not account for indirect learning (columns 3 and 5). Second, there is an information pass-through from informed husbands to uninformed wives (0.19, column 4) but not from informed wives to uninformed husbands (-0.01, column 6). The bottom panel shows a falsification test using prior beliefs. The estimates reveal that the information treatment has, as expected, no impact on prior beliefs. In Appendix Table A5, we present the results from estimating a model in which we interact all relevant variables with gender to test for gender differences in learning rates. The coefficient estimate on the interaction between gender and the indirect learning rate is large (0.22) and significant ($p = 0.040$), whereas the indirect learning rate for men is zero (0.004, column 2).

A.6 Main Result: Alternative Specifications

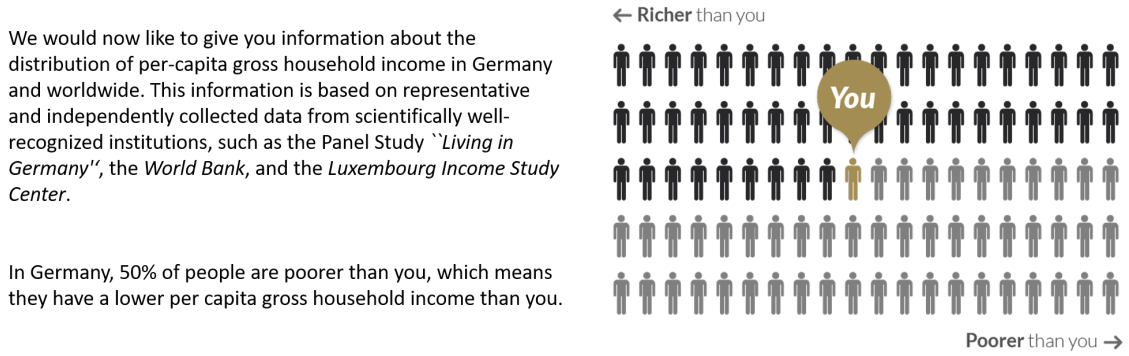
Next, we show that our results do not depend on any of the choices to restrict the study sample outlined in Section 3. Appendix Tables A6–A8 show these alternative specifications for our main result. First, Appendix Table A6 replicates the results from our baseline specification (Appendix Table A4) for the full sample. The information pass-through from husbands to wives is larger than in our baseline specification (0.22 vs. 0.19) and significant. Note that the likelihood of someone receiving information indirectly increases in households larger than two. Therefore, assignment to $T^{indirect}$ (indirect treatment) is random only after conditioning on the number of respondents in the household who could have been assigned to the direct information treatment. Second, in Appendix Table A7, we show that our results also hold if we restrict the sample to 2-person households only.

Though the effect is smaller than in our baseline specification (0.15 vs. 0.19) due to the much smaller sample size. Third, in Appendix Table A8, we show that our results do not depend on pooling beliefs. We see a positive indirect learning rate of women for national and global income rank information. In contrast, the indirect learning rate for men is, in both cases, close to zero.

A.7 Additional Results

Appendix Tables A9–A11 present additional results. In particular, in Appendix Table A9, we show that men react to directly delivered information from female and male interviewers in the same way. Appendix Table A10 shows that receiving information directly increases confidence in the posteriors for both women and men and that receiving information indirectly only has some effects on women but not men. Appendix Table A11 shows gender differences in the willingness to pay for information in the control and treatment group as well as in the group with indirect information.

Figure A1: Screenshot of a Sample of the Information Treatment



Notes: Visualization of the information treatment providing information about actual income rank at the national level (information about actual global income rank was presented analogously). Translated from German. Respondents received first some general information on the data sources and then learned the share of people in Germany with less per-capita gross household income. The information was illustrated using customized graphs that indicated the relative position to make it easier to understand and digest.

