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Hello, Can You Hear Me?

Impact of Speakerphones on Phone Survey Responses

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Abstract

Ensuring privacy of respondents in phone surveys is especially challenging compared to face-to-face interviews. While the use of phone surveys has become more common in development research, there is little information on how the conduct of phone surveys affects responses. Using phone survey data from India and Nepal, we test the impact of speakerphone use on bias in responses by women and men. We find that 65% of women respondents in India, and 61% of women and 59% of men respondents in Nepal had their phone on speaker during the survey. Speakerphone use is lower when women are matched with the same enumerators in the second round. Speaker use was associated with lower reported agency by women over their own income and the income of their spouse, while it is opposite for men. Our findings have important implication for the collection, design, and analysis of phone survey data.

Keywords: respondent privacy, response bias, gender, phone surveys, speakerphone, South Asia

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1. Introduction

The COVID-19 pandemic has prompted a switch from in-person to phone surveys, a trend that is expected to continue to grow because of a growing number of shocks and the overall lower cost of phone surveys. It is thus necessary to study and account for ways by which responses and data quality can be compromised in phone surveys. There is evidence, for example, on the effect of differential phone coverage and non-response (Ambel et al. 2021) which may bias phone survey results by under-representing poorer households and women, who have more limited access to phones. However, other types of bias arising due to the way phone surveys are conducted have received relatively less attention. The impact of third party presence on in-person survey responses has been investigated extensively (Aquilino, 1993; Smith, 1997; Zipp et al., 2002; Cantillon et al, 2005), but little to no evidence exists on the various channels by which respondent privacy can be breached in phone surveys, where enumerators cannot confirm or ensure respondent privacy.

Conventional ways of providing confidentiality in phone surveys have focused on phrasing questions such that someone overhearing the answer would not be able to tell what the answer is about (Ellsberg & Heise, 2002; Dimond et al., 2011; El Morr & Layal, 2020; Khalil et al., 2021). However, this assumes that the questions cannot be overheard—an assumption that is violated if the respondent’s phone is on speakerphone setting. If someone is overhearing the conversation, asking sensitive questions itself may jeopardize the safety of respondents, especially vulnerable groups like women and children. It is also important to consider how privacy concerns for women might be reinforced by the persistent gender gap in mobile phone ownership, which is especially acute in South Asia, where women often use their husband’s or son’s phone to answer phone surveys (GSMA, 2019, LeFevre et al, 2020, Raihan et al, 2021). This might further disempower women respondents in a phone survey setting.

Data reliability concerns are heightened when surveys cover potentially sensitive questions. Such questions suffer from problems such as social desirability bias, which could distort survey estimates (Krumpal, 2011), with the extent of sensitivity recognized as a major factor influencing this bias (Stocké, 2004; Kryson, 1998).

In light of these challenges, our paper demonstrates a possible channel by which respondent privacy can be breached in phone surveys, and how it impacts responses to questions on intra-household decision making. We conducted phone surveys of self-employed women in Gujarat, India, and women and men farmers in Dang, Nepal, to study the socio-economic impacts of COVID-19 on livelihoods. We find that a significant proportion of respondents were answering the survey while on speakerphone in both countries. We show that speakerphone biases responses to questions that can be perceived as sensitive, such as intra-household decision making over own and spousal income but does not impact responses to objective questions such as household coping strategies to deal with income loss. We also find geographic differences in both use and impacts of speaker use in the two regions. Our paper contributes to the growing body of literature on best practices for data collection, especially in the context of remote data collection and phone surveys.

2. Respondent privacy and response bias in surveys

There are many factors that govern whether and how the presence of a third party will impact survey responses. The first is the relationship between the bystander and the respondent, and if questions asked are about, or related to, the bystander. For instance, parental presence makes youth and young adults less likely to report substance abuse (Aquilino, 1997; Aquilino et al, 2000; Gfroerer, 1985; Hoyt & Chaloupka, 1994; Moskowitz, 2004). Evidence of bias related to spousal presence is mixed. Casterline & Chidambaram (1984) and Pollner & Adams (1994) confirm impact of spousal presence on reported substance abuse, but Aquilino (1997) finds no such impacts. Anderson & Silver (1987) confirm no impact of partner presence on

subjective questions like standard of living among Soviet couples. One must also consider if the respondent may face repercussions from the third party as a result of disclosure of key information (Edwards et al., 1998; Aquilino et al. 2000). Presence of familiar bystanders could lead to larger impact on responses as compared to that of strangers (Mavletova & Couper, 2013).

Moreover, impacts are larger for sensitive questions than those that collect neutral information (Krumpal, 2011; Mneimneh et al, 2015; Krysan, 1998). Much of the reported bias relates to social desirability, which is the tendency to give socially desirable responses instead of those that are reflective of true feelings (Grim, 2010). Respondents' willingness to report their answers accurately and honestly is influenced by the perceived privacy of the survey setting, the perceived legitimacy of the survey and the rapport between the interviewer and respondent (Holbrook et al.2003; Stocke 2007), all of which are more tenuous in phone surveys.

In face-to-face interviews, one can directly observe the presence of others, and omit sensitive questions if they would be overheard. In phone surveys, various techniques have been deployed to overcome bystander challenges to elicit sensitive information indirectly, such as randomized response technique (Warner, 1965) item count technique (Droitcour et al., 1991; Tsuchiya et al, 2007), the three-card method (Droitcour, Larson, & Scheuren, 2001), the bogus pipeline procedure (Clark & Tiffit, 1966; Jones & Sigall, 1971; Roesse and Jamieson, 1993) to name a few. However, most of these approaches assume that it is only the answer and not also the question that can be overheard. Moreover, the applicability of these approaches might be limited in settings where respondents are illiterate or require extra time to provide information through complex elicitation methods.

A further challenge is the environment in which the phone survey is conducted. Lynn and Kaminska (2011) find that poor line quality, multitasking during a survey, and distractions

due to active or passive involvement of others can affect answers. There is little evidence on potential ways by which respondent's privacy can be breached in mobile phone surveys. Brick et al. (2007) report that 5% of phone survey respondents in a study in the US noted that they were answering from someone else's home; and Lynn & Kaminska (2011) find in a study in Hungary that 2% of respondents felt that their responses were affected by bystanders. A few studies also noted the use of caller ID and answering machines by respondents for screening calls reduced survey participation (Kempf & Remington, 2007; Roth et al 2001). However, to our knowledge, the use of speakerphone has not been studied, especially in the context of low- and middle- income countries. The use of speakerphones while talking over the phone is quite common. In rural settings, it is useful for group-consultation or learnings in agriculture (Martin & Abbott, 2011). But one might also use it for other reasons such as network or cellphone device issues, hearing disability and to allow multi-tasking during calls.

A further reason for speakerphone use, which we discovered in our studies, relates to suspicion about women, in particular, talking to strangers. In patriarchal contexts and when women do not have their own phones and must be contacted via their husband's or in-laws' phones, they may be required or expected to use the speaker setting to allay suspicions. Although we had not encountered any literature about speakerphone usage in phone surveys, our partners SEWA alerted us that many women took phone calls on speaker settings, sometimes on their own volition, but often as a result of a request by spouses or in-laws. We realized that having the questions overheard could affect responses, and therefore made provision to at least record speakerphone use and analyze its effects.

