

The role of social identity in shaping economic choices: Evidence from women’s self-help groups in India

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[PRELIMINARY DRAFT- DO NOT CITE]

Abstract

Group-based interventions are fast gaining traction in developing countries, often bolstering existing government service delivery systems. Such groups often provide development programs with a means of extending their reach to households and individuals that might not otherwise seek public goods and services. However, the very reliance on the notion of “community” in these programs can constrain participation to those with a shared identity. In India, shared caste identity remains a central, and often controversial, element in many community-based programs. We explore the salience of caste identity with a field experiment conducted among women’s self-help groups in an eastern state of India. The experiment focused on the provision of information on nutrition, diet, and kitchen gardens. Specifically, we test the interplay between (a) the provision of information to self-help groups and (b) the caste identity of the information provider *relative* to the group’s caste identity, to assess what matters more – the message or the messenger. We randomize two treatments – an information treatment and a homophily treatment – and measure the effect on these treatments on two outcomes: group members’ willingness to contribute to a group-owned club good (a collectively managed kitchen garden), and individual members’ retention of the information they received. We find that (1) information is very important, (2) homophily, or shared caste identity with the information provider, is not that important, but (3) higher-caste information providers elicit greater willingness to contribute. These findings have several implications for the design of public programs that rely on community-based organizations and agents as implementing partners and may thus be susceptible to identity issues, such as the exclusion of lower castes from certain occupations, public spaces or public goods.

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1 Introduction

“Man is by nature a social animal”, states Aristotle in *Politics*. The social nature of men (and women) manifests itself in the organization of our modern-day societies, and especially in the formation of social groups. Organized along multiple lines – religion, race, income, interests, location, gender and education, among others – social groups connect us to those with whom we share a common interest or social identity. In doing so they often impart a social value, for example, a sense of belonging or security, psychological or emotional support, and economic opportunity. While the role of identity in shaping behaviors and preferences has been studied extensively in other disciplines, the topic has gained increased attention in economics in the last two decades. Starting from the first model incorporating identity into a standard utility framework (Akerlof and Kranton 2000), the number of theoretical and empirical studies of the role of identity in shaping economic behavior and outcomes has grown rapidly.

While several aspects of identity can either be chosen by individuals or assigned to them through simple labelling and sorting mechanisms (Akerlof and Kranton 2000), there are other aspects that are less fluid. Caste is one such aspect. Along with religion and gender, a person’s caste is one of the most dominant aspects of their identity in India. Individuals are born into a certain caste, and their inherited caste identity shapes much of their economic and social lives: where they live, who they marry, who they interact with and how, what services they can access, the education they receive, and the jobs they are employed at. The caste system is by design rigidly hierarchical, with upper castes the recipients of significant and perpetuated social and economic advantage. In fact, in recognition of the barriers to equal access to opportunity that caste presents, caste-based reservations in government-run educational institutions, government jobs and elected offices were enshrined in India’s constitution in 1950. The role of one’s caste in shaping behavior and choices is, therefore, both an economically important and socially salient issue.

This paper provides evidence on how caste-based identities can affect behavior in the context of a field experiment in rural eastern India, and in doing so, adds to the body of experimental literature dealing with social identity and behavior in developing countries. In collaboration with the PRADAN, an Indian NGO, we conducted a field experiment in the eastern state of West Bengal to study whether and how social identity influences individual preferences for club goods. Our experiment was conducted with pre-existing women’s self-help groups (SHGs), which are small savings and credit-based groups of 10-20 women living in close proximity. While not mandated in their formation, SHGs are generally ethnically homogenous, so without much loss of generality, we restrict our study to SHGs where all women were the same caste. Thus, we exploit two related types of social identity: (1) the identity conferred on an individual by virtue of her membership in the group, and (2) the shared ethnic identity made salient by the homogeneity in caste composition. We vary the caste identity of the group relative to that of the individuals who interact with these groups - “frontline workers” who are typically engaged in the last-mile delivery of health, nutrition, social protection and agricultural extension programs and

services – to better understand how this affects both the beneficiaries’ perception of the worker and their subsequent decision-making.

Our specific research questions are as follows. First, how does the provision of information affect an individual’s willingness to contribute (WTC) to a group-owned club good? Second, how does the identity of the messenger affect the retention of the information and its efficacy in eliciting higher WTC? Is communication more effective when the person delivering the message is a co-ethnic or when it is someone placed higher (or lower) in the established ethnic hierarchy?