Table A1: Effects of Information Provision on Response Rate to the Follow-Up Survey (Selective Attrition)

	Responded to Follow-Up Survey			
	(1)	(2)	(3)	(4)
Treatment	-0.018	-0.008		
	(0.020)	(0.026)		
Indirect Treatment		0.029		
		(0.032)		
National Rank: Treatment*(Information - Prior)			-0.029	-0.082
			(0.097)	(0.113)
National Rank: Indirect Treatment*(Information - Prior)				-0.153
				(0.146)
Global Rank: Treatment*(Information - Prior)			-0.146	-0.091
			(0.099)	(0.120)
Global Rank: Indirect Treatment*(Information - Prior)				0.152
				(0.134)
Observations	1,392	1,392	1,364	1,364

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions with standard errors clustered at the household level in parentheses using data from both surveys. The dependent variable is an indicator whether a respondent took part in the second survey one year later. Analysis conditional on number of household members and HH gross income.

Table A2: Effects of Information Provision on Response Rate to the Follow-Up Survey (Treatment Effect on Attrition)

	All	Women	Men
	(1)	(2)	(3)
National Rank: Treatment*(Information - Prior)	-0.019	-0.172	0.129
	(0.096)	(0.143)	(0.146)
Global Rank: Treatment*(Information - Prior)	-0.131	-0.083	-0.154
	(0.100)	(0.133)	(0.167)
P-value Nat.=Glob.	0.541	0.728	0.333
Observations	1,364	745	619

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions estimating the effect of treatment status on participation in the second survey using data from baseline survey. Standard errors clustered at the household level in parentheses. The dependent variable is an indicator whether a respondent took part in the second survey one year later. The control variables used in the analysis are the prior misperceptions about the national and global income rank, and the following demographic characteristics: age and dummies for gender, education, disability, unemployment, retirement, self-employment, political party and East Germany.

Table A3: Randomization Balance

	All			Women			Men		
	(1) Control	(2) Treat	(3) P-value	(4) Control	(5) Treat	(6) P-value	(7) Control	(8) Treat	(9) P-value
HH Gross Income (EUR 1,000s)	43.64	43.54	0.97	42.80	39.76	0.33	44.64	48.15	0.51
	(1.91)	(2.28)		(2.37)	(2.00)		(3.10)	(4.42)	
No. of Household Members	2.34	2.28	0.35	2.30	2.25	0.54	2.38	2.31	0.48
	(0.04)	(0.05)		(0.06)	(0.06)		(0.07)	(0.07)	
Age	54.58	56.44	0.06	55.28	56.11	0.53	53.76	56.83	0.04
	(0.71)	(0.69)		(0.97)	(0.91)		(1.02)	(1.06)	
Female (=1)	0.54	0.55	0.79						
	(0.02)	(0.02)							
Education: upper secondary (=1)	0.63	0.60	0.23	0.62	0.63	0.76	0.64	0.56	0.03
	(0.02)	(0.02)		(0.02)	(0.02)		(0.03)	(0.03)	
Education: college (=1)	0.22	0.23	0.61	0.19	0.17	0.63	0.26	0.30	0.23
	(0.02)	(0.02)		(0.02)	(0.02)		(0.02)	(0.03)	
Disabled (=1)	0.13	0.15	0.18	0.12	0.13	0.69	0.14	0.18	0.13
	(0.01)	(0.01)		(0.02)	(0.02)		(0.02)	(0.02)	
Unemployed (=1)	0.03	0.04	0.50	0.03	0.04	0.52	0.04	0.04	0.76
	(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.01)	
Self employed (=1)	0.07	0.05	0.21	0.05	0.04	0.89	0.09	0.06	0.13
	(0.01)	(0.01)		(0.01)	(0.01)		(0.02)	(0.01)	
Retired (=1)	0.34	0.35	0.72	0.35	0.34	0.74	0.34	0.37	0.38
	(0.02)	(0.02)		(0.02)	(0.02)		(0.03)	(0.03)	
East Germany (=1)	0.23	0.23	0.99	0.24	0.23	0.74	0.22	0.23	0.71
	(0.02)	(0.02)		(0.02)	(0.02)		(0.02)	(0.02)	
SPD Supporter (=1)	0.13	0.16	0.14	0.12	0.14	0.35	0.14	0.18	0.23
	(0.01)	(0.01)		(0.02)	(0.02)		(0.02)	(0.02)	
CDU/CSU Supporter (=1)	0.22	0.24	0.30	0.22	0.24	0.43	0.21	0.24	0.51
	(0.02)	(0.02)		(0.02)	(0.02)		(0.02)	(0.02)	
FDP Supporter (=1)	0.02	0.02	0.94	0.01	0.02	0.31	0.03	0.03	0.54
	(0.01)	(0.01)		(0.00)	(0.01)		(0.01)	(0.01)	
Gruene Supporter (=1)	0.06	0.08	0.28	0.07	0.08	0.46	0.05	0.07	0.42
	(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.01)	
Linke Supporter (=1)	0.04	0.03	0.35	0.04	0.02	0.15	0.04	0.04	0.91
	(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.01)	
AfD/Right Supporter (=1)	0.04	0.03	0.43	0.02	0.02	0.81	0.06	0.05	0.44
	(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.01)	
Joint F-Test			0.26			0.87			0.11
Observations	705	687		383	378		322	309	