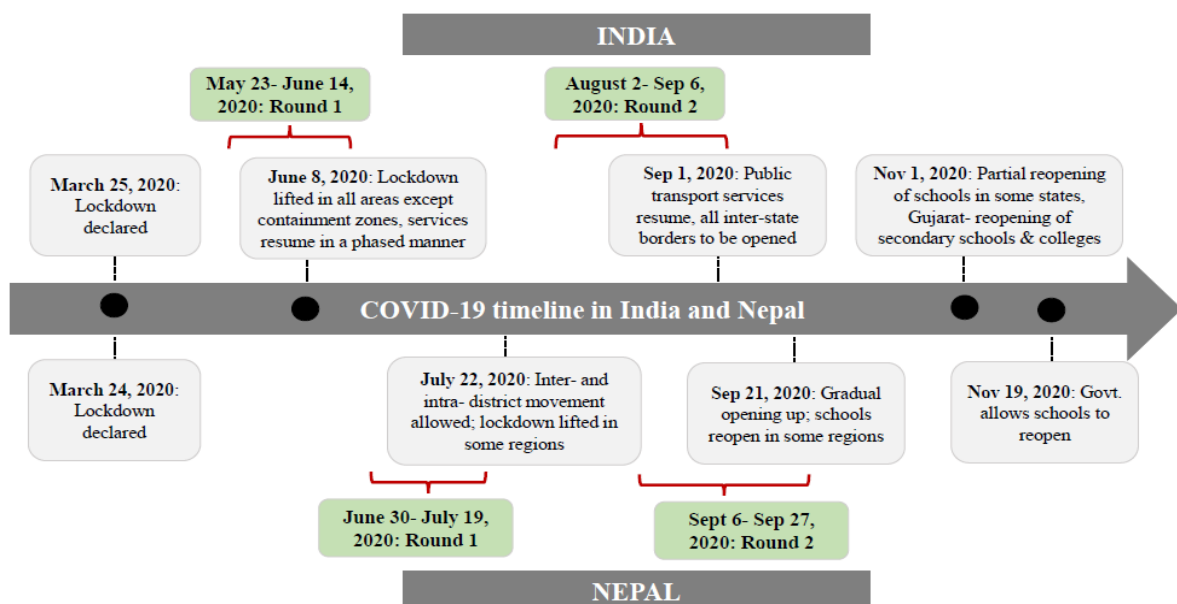
3. Data and empirical approach

We use data from multi-round phone surveys conducted in India and Nepal. In Gujarat state, India, we conducted phone surveys of women who were members of SEWA (Self Employed Women's Association), a trade union of women, many of whom are organized as a collection

of smaller self-help groups (SHGs). SEWA members are predominantly poor, self-employed women workers engaged in various forms of informal employment in rural and urban areas. We selected respondents from among SEWA district membership lists. SEWA staff contacted potential respondents in advance, telling them to expect our call, but not providing any information on when we would call. Out of a list of 930 respondents obtained from SEWA, 627 respondents were selected at random from both rural and urban areas in nine districts in round 1 (Ahmedabad rural, Ahmedabad urban, Arvalli, Anand, Chota Udaipur, Gandhinagar, Kutch, Mehsana, Patan and Surendranagar).

In Nepal, phone surveys of maize farmers were conducted in rural areas of four municipalities of Dang district (Dangisharan, Lamahi, Rapti and Shantinagar) in Lumbini province, in the Nepal Terai region. These farmers had been previously contacted during a household listing exercise conducted before the COVID-19 pandemic, for an RCT on agricultural extension. During the household listing, phone numbers of 970 respondents were recorded, out of which 698 belonged to women and 272 to men. However, out of these, 211 phone numbers (158 belonging to women and 53 belonging to men) could not be reached due to various reasons when they

Figure 1: Timeline for surveys conducted in Gujarat (India) and Dang (Nepal)



were called for the phone surveys, such as network issues and phone being inactive or switched off. Therefore, a total of 540 women and 219 men were surveyed in Dang, Nepal.

To track the short to medium term impacts of the pandemic and trace the evolution of household resilience strategies, five rounds of surveys with the same set of respondents were implemented between May 2020 to July 2021 in Gujarat and Dang. In round 2, the number of participants in Gujarat fell from 627 to 567 (9.6%) and the number of women participants in Dang fell from 540 to 490 (9.3%) and men participants fell from 219 to 200 (9.5%) due to attrition. This paper uses data from the 1st and 2nd round of surveys from both regions.

The survey included questions about the demographic profile, primary occupation, and household asset holdings of respondents, questions on intra-household decision making on earnings, sources of extension used by farmers, impact of the pandemic on household income, access to food and water, mobility, migration and on conflict and disagreement between the respondent and the primary male decision maker of the household (See Online [Appendix B](#) for questionnaire). The conflict module was not administered to respondents who had their phone on speaker or were otherwise not in a private setting.

The survey team was made up entirely of female enumerators. In Gujarat, many enumerators were previously affiliated with SEWA, while in Dang, the respondents were already familiar with enumerators due to the prior household listing exercise, which helped build rapport with the respondents in both countries. Additionally, as enumerators were familiar with local customs and procedures, and their earlier affiliation with SEWA in Gujarat, they were also able to provide valuable insights that improved the articulation of survey questions.

Verbal consent was obtained from all participants before the surveys. In Gujarat, all participants were provided with a food kit valued at 300 INR (USD 4) for two rounds of survey and in Dang, a phone credit of 100 NPR (USD 0.9) was provided to all study participants for each round. The team of female enumerators in Gujarat and Dang were

trained virtually in early May 2020 and June 2020, respectively, and the surveys were conducted using the Computer Assisted Telephone Interview (CATI) platform of SurveyCTO.

3.1 Measuring speakerphone use and respondent privacy

One way to confirm privacy in phone surveys is by directly asking respondents if they are around any person who can hear the responses. However, asking this is itself a sensitive question and may raise unnecessary suspicion by the respondent or others listening to the conversation. The respondent may then be asked, or forced, to remain in a place where their answers can be monitored to avoid any risk or conflict with other members of the household. Even when respondents say they are in a private space, that may not be accurate. This raises questions about the credibility and reliability of sensitive information.

After SEWA notified the survey team that women often answered phones while on speaker, the survey was modified to include questions on speaker use. Because one reason women used speakerphones was because husbands or in-laws were suspicious of women taking phone calls in private, and to avoid raising further suspicion, the question was worded as:

“I’m having a bit of trouble with the phone connection. Is the phone on speaker on your side? It’s not a problem if it is, but I just need to adjust a setting if it is.”

This allowed us to record the use of speakerphone, although we were not able to identify the reasons for using speakerphone settings (e.g., sound quality, multitasking, or intrahousehold suspicion).

The question was asked at the beginning of the survey and again towards the end before the module on intra-household conflict. If the respondent said that the phone was on speaker anytime during the survey, the questions on household conflict were not asked. No such filter was applied to any other question.

3.2 Sensitive and non-sensitive questions

In this paper, we test the links between speakerphone use and various survey responses. Questions on conflict were already eliminated if the phone was on speaker, however we test the impact of speaker use on responses to other questions which were not considered sensitive a priori. The respondents were asked about who decides how to spend their earnings, and about who decides how to spend the earnings of the spouse or primary male (henceforth spouse). Women's involvement in household decisions, especially those related to income, can be used as a proxy measure of women's agency, and to the extent that revealing agency is 'risky' for women, responses to these questions might be influenced by respondent privacy. Conversely, patriarchal social norms indicating that men should control income might create a social desirability bias for men to over-report their control over income.

We also test the impact of speakerphone use on questions assumed to be non-sensitive. Respondents were asked questions about their coping strategies to deal with income loss due to COVID-19, including use of savings, sale of assets, borrowing money, and use of transfers received from government or NGOs. Since there is no a priori reason to believe that the responses to these questions would differ when the respondent is not alone, we hypothesize that speakerphone use should not have any impact on these questions.

3.3 Variable description

We first determine the individual and region- specific characteristics associated with use of speakerphones by regressing speaker use on various household and respondent characteristics, including their proximity to urban areas, whether they use digital payment methods, total livestock owned, family size, religion, caste fixed effects, marital status, educational background, age (in Gujarat), and whether the respondent is household head, marital status, age, education, caste, family size, respondent & spouse's occupation, municipality, land owned and livestock size of the household in Nepal. In particular, marital status, household headship, age, caste, and education may affect women's empowerment

status and hence the likelihood that they will be required by others to use speakerphone. We also control for survey attributes such as time of call during the day, total number of call attempts made to reach the respondent, whether the phone was previously answered by any member of the household other than the respondent, and whether the respondent was surveyed by the same enumerator in both rounds, to see how trust-building might affect speakerphone behavior. A full list of independent variables included are described in the Appendix Table A.1. We run separate regressions for Nepal and Gujarat. Since the question on speakerphone was asked at two places in the survey- in the beginning and before the conflict module- we construct a variable for speaker use that captures whether the respondent had switched on the speaker at any time during the survey.

Secondly, we determine how speaker use impacts responses to the various questions discussed before. Based on the questions described earlier, we construct categorical and continuous outcome variables as described in Table 1.