To answer these questions, we randomly assign women from two distinct caste categories as frontline workers to SHGs that were either the same caste as the agents or were higher or lower in the caste hierarchy. Each agent conducted a simple game with the SHGs to elicit women’s individual willingness to contribute (WTC) towards an SHG-owned club good: a community kitchen garden. A kitchen garden was chosen because labor was the primary input required of SHG members, and members were familiar with the concept of contributing their labor time to a community endeavor. We use the random assignment of agent to SHG to assess how women’s WTC is affected by the caste of the agent conducting the game. Additionally, since WTC can also be influenced by participant knowledge, we cross-randomized the co-ethnicity treatment with an information treatment in which the agent first described the need for the club good – its importance to household health and nutrition – and then conducted the game. Respondents were also administered a nutrition knowledge test based on information given in the session to test retention and to measure if retention varied based on the ethnicity of the agent delivering the information.

Our paper ties into several strands of literature, the most relevant being the investigation of identity. Several papers have incorporated identity into more standard economic models, demonstrating both the mechanism of identity choice as well as ways in which that identity can alter economic preferences and behavior (Akerlof and Kranton 2000, 2002, 2005, 2008; Bénabou and Tirole 2011; Fang and Loury 2018; Horst, Kirman, and Teschl 2006; Shayo 2005). Empirically identifying the causal impact of identity is difficult, first, because the most common (and perhaps most influential) forms of identity – gender, religion, caste and race, for example – cannot be randomly assigned, and second because ethical considerations dictate caution in broaching these potentially sensitive topics. As a result, several empirical studies employ an experimental psychology tool called ‘priming’ – the process of providing subtle mental cues - to make the relevant aspect of identity salient (Cohn and Maréchal 2016). Lab and field experiments using priming or other identification mechanisms have augmented theoretical models with evidence of the role of identity in shaping cognitive or educational outcomes (Afridi, Li, and Ren 2015; Hoff and Pandey 2006, 2014), economic and social preferences (Benjamin, Choi, and Strickland 2010; Y. Chen and Li 2009; Costa-i-Font and Cowell 2013), aspirations and beliefs (Mukherjee 2015),

contributions to public goods (Benjamin, Choi, and Fisher 2010), firm dynamics (Eckel and Grossman 2005), and norms (Goette, Huffman, and Meier 2006), among others.

Within this growing body of literature, the evidence on the role of identity in developing countries, especially South and South East Asia, is still fairly limited. (Afridi, Li, and Ren 2015) demonstrate that making one's *hukou* - the Chinese household registration system identity - salient reduces the performance of rural migrant students relative to their urban counterparts, though this effect does not persist when competition is introduced. (Karachiwalla 2019) uses longitudinal data from Pakistan to assess the impact of having a same- or different-caste teacher on child aspirations, learning outcomes and parental investment, and finds that having a high-caste teacher improves outcomes for low-caste children. Using data from India, (Hoff and Pandey 2006, 2014) show that making caste salient creates a significant wedge in the number of cognitive puzzles solved by high and low caste boys, one that is not present when caste is not primed. (Mukherjee 2015) shows that priming for caste in the Indian context can affect not only parent and adolescent child aspirations and beliefs for long-run economic outcomes, but also actual performance, as measured by test scores. Finally, (Kumar and Somanathan 2015) show that having the same caste-identity as a service provider can significantly increase a beneficiary's chance of receiving benefits from certain government programs. The implications of these studies are twofold. One, that co-ethnicities can either exacerbate or lower existing inequalities between identity groups, making this an empirical question of interest. Two, that differences between identity groups cannot be explained only by differences in characteristics or ability, but that the identity tag itself affects performance, ostensibly by acting as a reminder of identity-based norms.

Identity-based norms dictate not only how someone with a given identity is expected to behave or perform, but also how they should modify that behavior depending on the identity of the person they are interacting with (Akerlof and Kranton 2005). To the extent that people internalize and follow these norms, identity can result in an individual's utility, and hence their behavior, being 'situation-dependent'. For example, several papers from different country contexts have shown that survey responses depend on ethnic, gender, racial or other identity disparities between interviewers and interviewees (Adida et al. 2016a; Blaydes and Gillum 2013; Cilliers, Dube, and Siddiqi 2015; Davis et al. 2010). Building on these findings, our investigation of co-ethnicities between agents and group members and the impact on women's WTC provides key insights into optimal service delivery design.