Notes: Mean and standard deviation (in parentheses) of control variables, separated for treatment and control in the baseline survey. P-value is from testing for difference between treatment and control. Joint F-test reports the p-value from an F-test based on regressing treatment status on all controls. Columns (1–3) includes data for all respondents, Columns (4–6) includes data for female respondents, and Columns (7–9) includes data for male respondents. All control variables are defined as binary variables except household income, number of household members, and age.

Table A4: Direct and Indirect Effects of Information Provision on Beliefs

	Posterior Belief 2018					
	(1) Pooled	(2) Pooled	(3) Women	(4) Women	(5) Men	(6) Men
Income Rank: Treatment*(Feedback - Prior)	0.164***	0.195***	0.170***	0.219***	0.162***	0.159***
	(0.034)	(0.037)	(0.046)	(0.049)	(0.052)	(0.056)
Income Rank: Indirect Treatment*(Feedback - Prior)		0.110**		0.191**		-0.009
		(0.054)		(0.074)		(0.079)
Observations	1,978	1,978	1,070	1,070	908	908
	Falsification Test: Prior Belief 2017					
	(1) Pooled	(2) Pooled	(3) Women	(4) Womens	(5) Males	(6) Males
Income Rank: Treatment*(Feedback - Prior)	-0.005	-0.015	0.030	0.014	-0.054	-0.060
	(0.025)	(0.030)	(0.029)	(0.031)	(0.042)	(0.049)
Income Rank: Indirect Treatment*(Feedback - Prior)		-0.033		-0.031		-0.020
		(0.030)		(0.035)		(0.046)
Observations	1,978	1,978	1,070	1,070	908	908

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions estimating the direct and indirect effects of information provision on beliefs for women and men. The top panel shows the main result (posterior beliefs), and the bottom panel shows a falsification test using prior beliefs. Standard errors are clustered at the household level, and the sample is restricted to single households and households with two mixed-gender adult partners. The direct learning rate corresponds to the pass-through of information on true income rank within a household, i.e., the effect of providing direct information to a respondent on their beliefs about income rank one year after the intervention – Income Rank: Treatment*(Information - Prior). Correspondingly, the indirect learning rate is the effect of providing indirect information through a respondent's partner on a respondent's posterior beliefs – Income Rank: Indirect Treatment*(Information - Prior). Regressions control for respondent's income, the number of household members, the prior belief about the income rank, the change in the true income rank between the two surveys, an indicator for beliefs about national income rank, and the following demographic characteristics: age and indicator variables for education, disability, unemployment, retirement, self-employment, political party, and East Germany.