Table 1: Outcome variables to study the impact of speakerphone use on responses

<i>Decision making about own income</i>
1. Respondent alone decides how to spend own income=1, spouse/other family member decides=0
2. Respondent is involved in decision making about how to spend own income (that is she/he either decides alone or jointly with spouse/other family member) =1, spouse/other family member decides=0
<i>Decision making about spouse's income</i>
3. Respondent alone decides how to spend spouse's income=1, spouse/other family member decides=0
4. Respondent is involved in decision making about how to spend spouse's income (that is, she/he either decides alone or jointly with spouse/other family member) =1, spouse/other family member decides=0
<i>Coping mechanisms used to deal with household income loss</i>
5. Respondent used savings to deal with income loss due to COVID-19=1, 0 if not used
6. Respondent sold assets to deal with income loss due to COVID-19=1, 0 if not used
7. Respondent borrowed money to deal with income loss due to COVID-19=1, 0 if not used
8. Respondent used transfers from government to deal with income loss due to COVID-19=1, 0 if not used
9. Respondent used transfers from NGO to deal with income loss due to COVID-19=1, 0 if not used

The outcome variables are regressed on speaker use, controlling for other household and individual attributes. As seen in table 1, we create the outcome variables to correspond to a strong or weak proxy measure of agency over income decision. For instance, the respondent deciding how to spend their income alone is a stronger indication of agency than a joint decision. In addition to looking at both rounds individually, we use panel regression and propensity score matching in the analysis.

3.4 Panel framework

We employ the technique of panel data regression using data from two survey rounds, where the parameters are defined as: $t = 1,2$ and $i = 1,2,3 \dots, n$ for each round.

A panel data model with random effects is chosen since it allows to control for various time invariant explanatory variables¹ such as age, caste, and location. Least squares linear regression is estimated for continuous dependent variables and a linear probability model is estimated for binary dependent variables. We use the following regression specification:

$$Y_{it} = \beta_0 + \theta S_{it} + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \dots + \beta_k X_{k,it} + u_i + \varepsilon_{it}$$

where,

Y_{it} = dependent variables as defined previously for respondent i at time t ,

S_{it} = indicator for whether the phone is on speaker for respondent i at time t ,

$X_{k,it}$ = k th demographic characteristic of the respondent²,

β_k = the coefficient of the k th covariate,

u_i = between entity error term for entity i , and³

¹ The Hausman test for a model with fixed effects versus random effects was carried out for all regressions which revealed a model of random effects would provide a better fit.

² See table A.1 for details about control variables.

³ The variation in panel data models comes from two sources: between variation, which means how an individual varies from the sample mean, and within variation which means how an individual varies at any

ε_{it} = within entity error term for entity i at time t .

We dropped observations where the respondent replied with 'don't know' or refused to answer the question. We also dropped those respondents who did not have any earnings or whose spouse/primary male did not have any earnings from the respective regressions for those dependent variables⁴.

3.5 Propensity score matching

To supplement our analysis, we use propensity score matching (PSM) to study treatment effects. Matching helps to create a set of individuals in a control group who are like those in the treatment group across various observable characteristics. The differences in outcomes between this selected control and treatment group could thus be reflective of the true treatment effect (Rubin 1974; Heckman 1997)⁵. In our case, speaker use is the treatment and those who do not use speakerphone are categorized as control.

We employ the technique of one-to-one nearest neighbor matching. Since propensity score matching is routinely performed for cross sectional data and less so for panel data, we match speaker users with non-users for each round separately. This is needed since the treatment (speaker users) and control (speaker non-users) groups change across rounds.⁶

We follow the standard Rubin (1974) model to measure the treatment effect. In this model, the outcome is $Y_i(1)$ if an individual i receives the treatment effect and $Y_i(0)$ if the individual i receives the control. The treatment effect for an individual i can be written as $Y_i(1) - Y_i(0)$. This individual effect cannot be estimated since we observe each individual in only one state-

given point of time, from their individual mean. Therefore, the error term has two components, the first term, u_{it} measuring between variation (combination of cross-section and time series), and the second term, ε_{it} , measuring the within variation.

⁴ For Gujarat, 76 observations in round 1 and 54 observations in round 2 were dropped for this reason. For Dang, 33 observations were dropped in each round 1 and 2.

⁵ This is assuming no unobservable differences exist between the two groups, a strong assumption in most cases.

⁶ See appendix Table A.2 and A.3 for t-tests of differences in covariates from p-score matching.

either in the treatment or control group. Instead, we look at the average treatment effect (ATE):

$$\tau = E(Y(1) - Y(0))$$

if it is calculated for both treatment and control group and average treatment effect on treated (ATT) if calculated for just the treatment group. In this case, we only estimate ATT to study the impact of speakerphone use, using the matched sample to regress dependent variables in Table 1 on speaker use and other household and individual characteristics in a panel framework. One major assumption of PSM is the conditional independence assumption (CIA) which assumes that conditional on the observed characteristics, treatment estimates are not confounded by unobserved selection bias or that

$$E(\varepsilon | X) \neq 0$$

This is a much stronger assumption and thus, one should note that while PSM allows us to control for the observable characteristics, there is still a risk of endogeneity arising out of the unobservable characteristics, which are subsumed by the error presently (ε). The other vital assumption is the assumption of common support which ensures that the treatment observations have comparison observations (control groups) “nearby” in the propensity score distribution and it is only in areas of common support that inferences can be made about causality.

4 Results

4.1 Descriptive statistics

The sample included women respondents with an average age of 40 years in Gujarat and 35 years in Dang, while men averaged 46 years in Dang (Table 2). In Gujarat 46% of women

belonged to the upper caste and 38% belonged to scheduled castes/tribes⁷. In Dang 52% of women and 37% of men belonged to upper castes like Brahmin and Chhetri while others belonged to lower castes like Dalits and Janjatis⁸. Most respondents were married, and nearly one-third of women in both countries and one-fourth of men had no formal education.

Table 2: Descriptive statistics of sample households

Characteristics		Mean (SD)/ proportion		
		Gujarat	Nepal- Women	Nepal- Men
Age (years)		40 (10)	35 (10)	46 (12)
Caste (%)	Upper caste	46%	52%	36%
	Lower castes	54%	48%	64%
Family size		7 (5)	5 (2)	6 (2)
Married (%)		93%	97%	93%
Education (%):	No formal schooling	32%	34%	21%
	More than 1 st & <=5 th class	34%	18%	26%
	More than 5 th & <=10 th class	28%	37%	41%
	More than secondary	6%	11%	11%
Occupation (%):	Agriculture/ livestock	40%	81%	68%
	Casual labourer	17%	2%	11%
	Street vendor	29%	-	-
	Unemployed	4%	11%	2%
	Others	11%	6%	18%
Number of observations	Round 1	627	540	219
	Round 2	567	490	200

Note: Standard deviation in parentheses

The Gujarat sample included respondents with varying occupations. Street vendors were mostly concentrated in urban areas, while farmers and casual laborers resided in rural areas. In Dang, 81% of respondents were engaged in agriculture/livestock farming as their primary occupation at the time of the survey.

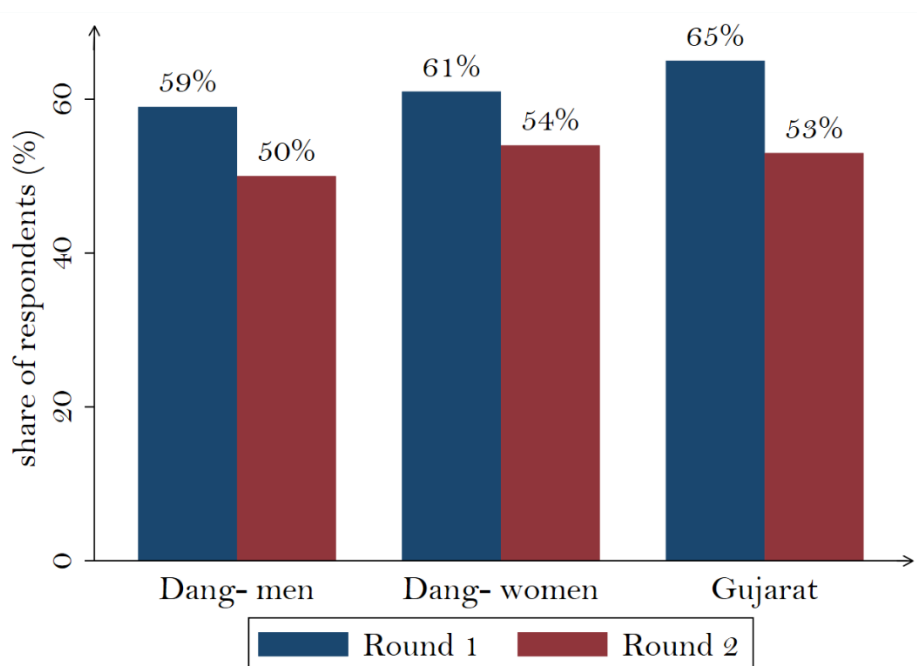
Only around one-fifth of women in both countries reported themselves to be the household head in round 1. Forty-four percent of respondents in Gujarat reported that their household owned livestock, usually a cow, buffalo, or poultry. In Nepal, 94% of households reported to own livestock, mostly goats, poultry, and cattle.