Finally, there is a large body of literature that looks at the effect of shared group identity on outcomes such as attitudes towards individuals both within and outside groups, provision of public goods and levels of cooperation (Algan, Hémet, and Laitin 2016; Besley et al. 2004; Canelo, Croson, and Li 2017; Y. Chen and Li 2009; Croson, Marks, and Snyder 2008; Eckel and Grossman 2005; Fehrler and Kosfeld 2013; Goette, Huffman, and Meier 2006; Habyarimana et al. 2006; Kranton et al. 2013; Kumar and Somanathan 2015; Sell 1997; Solow and Kirkwood 2002). With some exceptions, most studies find

that there is greater cooperation and trust among individuals from the same social group, and that shared identity with a service provider or government worker improves provision. Our club-good experiment is conducted with pre-existing women's SHGs, so we anticipate that greater cooperation and trust among group members will induce women to be willing to contribute more labor hours towards the group-owned club good.

Our paper also ties into the broader literature on the impact of health and nutrition related behavior change communication (BCC), or more simply, information aimed at altering existing behavior. This information can take several forms – in person communication, media, and community or social mobilization. The importance of integrating information into other interventions in order to effect change is by now fairly well understood (Ahmed et al. 2016; Bhutta et al. 2013; Caulfield, Huffman, and Piwoz 1999; Fabrizio, Liere, and Peltó 2014; Hoddinott et al. 2017; Kennedy et al. 2018; Lamstein et al. 2014; Olney et al. 2015; Saha, Annear, and Pathak 2013), and many agriculture, health and nutrition programs now include information provision as a matter of course. However, while the importance of information is not disputed, most interventions that incorporate it assume that the content and presentation of the message is of paramount importance. In countries like India that are deeply and hierarchically divided based on caste and tribal identity, the identity of the messenger itself could affect the effectiveness of the message, especially when the intervention seeks contributions towards a good that would most likely be shared with the community of co-ethnics.

Given this background, our experiment provides interesting insights into group dynamics, caste identities, and the effect of information in a setting that mimics the real world. Our information treatment and experimental design allow us to separately identify both the effect of information and the effect of co-ethnicity of the messenger and the group. If beneficiaries are less receptive to messages received from persons representative of certain ethnic groups (their own or higher/lower in the hierarchy), this could negatively affect the effectiveness of service provision and development interventions. Quantifying the impact of ethnic identity on the effectiveness of message delivery is important more generally because if the interaction between messenger and the population to be served is filtered by identity, this may act as a barrier to more effective transmission of information and may even serve to disempower the groups that interventions intend to reach.

In brief, we find that (1) information is very important, that women are able to retain the information they are provided, and that retention is better when the agent is of a lower caste than the group, (2) homophily, or shared caste identity with the agent providing information is less important in driving individual WTC, but that (3) higher caste agents elicit higher willingness to contribute, regardless of the caste of the group they are matched to. This last effect cannot be attributed to a greater valuation (or understanding of the value) of the club good, given that retention of information is actually better when the group is paired with a lower caste agent. We hope that our results are able to inform both PRADAN's

own service delivery, as well as service delivery through many of India's government social protection programs which rely on frontline workers, for example, health services delivered through the Accredited Social Health Activists and Auxiliary Nurse Midwives, or the Integrated Child Development Services scheme, delivered through the Anganwadi Worker.

The rest of the paper proceeds as follows. Section 2 lays the groundwork by describing the context, section 3 introduces the experiment design and conceptual framework and section 4 details the empirical design. Descriptive statistics and results are in section 5, and section 6 concludes.

2 Context

2.1 Women's groups in India

Globally, women's groups have emerged as an important platform for improving the economic, political and social empowerment of poor women (Brody et al. 2017; Meinzen-Dick et al. 2014). These groups have proliferated in India over the last three decades and are now a central component of many rural development programs. A typical SHG consists of 10-20 women who live in close proximity and meet regularly to deposit money into a group account from which individual loans are provided on a rotating basis or to those in need (Nair 2005). SHGs often engage in wider activity portfolios designed to enhance both individual member objectives (Bouman 1995; Shah, Rao, and Shankar 2007; Tankha 2002) as well as community or group objectives through collective action (Chen et al. 2006; Desai and Joshi 2014). For example, SHGs receive training and inputs to pursue income-generating activities, especially in agriculture, and, through organizations like producer companies, work to improve women farmers' access to markets. They are also recruited to help with public works or service delivery, such as school monitoring programs or audits of social protection schemes. SHGs are increasingly being used to deliver information aimed at improving health, sanitation, nutrition and political participation, and to advance gender-related outcomes such as women's empowerment within the family. Overall, SHGs in India have quickly become a rural institution in their own right.