Table A5: Alternative Specification – Model with Interactions

	Posterior Belief 2018		Prior Belief 2017	
	(1)	(2)	(3)	(4)
Income Rank: Treatment*(Feedback - Prior)	0.160***	0.162***	-0.058	-0.065
	(0.051)	(0.055)	(0.044)	(0.051)
Female=1 × Income Rank: Treatment*(Feedback - Prior)	0.006	0.063	0.089	0.074
	(0.069)	(0.073)	(0.054)	(0.059)
Income Rank: Indirect Treatment*(Feedback - Prior)		0.004		-0.025
		(0.078)		(0.047)
Female=1 × Income Rank: Indirect Treatment*(Feedback - Prior)		0.221**		-0.063
		(0.107)		(0.060)
Observations	1,978	1,978	1,978	1,978

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions estimating the direct and indirect effects of information provision on beliefs using a specification that interacts all relevant variables with an indicator for gender. Columns (1–2) show the effect on posterior beliefs, and columns (3–4) show a falsification test using prior beliefs. Standard errors are clustered at the household level, and the sample is restricted to single households and households with two mixed-gender adult partners. The direct learning rate corresponds to the pass-through of information on true income rank within a household, i.e., the effect of providing direct information to a respondent on their beliefs about income rank one year after the intervention – Income Rank: Treatment*(Information - Prior). Correspondingly, the indirect learning rate is the effect of providing indirect information through a respondent's partner on a respondent's posterior beliefs – Income Rank: Indirect Treatment*(Information - Prior). Regressions control for respondent's income, the number of household members, the prior belief about the income rank, the change in the true income rank between the two surveys, an indicator for beliefs about national income rank, and the following demographic characteristics: age and indicator variables for education, disability, unemployment, retirement, self-employment, political party, and East Germany.

Table A6: Alternative Specification – Full Sample

	Posterior Belief 2018					
	(1) Pooled	(2) Pooled	(3) Women	(4) Women	(5) Men	(6) Men
Income Rank: Treatment*(Feedback - Prior)	0.141***	0.177***	0.132***	0.194***	0.157***	0.152***
	(0.032)	(0.035)	(0.044)	(0.045)	(0.048)	(0.053)
Income Rank: Indirect Treatment*(Feedback - Prior)		0.116**		0.218***		-0.014
		(0.051)		(0.071)		(0.068)
Observations	2,259	2,259	1,220	1,220	1,039	1,039
	Prior Belief 2017					
	(1) Pooled	(2) Pooled	(3) Women	(4) Women	(5) Men	(6) Men
Income Rank: Treatment*(Feedback - Prior)	-0.008	-0.009	0.015	0.021	-0.046	-0.061
	(0.024)	(0.028)	(0.026)	(0.029)	(0.040)	(0.047)
Income Rank: Indirect Treatment*(Feedback - Prior)		-0.004		0.020		-0.043
		(0.031)		(0.041)		(0.045)
Observations	2,259	2,259	1,220	1,220	1,039	1,039

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions estimating the direct and indirect effects of information provision on beliefs for women and men. The top panel shows the main result (posterior beliefs), and the bottom panel shows a falsification test using prior beliefs. Standard errors are clustered at the household level, and the sample includes all households (household sizes $j \in \{1, 2, 3, 4, 5, 6\}$). The direct learning rate corresponds to the pass-through of information on true income rank within a household, i.e., the effect of providing direct information to a respondent on their beliefs about income rank one year after the intervention – Income Rank: Treatment*(Information - Prior). Correspondingly, the indirect learning rate is the effect of providing indirect information through a respondent's partner on a respondent's posterior beliefs – Income Rank: Indirect Treatment*(Information - Prior). Regressions control for respondent's income, the number of household members, the prior belief about the income rank, the change in the true income rank between the two surveys, an indicator for beliefs about national income rank, and the following demographic characteristics: age and indicator variables for education, disability, unemployment, retirement, self-employment, political party, and East Germany.