⁷ Scheduled castes and tribes are historically disadvantaged groups, and constitutionally protected under a special schedule of the Indian constitution.

⁸ In Nepal, *Chhetri* are considered upper caste and *Janjati* (translation, forest tribe) belong to historically marginalized and disadvantaged groups. *Terai* refers to the origin of the group in the plains of Nepal.

Our surveys showed that 65% of women in Gujarat had put their phones on speaker in round 1 at some point during the survey. This number reduced to 53% by round 2. Similarly, in Dang, 61% of women reported using the phone on speaker in round 1; this reduced to 54% by round 2. The results for men were 59% and 50% respectively (Figure 2).

Figure 2: Use of speakerphone during the survey



Source: Author's calculations. Round 1 conducted between May-July 2020 and Round 2 between August-September 2020. Respondent is counted as using speaker if speaker use is recorded either at the beginning and/or towards the end of the survey.

4.1.1 Intra-household decision making

In Gujarat, in both rounds, roughly 1 in 3 women responded that she alone makes decisions on how to spend her earnings. Likewise, one-third of women said their husband took this decision for them. In contrast, in round 1, only 19% of women said that they decided alone on how to spend the earnings of their spouse/primary male and about 35% of the respondents said the male alone decided how to spend his income. But in round 2, 26% women reported to be deciding independently about husband/primary male's income and 28% reported that he decides it alone. In Dang, nearly 29% of women in both rounds reported they alone made decisions on how to spend own earnings, over 40% in both rounds said they do it jointly with their husbands, and 9% in round 1 and 12% in round 2 said their spouse does that alone. About

15% respondents in round 1 and 17% in round 2 said they alone made decision on how to spend spouse's earnings, 15% in round 1 and 18% in round 2 said their spouse does that alone, and more than 50% in both rounds said they do it jointly with their husband.

4.1.2 Speakerphone and response bias

The t-tests of differences in proportion for Gujarat show that the responses to questions about who decides how to spend your own income differ by use of speakerphone in both rounds. Women are less likely to report taking decision independently or jointly with male for their own income in round 1 and for male's income in round 2 when the phone is on speaker as compared to when it is not. In Dang, on the other hand, we do not see a strong effect of speaker use on own or spouse's income for women in either round. However, on average, men in Nepal were less likely to report women's control over their own and spouse's income when the phone was on speaker, perhaps reflecting norms of masculinity involving control over household income. In response to questions on coping mechanisms, we observe only a small and statistically insignificant difference between speaker users and non-users in both countries, as hypothesized. See the Appendix Table A.4-A.6 for all the t-test results.

Table 3: Determinants of speakerphone use

	Gujarat			Nepal Women			Nepal Men		
	Round 1	Round 2	Panel	Round 1	Round 2	Panel	Round 1	Round 2	Panel
Same enumerator in round 1 and 2	-	-0.276*** (0.044)	-		-0.121* (0.064)			0.086 (0.114)	
Time of call: Afternoon	0.011 (0.060)	0.098 (0.062)	0.055 (0.044)	-0.034 (0.066)	-0.014 (0.058)	-0.033 (0.043)	0.104 (0.105)	-0.053 (0.106)	0.012 (0.072)
Time of call: Evening	-0.066 (0.060)	0.167*** (0.062)	0.041 (0.043)	0.053 (0.060)	0.026 (0.070)	0.025 (0.046)	-0.012 (0.096)	-0.008 (0.116)	-0.039 (0.071)
Number of call-attempts	0.072** (0.028)	0.024 (0.027)	0.028 (0.019)	0.033 (0.021)	0.027 (0.024)	0.025* (0.014)	0.043 (0.040)	-0.076** (0.036)	-0.031 (0.023)
Family picked the call	-0.042 (0.071)	0.281*** (0.075)	0.113** (0.054)	-0.041 (0.076)	-0.103 (0.087)	-0.060 (0.054)	0.162 (0.145)	0.342** (0.137)	0.239** (0.097)
HH Head-Self	0.175*** (0.049)	-0.026 (0.051)	0.065* (0.035)	-0.091 (0.066)	-0.061 (0.066)	-0.075 (0.052)	-0.020 (0.127)	0.061 (0.129)	0.002 (0.108)
Married	0.147** (0.063)	0.024 (0.061)	0.081* (0.046)	0.113 (0.111)	0.414*** (0.088)	0.260*** (0.074)	-0.069 (0.326)	-0.038 (0.329)	-0.130 (0.295)
Age (years)	0.004 (0.012)	0.004 (0.008)	0.002 (0.007)	0.037** (0.015)	-0.008 (0.017)	0.015 (0.012)	0.017 (0.023)	-0.008 (0.027)	0.008 (0.018)
HH size	0.001 (0.004)	-0.003 (0.005)	0.000 (0.003)	0.020* (0.012)	0.001 (0.014)	0.012 (0.010)	-0.020 (0.015)	0.016 (0.017)	0.006 (0.013)
Attended school	0.031 (0.046)	-0.009 (0.047)	-0.003 (0.035)	-0.126** (0.062)	-0.094 (0.066)	-0.112** (0.048)	0.074 (0.109)	0.141 (0.119)	0.103 (0.081)
Round 2			-0.119*** (0.026)			-0.058* (0.032)			-0.085* (0.050)
Constant	0.187 (0.266)	0.364 (0.231)	0.355** (0.169)	-0.251 (0.334)	0.175 (0.326)	-0.002 (0.251)	-0.672 (0.653)	1.535* (0.779)	0.490 (0.546)
Observations	626	567	1193	386	386	772	155	155	310
R^2	0.057	0.156		0.112	0.122		0.187	0.140	
Adjusted R^2	0.031	0.128		0.066	0.073		0.073	0.012	
rho			0.171			0.182			0.218

Note: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. In Gujarat regressions, we also control for urban, total livestock owned, religion, caste fixed effects, age squared and respondent's occupation in all specifications. In Dang regression, we also control for total livestock owned, land owned, age squared, group membership, occupation fixed effects and municipality fixed effects in all specifications.

4.2 Determinants of speaker use

We first look at what affects use of speakerphone, disaggregated by gender and country (Table 3). We report results from each round separately, as well as a panel regression of both rounds. We find that having the same enumerator in both rounds reduces the likelihood of putting the phone on speaker for women, but not for men. Being married or the household head is positively associated with speaker use. We also find that speakerphone use is higher

if another family member had picked up the phone call during the current or previous attempts to reach the respondent, which may reflect the phone belonging to someone else. We find results to be same when controlling for enumerator fixed effects (See Online Appendix Table B.1-B.3). Similarly, results remain unchanged when using alternative specifications.

4.3 Main results

Table 4⁹ presents estimates of the relationship between speaker use and decision making over respondent's earnings for the full and matched sample for Gujarat and Dang. In Gujarat, we find that having the speaker on during the survey reduces women's likelihood to report that they make or participate in decisions about how to spend their income. We do not see these effects for women in Nepal. However, we see that speaker use is associated with men reporting more control over their own income.

⁹ While we control for various individual and household characteristics in these and subsequent regressions, only the coefficient of speaker use is displayed henceforth for brevity. Full results from all the regressions can be found in the Online appendix (see Appendix Table B.4-B.16).