Evidence suggests that SHGs are generally ethnically homogenous (Baland, Somanathan, and Vandewalle 2011; Sharma 2001), partly due to self-selection into groups. However, the selection may also be exogenous, for example, deliberate selection by government and non-governmental organizations that engage SHGs, because it is believed that homogeneity improves cohesion and thus performance. The selection may also have a spatial dimension in that villages in India tend to be divided into ethnically homogeneous hamlets, so women living close to one another are typically of the same ethnicity (Baland, Somanathan, and Vandewalle 2011; Deshmukh-Ranadive 2004; Sharma 2001). This implies that development programs that use SHGs as vehicles for advancing interventions in agriculture, health, nutrition, or other areas may be susceptible to limitations imposed by society's identity-related conventions, such as the exclusion of lower castes from certain occupations, public spaces or public goods.

2.2 PRADAN and the larger impact evaluation

The experiment described in this paper was conducted in collaboration with Professional Assistance for Development Action (PRADAN), an NGO that has worked to form and strengthen SHGs since the 1980s. PRADAN uses a multi-pronged approach to improve agriculture and livelihoods, gender, rights and entitlements, and, more recently, health and nutrition, and works largely among the marginalized communities of scheduled caste (SC) and scheduled tribe (ST) groups³ across eight states in eastern, western and central India. Our experiment is nested within the context of a larger impact evaluation study of PRADAN's behavior change communication (BCC) efforts around health and nutrition.

Since 2016, under its Nutrition Intensification (NI) approach, PRADAN began providing health and nutrition BCC to SHG women through a dedicated community agent, typically a woman from the same village or community as the SHGs she works with. This agent, known as a *Poshan Sakhi* (literally, 'nutrition friend/companion'), receives training in health and nutrition, and then disseminates the same information in an SHG meeting through a combination of oral, visual, and participatory methods. The BCC content covers topics related to maternal and child health, as well as related topics such as sanitation, government entitlement schemes, and home gardens, and is divided into several micromodules, with each micromodule being 'transacted' at one SHG meeting. The larger impact evaluation is measuring the impact of integrating this BCC into PRADAN's existing agriculture and livelihoods interventions on knowledge, practices, and health- and nutrition-related outcomes.

Our experiment is designed to inform both PRADAN's nutrition programming as well as its broader portfolio of services. It may also inform many of India's social protection programs which rely on frontline workers, for example, health services delivered through the Accredited Social Health Activists and Auxiliary Nurse Midwives, or the Integrated Child Development Services scheme, delivered through the Anganwadi Worker.

3 Experimental design

Several months prior to the actual experiment we conducted a qualitative scoping exercise, observations from which helped inform several key design elements. Women from the General caste (the highest caste) were financially secure and unwilling to contribute labor hours to the cultivation of foods they could easily purchase in the market. However, among the other caste groups, there was widespread agreement on the importance of eating fruits and vegetables, and a willingness to contribute to a kitchen garden. SHGs that had a mixed caste composition were not as cohesive or cooperative as those in which

³ The Constitution of India guarantees affirmative action in the form of positive discrimination in education, political representation and government jobs to members of certain castes and tribes that have been historically marginalized and persecuted and remain socially and economically deprived. These provisions are enshrined in a special Schedule of the Constitution, thus giving these groups the name Scheduled Caste (SC) and Scheduled Tribe (ST). According to the 2011 Indian Census, SCs and STs form 16.2% and 8.2% of India's population respectively.

all members belonged to the same caste⁴, in fact, SHG members in caste-homogenous groups preferred an equal sharing rule for kitchen garden production over a rule that compensated members based on their labor input. Tribal populations in this area were distinctly worse off on almost all measurable welfare indicators, and there was broad recognition that they were the lowest rung in the caste hierarchy. Someone familiar with the area could distinguish members of different caste groups from their appearance, but even if not, individual names were a clear indication of caste identity. Finally, land was abundant and, if no member was willing to loan household land for the community garden, could be rented at a very nominal price.