Table A7: Alternative Specification – Partners Only

	Posterior Belief 2018					
	(1) Pooled	(2) Pooled	(3) Women	(4) Women	(5) Men	(6) Men
Income Rank: Treatment*(Feedback - Prior)	0.115***	0.140***	0.122**	0.197***	0.102	0.072
	(0.043)	(0.053)	(0.059)	(0.071)	(0.064)	(0.075)
Income Rank: Indirect Treatment*(Feedback - Prior)		0.050		0.148*		-0.061
		(0.065)		(0.088)		(0.092)
Observations	1,203	1,203	608	608	595	595
	Prior Belief 2017					
	(1) Pooled	(2) Pooled	(3) Women	(4) Women	(5) Men	(6) Men
Income Rank: Treatment*(Feedback - Prior)	0.022	-0.000	0.048	0.047	-0.035	-0.059
	(0.031)	(0.046)	(0.036)	(0.047)	(0.050)	(0.065)
Income Rank: Indirect Treatment*(Feedback - Prior)		-0.044		-0.002		-0.050
		(0.042)		(0.046)		(0.059)
Observations	1,203	1,203	608	608	595	595

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions estimating the direct and indirect effects of information provision on beliefs for women and men. The top panel shows the main result (posterior beliefs), and the bottom panel shows a falsification test using prior beliefs. Standard errors are clustered at the household level, and the sample is restricted to households with two mixed-gender adult partners. The direct learning rate corresponds to the pass-through of information on true income rank within a household, i.e., the effect of providing direct information to a respondent on their beliefs about income rank one year after the intervention – Income Rank: Treatment*(Information - Prior). Correspondingly, the indirect learning rate is the effect of providing indirect information through a respondent's partner on a respondent's posterior beliefs – Income Rank: Indirect Treatment*(Information - Prior). Regressions control for respondent's income, the number of household members, the prior belief about the income rank, the change in the true income rank between the two surveys, an indicator for beliefs about national income rank, and the following demographic characteristics: age and indicator variables for education, disability, unemployment, retirement, self-employment, political party, and East Germany.

Table A8: Alternative Specification – Separated by National and Global Income Ranks

	Posterior Belief 2018 - Women				Posterior Belief 2018 - Men			
	(1) National	(2) National	(3) Global	(4) Global	(5) National	(6) National	(7) Global	(8) Global
National Rank: Treatment*(Feedback - Prior)	0.112*	0.176***			0.219***	0.219***		
	(0.059)	(0.062)			(0.061)	(0.066)		
National Rank: Indirect Treatment*(Feedback - Prior)		0.270***				0.001		
		(0.091)				(0.091)		
Global Rank: Treatment*(Feedback - Prior)			0.217***	0.263***			0.093	0.083
			(0.056)	(0.061)			(0.073)	(0.079)
Global Rank: Indirect Treatment*(Feedback - Prior)				0.159*				-0.028
				(0.096)				(0.099)
Observations	539	539	531	531	457	457	451	451
	Prior Belief 2017 - Women				Prior Belief 2017 - Men			
	(1) National	(2) National	(3) Global	(4) Global	(5) National	(6) National	(7) Global	(8) Global
National Rank: Treatment*(Feedback - Prior)	0.029	0.013			0.000	-0.015		
	(0.036)	(0.040)			(0.041)	(0.047)		
National Rank: Indirect Treatment*(Feedback - Prior)		-0.067				-0.058		
		(0.057)				(0.047)		
Global Rank: Treatment*(Feedback - Prior)			0.003	-0.008			-0.054	-0.048
			(0.026)	(0.029)			(0.046)	(0.051)
Global Rank: Indirect Treatment*(Feedback - Prior)				-0.030				0.017
				(0.029)				(0.049)
Observations	557	557	538	538	476	476	454	454

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions estimating the direct and indirect effects of information provision on national and global income ranks on beliefs for women and men. The top panel shows the main result (posterior beliefs), and the bottom panel shows a falsification test using prior beliefs. Standard errors are clustered at the household level, and the sample is restricted to single households and households with two mixed-gender adult partners. The direct learning rate corresponds to the pass-through of information on true income rank within a household, i.e., the effect of providing direct information to a respondent on their beliefs about income rank one year after the intervention – National (Global) Rank: Treatment*(Information - Prior). Correspondingly, the indirect learning rate is the effect of providing indirect information through a respondent's partner on a respondent's posterior beliefs – National (Global) Rank: Indirect Treatment*(Information - Prior). Regressions control for respondent's income, the number of household members, the prior belief about the income rank, the change in the true income rank between the two surveys, and the following demographic characteristics: age and indicator variables for education, disability, unemployment, retirement, self-employment, political party, and East Germany.