Table 4: Decision-making: Own income

Who decides how to spend your own income? 0= Spouse/Other family member decides												
	Gujarat Women				Nepal Women				Nepal Men			
	Respondent alone decides=1		Respondent is involved in decision making process=1		Respondent alone decides=1		Respondent is involved in decision making process=1		Respondent alone decides=1		Respondent is involved in decision making process=1	
	Full sample	Matched sample	Full sample	Matched sample	Full sample	Matched sample	Full sample	Matched sample	Full sample	Matched sample	Full sample	Matched sample
Main												
Used speaker	-0.118*** (0.0320)	-0.113*** (0.0325)	-0.0545** (0.0275)	-0.0491* (0.0278)	0.0496 (0.0482)	0.0674 (0.0536)	-0.0161 (0.0305)	-0.0125 (0.0349)	0.207*** (0.0739)	0.188** (0.0878)	0.0623 (0.0382)	0.0492 (0.0436)
R-squared	0.278	0.276	0.117	0.115	0.261	0.274	0.090	0.114	0.205	0.222	0.103	0.121
Heterogeneous effect: HH head												
Used Speaker	-0.113*** (0.037)	-0.109*** (0.0379)	-0.0564* (0.0316)	-0.051 (0.032)	0.0665 (0.0598)	0.0740 (0.066)	-0.0147 (0.0368)	-0.0136 (0.0417)	0.0846 (0.150)	0.110 (0.150)	-0.0311 (0.0872)	0.0271 (0.0999)
HH head-Self	0.396*** (0.0612)	0.404*** (0.0618)	0.224*** (0.0458)	0.228*** (0.0461)	0.350*** (0.0764)	0.331*** (0.0881)	0.144*** (0.0405)	0.140*** (0.0484)	0.00472 (0.179)	0.0891 (0.186)	0.0319 (0.110)	0.0934 (0.133)
Speaker* HH head self	-0.0202 (0.0735)	-0.0191 (0.0741)	0.00969 (0.0579)	0.00966 (0.0579)	-0.0691 (0.0845)	-0.0277 (0.0949)	-0.00679 (0.0497)	0.00511 (0.0571)	0.144 (0.171)	0.0928 (0.179)	0.108 (0.0983)	0.0251 (0.113)
R-squared	0.278	0.276	0.117	0.115	0.262	0.274	0.0900	0.114	0.203	0.218	0.106	0.121
Heterogeneous effect: Education												
Used Speaker	-0.139** (0.057)	-0.137** (0.0576)	-0.104** (0.0449)	-0.104** (0.0457)	0.176* (0.0995)	0.232** (0.107)	0.111* (0.0606)	0.169** (0.0726)	-0.0151 (0.137)	-0.0558 (0.222)	-0.0417 (0.0715)	-0.0619 (0.0905)
Educated	-0.0207 (0.0583)	-0.0166 (0.0587)	-0.0465 (0.0472)	-0.044 (0.0475)	0.191* (0.107)	0.203* (0.116)	0.136** (0.0626)	0.174** (0.0715)	-0.048 (0.151)	0.00699 (0.201)	-0.0136 (0.0717)	-0.00629 (0.0794)
Speaker* Educated	0.0317 (0.0681)	0.0354 (0.069)	0.0742 (0.0557)	0.0821 (0.0565)	-0.168 (0.112)	-0.222* (0.121)	-0.178** (0.0705)	-0.247*** (0.0827)	0.279* (0.162)	0.287 (0.233)	0.129 (0.0841)	0.138 (0.101)
R-squared	0.278	0.276	0.118	0.116	0.27	0.287	0.101	0.132	0.23	0.245	0.113	0.134
N	735	721	1128	1110	407	343	844	695	165	132	370	293

Note: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We also control for whether respondent is household head, marital status, age, education, caste, family size, respondent & spouse's occupation, municipality Fes, land owned and livestock size of the household.

To see if speaker use impacts agency over own income independently or through some pathway, we interact speaker with variables that in theory might determine a respondent's empowerment, such as education and being a household head. For Gujarat, we see that while speaker use reduces the likelihood of reporting control over own income, we find only weak evidence that this impact is attenuated by women who have some schooling compared to women with no education. On the other hand, in Nepal we find the opposite to be true with more educated women less likely to report control over their income. We find no similar results for men.

Table 5 reports results for the impact of speaker use on decision making about spousal income. As before, we find strong evidence that speaker use is associated with lower reported control over income of the spouse- either independently or jointly- for women in Gujarat, but not in Nepal. However, speaker use raises the likelihood of men reporting that they decide how to spend the earnings of their wives, either independently or jointly, in both the matched and full sample.

Here too we estimate heterogeneity by education and household head status. In Gujarat, the interaction of speaker use and education is significant and positive in all regressions indicating that educated women are more likely to report control over spousal income when the phone is on speaker. We find no similar results with HH head status. In Dang, we find no relationship between education (or HH head status) jointly with speaker use in determining control over spousal income for women or men.

Table 5: Decision-making: Spouse's income

Who decides how to spend earnings of your spouse? 0= Spouse/Other family member decides												
	Gujarat Women				Nepal Women				Nepal Men			
	Respondent alone decides=1		Respondent is involved in decision making process=1		Respondent alone decides=1		Respondent is involved in decision making process=1		Respondent alone decides=1		Respondent is involved in decision making process=1	
	Full sample	Matched sample	Full sample	Matched sample	Full sample	Matched sample	Full sample	Matched sample	Full sample	Matched sample	Full sample	Matched sample
Main												
Used speaker	-0.0723** (0.0334)	-0.0660* (0.0339)	-0.0462 (0.0297)	-0.0420 (0.0299)	-0.0105 (0.0486)	-0.0121 (0.0553)	0.0149 (0.0301)	0.00287 (0.0329)	0.437*** (0.108)	0.539*** (0.126)	0.115*** (0.0413)	0.156*** (0.0484)
R-squared	0.291	0.296	0.125	0.125	0.270	0.288	0.143	0.163	0.516	0.567	0.126	0.158
Heterogeneous effect: HH head												
Used Speaker	-0.0703* (0.0375)	-0.0641* (0.0384)	-0.0615* (0.0341)	-0.0589* (0.0345)	0.0111 (0.0514)	0.0185 -0.0588	0.0245 (0.0343)	0.0206 -0.0375	0.368* (0.217)	0.576** -0.261	-0.149 (0.122)	-0.0118 -0.158
HH head-Self	0.373*** (0.0634)	0.384*** (0.0640)	0.181*** (0.0485)	0.186*** (0.0486)	0.202** (0.0924)	0.208** -0.106	0.0802 (0.0533)	0.0975* -0.0574	0.465** (0.207)	0.576*** -0.207	-0.0314 (0.0982)	-0.0372 -0.128
Speaker* HH head self	-0.00874 (0.0757)	-0.00813 (0.0771)	0.0721 (0.0599)	0.0795 (0.0603)	-0.122 (0.142)	-0.178 -0.162	-0.047 (0.0713)	-0.0929 -0.0782	0.09 (0.226)	-0.0442 -0.268	0.311** (0.13)	0.193 -0.165
R-squared	0.291	0.296	0.126	0.126	0.274	0.297	0.144	0.165	0.516	0.567	0.151	0.166
Heterogeneous effect: Education												
Used Speaker	-0.157*** (0.0605)	-0.151** (0.0614)	-0.112** (0.0485)	-0.110** (0.0484)	-0.00078 (0.0995)	-0.00133 (0.127)	0.122* (0.0624)	0.107 (0.0721)	0.512*** (0.192)	0.621** (0.261)	0.189 (0.13)	0.225 (0.153)
Educated	-0.0927 (0.0592)	-0.0929 (0.0598)	-0.0552 (0.0502)	-0.0536 (0.0503)	0.190** (0.0959)	0.157 (0.113)	0.195*** (0.0627)	0.185** (0.0725)	0.105 (0.204)	0.132 (0.215)	0.104 (0.129)	0.105 (0.14)
Speaker* Educated	0.124* (0.0709)	0.125* (0.0721)	0.0994* (0.0601)	0.102* (0.0601)	-0.0135 (0.111)	-0.0146 (0.135)	-0.150** (0.0713)	-0.142* (0.0814)	-0.0904 (0.225)	-0.098 (0.283)	-0.0898 (0.139)	-0.0846 (0.159)
R-squared	0.293	0.297	0.126	0.127	0.27	0.288	0.15	0.169	0.517	0.568	0.128	0.161
N	666	655	999	983	356	300	832	687	76	62	316	251

Note: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We also control for whether respondent is household head, marital status, age, education, caste, family size, respondent & spouse's occupation, municipality Fes, land owned and livestock size of the household.

Table 6: Coping mechanism – Gujarat Women

	Full sample					Matched sample				
	Used saving	Used assets	Used borrowings	Used govt transfers	Used NGO transfers	Used saving	Used assets	Used borrowings	Used govt transfers	Used NGO transfers
Main										
Used speaker	0.00844 (0.0304)	0.00409 (0.0140)	-0.0191 (0.0232)	-0.0182 (0.0246)	-0.0131 (0.0189)	0.00877 (0.0303)	0.00574 (0.0140)	-0.0184 (0.0235)	-0.0179 (0.0247)	-0.0105 (0.0191)
R squared	0.0749	0.0415	0.419	0.153	0.185	0.0768	0.0415	0.416	0.150	0.185
Heterogeneous effect: HH head										
Used speaker	0.0195 (0.0335)	0.0113 (0.0145)	-0.0396 (0.0257)	-0.0154 (0.0275)	-0.000449 (0.0194)	0.0169 (0.0335)	0.0115 (0.0146)	-0.0405 (0.0261)	-0.0177 (0.0277)	0.00276 (0.0196)
HH head-Self	0.246*** -0.064	0.0421 (0.0309)	-0.0694 (0.0451)	-0.00809 (0.0414)	0.147*** (0.0487)	0.243*** (0.0642)	0.0389 (0.0311)	-0.0702 (0.0453)	-0.00858 (0.0417)	0.147*** (0.0487)
Speaker* HH head-self	-0.0557 (0.0756)	-0.0379 (0.0379)	0.107* (0.0579)	-0.0145 (0.0546)	-0.0661 (0.0578)	-0.0408 (0.0766)	-0.0307 (0.0388)	0.114* (0.0589)	-0.00079 (0.0553)	-0.0694 (0.0585)
R squared	0.0756	0.0426	0.421	0.153	0.186	0.0772	0.0424	0.419	0.15	0.186
Heterogeneous effect: Education										
Used speaker	0.054 (0.0529)	0.00154 (0.0205)	-0.0202 (0.0463)	-0.0196 (0.0445)	-0.044 (0.0368)	0.0636 (0.0526)	0.00261 (0.0205)	-0.0153 (0.0469)	-0.0167 (0.045)	-0.0444 (0.0368)
Educated	0.0265 (0.0532)	0.0358* (0.0207)	-0.0247 (0.0445)	-0.00063 (0.0419)	-0.0133 (0.0376)	0.0259 (0.0531)	0.0337 (0.0206)	-0.0255 (0.0446)	-0.00229 (0.042)	-0.0122 (0.0376)
Speaker* educated	-0.0672 (0.0632)	0.00377 (0.0269)	0.00163 (0.0529)	0.00205 (0.0524)	0.0456 (0.043)	-0.0809 (0.0632)	0.00464 (0.0269)	-0.00453 (0.0536)	-0.0018 (0.0531)	0.05 (0.0431)
R squared	0.0759	0.0415	0.419	0.153	0.186	0.0782	0.0415	0.416	0.15	0.186
N	1162	1162	1162	1162	1162	1143	1143	1143	1143	1143

Note: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We also control for whether respondent is household head, marital status, age, education, caste, family size, respondent & spouse's occupation, municipality Fes, land owned and livestock size of the household.

Table 7a: Coping mechanisms - Nepal Women

	Full sample					Matched sample				
	Used saving	Used assets	Used borrowings	Used govt transfers	Used NGO transfers	Used saving	Used assets	Used borrowings	Used govt transfers	Used NGO transfers
Main										
Used speaker	-0.0318 (0.0334)	-0.0379 (0.0241)	-0.0634* (0.0343)	-0.0177 (0.0194)	0.00170 (0.00388)	-0.0303 (0.0368)	-0.0555** (0.0260)	-0.0436 (0.0381)	-0.00978 (0.0199)	0.000171 (0.00394)
R squared	0.0550	0.0857	0.0432	0.0931	0.0373	0.0592	0.0827	0.0435	0.0830	0.0359
Heterogeneous effect: HH head										
Used speaker	-0.0486 (0.0369)	-0.0288 (0.0255)	-0.0559 (0.0379)	-0.00351 (0.0188)	0.00188 (0.00479)	-0.0479 (0.0404)	-0.0573** (0.0286)	-0.0356 (0.0413)	0.00889 (0.0188)	-0.0000954 (0.00494)
HH head-Self	-0.0491 (0.0717)	0.106** (0.0516)	0.0549 (0.0695)	0.105** (0.0467)	-0.00841* (0.00501)	-0.0698 (0.0795)	0.0555 (0.0570)	0.0968 (0.0778)	0.109** (0.0535)	-0.0105* (0.00616)
Speaker* HH head-self	0.0844 (0.082)	-0.0451 (0.063)	-0.0376 (0.0873)	-0.0711 (0.057)	-0.00088 (0.00498)	0.0931 (0.0947)	0.00922 (0.0644)	-0.0428 (0.103)	-0.0967 (0.0600)	0.00137 (0.00571)
R squared	0.0559	0.0863	0.0432	0.0958	0.0373	0.0603	0.0827	0.0433	0.0883	0.0359
Heterogeneous effect: Education										
Used speaker	-0.0864 (0.062)	-0.0317 (0.0449)	-0.190*** (0.0671)	-0.056 (0.0387)	0.0136* (0.00763)	-0.0737 (0.0698)	-0.0459 (0.0488)	-0.151** (0.0766)	-0.0336 (0.039)	0.011 (0.007)
Educated	0.0778 (0.0726)	0.019 (0.0511)	-0.115 (0.0715)	-0.0697* (0.0413)	0.00545 (0.00539)	0.068 (0.0814)	0.0179 (0.0599)	-0.0734 (0.083)	-0.0606 (0.0417)	0.0039 (0.005)
Speaker* educated	0.0767 (0.0725)	-0.00857 (0.0524)	0.179** (0.077)	0.0537 (0.0438)	-0.0167** (0.00816)	0.0596 (0.081)	-0.0131 (0.0564)	0.149* (0.0875)	0.0326 (0.0449)	-0.0148* (0.008)
R squared	0.0562	0.0857	0.0532	0.0949	0.0401	0.0598	0.0828	0.0516	0.0837	0.0382
N	869	869	869	869	869	717	717	717	717	717

Note: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We also control for whether respondent is household head, marital status, age, education, caste, family size, respondent & spouse's occupation, municipality Fes, land owned and livestock size of the household.