Table A9: Direct and Indirect Effect of Information Provision on Beliefs for Men by Interviewer Gender

	Posterior Belief 2018 – Men	
	(1) Male Interviewer	(2) Female Interviewer
Income Rank: Treatment*(Feedback - Prior)	0.121*	0.163*
	(0.067)	(0.093)
Income Rank: Indirect Treatment*(Feedback - Prior)	-0.006	-0.040
	(0.099)	(0.124)
Observations	510	394
	Prior Belief 2017 – Men	
	(1) Male Interviewer	(2) Female Interviewer
Income Rank: Treatment*(Feedback - Prior)	-0.089	-0.024
	(0.058)	(0.062)
Income Rank: Indirect Treatment*(Feedback - Prior)	-0.046	0.002
	(0.052)	(0.068)
Observations	510	394

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions estimating the direct effect of information provision on beliefs for men separated by interviewer gender. The top panel shows the main result (posterior beliefs), and the bottom panel shows a falsification test using prior beliefs. Standard errors are clustered at the household level, and the sample is restricted to single households and households with two mixed-gender adult partners. The direct learning rate corresponds to the pass-through of information on true income rank within a household, i.e., the effect of providing direct information to a respondent on their beliefs about income rank one year after the intervention – Income Rank: Treatment*(Information - Prior). Correspondingly, the indirect learning rate is the effect of providing indirect information through a respondent's partner on a respondent's posterior beliefs – Income Rank: Indirect Treatment*(Information - Prior). Regressions control for respondent's income, the number of household members, the prior belief about the income rank, the change in the true income rank between the two surveys, an indicator for beliefs about national income rank, and the following demographic characteristics: age and indicator variables for education, disability, unemployment, retirement, self-employment, political party, and East Germany.

Table A10: Effects of Information Provision on Belief Certainty One Year Later

	Certainty Posterior Belief					
	(1) Pooled	(2) Pooled	(3) Women	(4) Women	(5) Men	(6) Men
Treatment	0.533***	0.669***	0.432**	0.611***	0.650***	0.730***
	(0.139)	(0.169)	(0.206)	(0.234)	(0.193)	(0.216)
Indirect Treatment		0.426*		0.577*		0.246
		(0.229)		(0.343)		(0.299)
Observations	1,983	1,983	1,074	1,074	909	909

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions estimating the effect of information provision on confidence in posterior beliefs. Standard errors are clustered at the household level in parentheses. The dependent variable is the confidence in stated posterior beliefs measured on a 1–10 scale emulating steps of 10 percent. "Treatment" is an indicator for treatment information on income ranks, and "Indirect Treatment" takes the value 1 if the respondent did not receive the information but another member of her household and 0 otherwise (i.e., if the respondent received the information or if none of the household members received the information). Regressions control for respondent's income, the number of household members, the prior belief about the income rank, the change in the true income rank between the two surveys, an indicator for beliefs about national income rank, and the following demographic characteristics: age and indicator variables for education, disability, unemployment, retirement, self-employment, political party and East Germany.

Table A11: Gender Differences in WTP for Information on Actual Income Ranks

	WTP For Information		
	(1) Control	(2) Treatment	(3) Indirect
Female (=1)	-0.882	-0.899	-3.084**
	(0.751)	(0.680)	(1.252)
Observations	645	905	300

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Interval regressions estimating gender differences in willingness to pay (WTP) for information on actual income ranks. "Control" refers to respondents who neither received direct nor indirect information, "Treatment" refers to directly informed respondents, and "Indirect" refers to indirectly informed respondents. Standard errors are clustered at the household level in parentheses. The dependent variable is the WTP for information, measured as the switch point from receiving information to receiving money in the list-price format. Regressions control for the following demographic characteristics: age and indicator variables for education, disability, unemployment, retirement, self-employment, political party, and East Germany.