Table 7b: Coping mechanisms - Nepal Men

	Full sample					Matched sample				
	Used saving	Used assets	Used borrowings	Used govt transfers	Used NGO transfers	Used saving	Used assets	Used borrowings	Used govt transfers	Used NGO transfers
Main										
Used speaker	-0.0212 (0.0516)	0.00920 (0.0380)	0.00247 (0.0475)	-0.00146 (0.0277)	-0.0184 (0.0137)	0.00722 (0.0538)	-0.0115 (0.0397)	-0.0362 (0.0529)	0.000554 (0.0296)	-0.0267* (0.0159)
R squared	-0.0212	0.00920	0.00247	-0.00146	-0.0184	0.117	0.105	0.134	0.0659	0.0679
Heterogeneous effect: HH Head										
Used speaker	0.172 (0.146)	0.115 (0.0864)	-0.0031 (0.0902)	0.104 (0.0746)	-0.00421 (0.0161)	0.216 (0.155)	0.236** (0.106)	-0.0195 (0.0938)	0.0493 (0.0830)	0.000647 (0.0253)
HH head-Self	0.0925 (0.133)	0.0304 (0.0754)	0.157 (0.113)	0.0519 (0.0446)	0.0247 (0.0194)	0.111 (0.141)	0.0828 (0.0846)	0.153 (0.130)	0.0517 (0.0509)	0.0426 (0.0302)
Speaker* HH head-self	-0.223 (0.155)	-0.123 (0.0932)	0.00641 (0.103)	-0.123 (0.0777)	-0.0165 (0.0218)	-0.236 (0.162)	-0.283** (0.113)	-0.0189 (0.110)	-0.0555 (0.0872)	-0.0312 (0.0268)
R squared	0.0745	0.0937	0.107	0.0663	0.0484	0.126	0.125	0.134	0.0671	0.0693
Heterogeneous effect: Education										
Used speaker	-0.0129 (0.111)	-0.0804 (0.0929)	0.0429 (0.115)	-0.0116 (0.0349)	0.0106 (0.0255)	0.0575 (0.114)	-0.153 (0.0979)	0.105 (0.126)	-0.00463 (0.0431)	-0.0203 (0.015)
Educated	-0.0449 (0.113)	-0.170** (0.0837)	-0.159 (0.105)	0.0316 (0.0414)	0.0287* (0.0169)	-0.0119 (0.127)	-0.208** (0.0864)	-0.11 (0.115)	0.0164 (0.0449)	0.027 (0.0198)
Speaker* educated	-0.0104 (0.123)	0.111 (0.0995)	-0.0505 (0.125)	0.0126 (0.0449)	-0.0357 (0.0282)	-0.0629 (0.127)	0.177* (0.104)	-0.175 (0.137)	0.00648 (0.052)	-0.00799 (0.0214)
R squared	0.068	0.0937	0.106	0.0611	0.0506	0.117	0.116	0.132	0.0659	0.0681
N	379	379	379	379	379	302	302	302	302	302

Note: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We also control for whether respondent is household head, marital status, age, education, caste, family size, respondent & spouse's occupation, municipality Fes, land owned and livestock size of the household.

Tables 6 and 7a and 7b report results of regression for coping mechanisms to deal with income loss due to COVID-19. As hypothesized, speakerphone does not impact responses about the use of various coping mechanisms for either the full or matched sample in Gujarat. In Dang, there is only a very weak and inconsistent impact of speaker use on reported use of borrowing and assets by women and use of NGO transfers by men.

5. Discussion and conclusion

Putting the phone on speaker while talking is a common practice that we observe around us all the time. This could be driven by many factors- from innocuous reasons like multi-tasking, mobile instrument and signal issues, to more involuntary reasons such lack of access to privacy and pressure from family members, as anecdotal evidence from our preliminary field work in Gujarat suggests. That an innocuous act such as this could bias survey responses has not yet been evaluated extensively. As phone surveys continue to rise in popularity, the larger ethical question of respondents' breach of privacy in the interview process merits closer attention. Using phone survey data from India and Nepal, we test the determinants of speaker use and the impact of speaker use on women and men's responses to sensitive and non-sensitive questions.

Our results show evidence that speaker use can be explained partially by trust-building, and as respondents develop trust with the enumerators overtime, speaker use reduces. This effect is stronger in Gujarat, compared to Nepal. There are many reasons why this might be true. Firstly, in India, we were forewarned by SEWA staff about women putting phones on speaker at the behest of their family, implying some level of disempowerment and coercion. Secondly, it is possible that the affiliation of enumerators with SEWA in Gujarat was helpful in trust and rapport building with respondents over time. In contrast, respondents in Nepal already knew the enumerators since they had been previously contacted during an in-person household listing exercise. This meant that there was a significant difference in the familiarity with enumerators between the two regions. As a result, developing trust with enumerator is

more significant in India than in Nepal in reducing speaker use. This points to the potential role played by study context and enumerator selection in determining speaker use.

Our regressions also reveal the commonality in certain findings between the two regions. For instance, women who are household heads and older women are more likely to participate in decision making over own and husband's income in both countries. We also find that while covariates like caste, household size, and occupation are correlated with response to decision-making questions, they are not significant predictors of speaker use. There may be other unobservable factors that determine speaker use. Alternatively, while the practice of using speakerphone itself might not be driven by proximate measures of disempowerment; conditional on speaker use, women are more likely to change their answer, or give socially desirable responses, to sensitive questions.

We also see that speakerphone biases women's responses to questions on intra-household decision-making, causing women to report limited agency over their own income and the income of their spouses. Again, the results are stronger for India than Nepal. We find the opposite to be true for men in Nepal, with speaker use leading to more reported control over own and spousal income by men. The direction of results for women and men are both consistent with the hypothesis of social desirability bias. We find no similar results for non-sensitive questions on various household level coping measures.

Ensuring privacy of the respondent during phone surveys is important and asking indirectly about speakerphone use can be a viable proxy measure to better gauge respondent privacy. Without more careful framing of questions, it is hard to differentiate whether women are being forced by others to have their phones on speaker or if they do so of their own volition. Regardless, we demonstrate that it is important for researchers and practitioners to have information on whether respondents are answering phone survey questions in private and to account for it when analyzing data. We recommend that, at a minimum, it should become

standard practice to record whether speakerphone settings are used, and to design all questions to anticipate that the questions, as well as responses, can be overheard. If and how such bias can be corrected and accounted for is beyond the scope of this paper but remains an area for further research and enquiry.

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Appendix A

Table A.1: List of independent variables used in regressions

Variable	Description
Used Speaker	=1 if speaker was switched on either in the beginning of the survey or just before conflict module, 0 otherwise
Total survey time	Total time taken in the survey in minutes
Survey timing	=0 if the survey was conducted in morning (before 12 am), =1 if survey was conducted in afternoon (between 12 am and 6 pm), =2 if survey was conducted in evening (after 6 pm). Morning is used as base category and separate dummy variables are inserted for Afternoon and Evening.
Household head is respondent	=1 if respondent is the household head, 0 otherwise
Urban	=1 if the respondent belongs to urban area, 0 otherwise
Household size	Total number of household members living in the family
Age	Age of the respondent in years
Age squared	Square of age of the respondent
Educated	=1 if the respondent has attained some form of education/formal schooling, 0 if no formal schooling attained
Own occupation	Fixed effects of respondent's primary occupation. The reference category in each regression is unemployed. A separate dummy variable is included for the rest of occupations: For Gujarat- agriculture, casual labor, street vendor and all others (combining service provider home based worker, wage/salary job person and unemployed) For Dang: agriculture/livestock and all others (combining laborers, self- employed and others)
Spouse occupation	Fixed effects of husband's/primary male's primary occupation. The reference category in each regression is Agriculture/livestock farmers. A separate dummy variable is included for the rest of occupations namely casual labor, service provider, street vendor, home based worker, wage/salary job person, unemployed and others.
Caste	Caste fixed effects. For India: The reference category is general/upper caste. A separate dummy variable is included for Scheduled caste/Scheduled tribe and Other backward Classes. For Nepal: Reference category is lower caste and dummy is included for upper castes.

Variable	Description
Religion	Only for India: Religion fixed effects. Base category is Muslims. A dummy variable is included for Hindu.
Agricultural land	Agricultural land owned by the household (hectares)
Agricultural land squared	Square of agricultural land owned by household (hectares)
Municipality	Nepal: The reference category is Dangisharan. Dummies are included each for Lamahi, Rapti, Shantinagar.
Married	=1 if respondent is married, 0 otherwise
Total animal	Total number of animals/livestock owned by the household

Table A.2: T-tests from propensity score matching- Gujarat

Variable	Mean			t-test		V(T)/ V(C)
	Treated	Control	%bias	t	p>t	
HH Head	0.22166	0.222	0	0	1	.
Married	0.90176	0.899	0.8	0.12	0.906	.
Age	40.202	40.7	-4.9	-0.74	0.457	1.16
Age Squared	1709.6	1737	-3.2	-0.48	0.632	1.1
SC/ST	0.3728	0.38	-1.6	-0.22	0.826	.
OBC	0.15113	0.151	0	0	1	.
Religion	0.02015	0.015	3.3	0.54	0.59	.
HH Size	6.5768	6.441	3.1	0.44	0.66	1.57*
Educated	0.67758	0.637	8.6	1.2	0.232	.
Occupation: Farming	0.42317	0.393	6.2	0.87	0.387	.
Occupation: Labor	0.16625	0.113	14.1	2.15	0.032	.
Occupation: Vendor	0.29723	0.385	-19.6	-2.63	0.009	.
Afternoon	0.4131	0.37	8.8	1.24	0.217	.
Evening	0.45088	0.463	-2.5	-0.36	0.722	.
Urban	0.29723	0.395	-21.3	-2.92	0.004	.
Number of calls	1.4282	1.426	0.3	0.04	0.966	1.21
Family picked calls	0.1335	0.128	1.5	0.21	0.834	.
Total livestock	1.7708	2.186	-11	-1.04	0.297	0.22*

* if variance ratio outside (0.82; 1.22)

Ps R ²	LR chi ²	p>chi ²	MeanBias	MedBias	B	R	%Var
0.018	19.82	0.343	6.2	3.3	31.7*	0.84	40

* if B>25%, R outside (0.5; 2)

Source: Author calculations. The table shows differences in mean between the matched treated and control group and test for difference in means of observable characteristics of the matched sample.

Table A.3: T-tests from propensity score matching- Dang

Variable	Mean			t-test		V(T)/V(C)
	Treated	Control	%bias	t	p>t	
HH Head	0.37815	0.36134	3.4	0.38	0.705	.
Married	0.94958	0.93697	5.5	0.59	0.553	.
Age	39.912	41.378	-12.2	-1.36	0.175	1.2
Age squared	1743.4	1837.8	-9.3	-1.03	0.303	1.30*
Upper caste	0.4958	0.54202	-9.3	-1.01	0.314	.
HH Size	5.1765	4.9496	9.8	1.11	0.268	1.29
Educated	0.65126	0.65546	-0.9	-0.1	0.923	.
Occupation Agriculture	0.80252	0.81513	-3.1	-0.35	0.727	.
Occupation others	0.12605	0.13866	-3.7	-0.4	0.686	.
Time of call: Afternoon	0.32353	0.28992	7.2	0.79	0.428	.
Time of call: Evening	0.37815	0.37395	0.9	0.09	0.925	.
Total livestock	2.9076	3.0756	-5.9	-0.62	0.533	1.40*
Land in hectares	13.161	10.685	9.3	1.05	0.293	2.33*
Member of SHG	0.80672	0.83613	-7.4	-0.84	0.403	.
Municipality-1	0.33193	0.32773	0.9	0.1	0.923	.
Municipality-2	0.11345	0.12185	-2.5	-0.28	0.777	.
Municipality-3	0.48739	0.5	-2.5	-0.27	0.784	.
Family picked calls	0.14706	0.13445	3.7	0.39	0.693	.
No. of call attempts	2.1849	2.2017	-1.4	-0.15	0.878	1.24

* if variance ratio outside (0.77; 1.29)

Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
0.024	15.95	0.66	5.2	3.7	36.8*	1.05	50

* if B>25%, R outside (0.5; 2)

Source: Author calculations. The table shows differences in mean between the matched treated and control group and test for difference in means of observable characteristics of the matched sample.

Table A.4: T-tests for impact of speaker use on outcome variables in Gujarat

Variable	Round 1			Round 2		
	(1)	(2)	T-test	(1)	(2)	T-test
	Not on speaker	On speaker	Difference	Not on speaker	On speaker	Difference
	Mean/SE	Mean/SE	(1)-(2)	Mean/SE	Mean/SE	(1)-(2)
Woman decides on own income	0.573 (0.042)	0.458 (0.031)	0.115**	0.552 (0.037)	0.412 (0.037)	0.140***
Women involved in decision	0.712 (0.031)	0.639 (0.024)	0.073*	0.687 (0.029)	0.645 (0.028)	0.042
Woman decides on spouse's income	0.277 (0.042)	0.353 (0.031)	-0.076	0.551 (0.040)	0.340 (0.037)	0.212***
Women involved in decisions on spouse's income	0.574 (0.036)	0.557 (0.027)	0.016	0.697 (0.030)	0.609 (0.030)	0.087**
Used saving	0.466 (0.034)	0.502 (0.025)	-0.036	0.410 (0.030)	0.399 (0.028)	0.011
Used asset	0.054 (0.015)	0.067 (0.012)	-0.012	0.038 (0.012)	0.040 (0.011)	-0.002
Borrowed	0.466 (0.034)	0.461 (0.025)	0.005	0.380 (0.030)	0.302 (0.027)	0.077*
Used govt transfer	0.425 (0.033)	0.340 (0.024)	0.085**	0.060 (0.015)	0.093 (0.017)	-0.033
Used NGO transfer	0.041 (0.013)	0.047 (0.010)	-0.006	0.244 (0.026)	0.216 (0.024)	0.028

The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. All variable except care hours are binary variables.

Table A.5: T-tests for impact of speaker use on outcome variables in Dang- Women

Variable	Round 1			Round 2		
	(1)	(2)	t-test	(1)	(2)	t-test
	Not on speakerphone	Speakerphone	Difference	Not on speakerphone	Speakerphone	Difference
	Mean/SE	Mean/SE	(1)-(2)	Mean/SE	Mean/SE	(1)-(2)
Woman decides on own income	0.667 (0.042)	0.575 (0.044)	0.092	0.575 (0.038)	0.623 (0.059)	-0.048
Women involved in decision	0.849 (0.021)	0.788 (0.026)	0.061*	0.776 (0.023)	0.795 (0.036)	-0.019
Woman decides on spouse's income	0.436 (0.051)	0.337 (0.048)	0.099	0.342 (0.039)	0.451 (0.070)	-0.109
Women involved in decisions on spouse's income	0.789 (0.026)	0.722 (0.029)	0.067*	0.681 (0.027)	0.769 (0.038)	-0.088*
Used saving	0.614 (0.029)	0.647 (0.030)	-0.033	0.567 (0.026)	0.507 (0.043)	0.060
Used asset	0.102 (0.018)	0.067 (0.016)	0.035	0.188 (0.021)	0.142 (0.030)	0.046
Borrowed	0.428 (0.029)	0.467 (0.031)	-0.039	0.475 (0.027)	0.493 (0.043)	-0.018
Used govt transfer	0.105 (0.018)	0.141 (0.022)	-0.036	0.022 (0.008)	0.030 (0.015)	-0.007
Used NGO transfer	0.004 (0.004)	0.004 (0.004)	-0.000	0.000 (0.000)	0.015 (0.011)	-0.015**

The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. All variable except care hours are binary variables.

Table A.6: T-tests for impact of speaker use on outcome variables in Dang- Men

	Round 1			Round 2		
	(1)	(2)	t-test	(1)	(2)	t-test
Variable	Not on speakerphone Mean/SE	Speakerphone Mean/SE	Difference (1)-(2)	Not on speakerphone Mean/SE	Speakerphone Mean/SE	Difference (1)-(2)
Woman decides on own income	0.627 (0.068)	0.673 (0.066)	-0.046	0.710 (0.055)	0.938 (0.063)	-0.227*
Women involved in decision	0.846 (0.033)	0.813 (0.041)	0.032	0.868 (0.028)	0.977 (0.023)	-0.109**
Woman decides on spouse's income	0.407 (0.096)	0.455 (0.109)	-0.047	0.429 (0.095)	1.000 (0.000)	-0.571**
Women involved in decisions on spouse's income	0.845 (0.036)	0.850 (0.040)	-0.005	0.869 (0.031)	1.000 (0.000)	-0.131**
Used saving	0.579 (0.044)	0.656 (0.050)	-0.077	0.577 (0.040)	0.545 (0.076)	0.031
Used asset	0.095 (0.026)	0.032 (0.018)	0.063*	0.192 (0.032)	0.136 (0.052)	0.056
Borrowed	0.468 (0.045)	0.398 (0.051)	0.070	0.340 (0.038)	0.477 (0.076)	-0.138*
Used govt transfer	0.103 (0.027)	0.108 (0.032)	-0.004	0.032 (0.014)	0.045 (0.032)	-0.013
Used NGO transfer	0.024 (0.014)	0.022 (0.015)	0.002	0.006 (0.006)	0.000 (0.000)	0.006

The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. All variable except care hours are binary variables.

Online Appendix:

Appendix B: Phone survey questionnaire [here](#)

Appendix C: Link to access full regression results [here](#)

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