We used the insights from the scoping exercise to design the actual experiment. To identify the two sources of variation outlined in our two research questions with two caste groups, we needed six different treatment groups (Figure 1). There are two cross-randomized treatments, the provision of information, and the ethnic identity of the agent relative to the group, depicted using (info, no info) and the letters H and L for High caste and Low caste, respectively. The first letter in a treatment combination represents the ethnicity of the group, the second the ethnicity of the agent. For example, (H, H, info) is a High caste group paired with a High caste agent who provides information. (L, H, no info) is a Low caste group paired with a High caste agent who only conducts the WTC game but does not provide any information. The WTC exercise and nutrition knowledge test are administered to all the respondents regardless of their treatment assignment.

Figure 1: Graphical depiction of the six treatment groups

		Ethnic identity of agent			
		“High” Agent	“Low” agent	“High” Agent	“Low” agent
Information treatment:		No information		Information	
Ethnic identity of Group	“High” group	(H, H, no info)		(H, H, info)	(H, L, info)
	“Low” Group		(L, L, no info)	(L, H, info)	(L, L, info)

Within the information treatment, two sets of groups receive information from an agent of the same ethnic group as the group members ((H, H, info) and (L, L, info)), whereas two sets of groups receive information from an agent belonging to a different ethnic group, higher or lower on the established

⁴ For example, mixed caste groups had significant disagreement on how produce from a community garden should be shared, as well as on division of labor.

ethnic hierarchy ((H, L, info) and (L, H, info)). Since all groups within the information treatment receive the same information, this minimizes concerns that the usefulness of the good is greater for any single caste group.

In addition to this information treatment, there are two other sets of groups – of Low and High castes - that do not receive information. We call these groups the “pure controls” since they are exposed to neither the information nor the ethnicity treatments.

These six groups are enough to identify our main outcomes of interest, even if the effect of the information treatment varies by group type. For example, comparisons of the WTC for [(H, L, info) and (H, H, info)] and [(L, L, info) and (L, H, info)] allow us to isolate the effect of co-ethnicity with the agent, which may differ depending on the relative places of agent and group in the caste hierarchy, keeping information provision constant. Similarly, comparisons of [(H, H, info) and (H, H, no info)] and [(L, L, info) and (L, L, no info)] allows us to disentangle the effect of information, while not restricting this effect to be the same regardless of group and agent type.

Location

We conducted our experiment in Baghmundi block of Purulia district in West Bengal. This block was chosen because it is one of PRADAN’s oldest blocks, and the SHGs here were formed on average, 6 years prior to our intervention. These mature SHGs have been operating long enough for norms of cooperation and trust to have developed. The profile of SHG members revealed that this block had a sizeable number of upper and lower caste groups, providing us with the variation needed for this experiment.

Caste groups

We chose two caste groups to be included in the experiment: Other Backward Classes (OBCs) and Scheduled Tribes (STs). OBCs are higher in the hierarchy than STs, who are the most marginalized caste group, living predominantly in one area of the block which is hilly and hard to access, and acutely dependent on agriculture as the main source of income. Scheduled Castes (SCs) form the other major group in this area, however they fall somewhere in between the OBCs and STs, making the hierarchical distinction with either of the other groups less stark. For the purpose of this experiment, then, OBC groups were “High” caste and ST groups were “Low” caste.

We used PRADAN’s internal monitoring data to obtain the full list of SHGs in this block.⁵ The collection of PRADAN’s monitoring data is collected by Community Data Collectors, or CDCs, who

⁵ In blocks where PRADAN is operational, other governmental or non-governmental groups are not involved in organizing women into SHGs. Thus, the list obtained from PRADAN forms the universe of SHGs. SHGs need to be defunct for six months to be considered dissolved – this means some of the SHGs in the list may not have existed at the time of the survey if they had only recently ceased to meet, however, barring issues of omission of this nature, there is no indication that there is a clear reporting bias of any kind in the monitoring data.

are women from within the community but with a certain minimum number of years of education. We restricted the list to only those groups that were entirely OBC or ST, eliminating all mixed caste groups altogether.⁶ We then selected 40 groups for each of the six treatments, making it a total of 240 SHGs, or approximately 2240 individual SHG members. We selected 9 CDCs for data collection, 5 of whom were OBC and 4 ST.

Choice of club good

Aside from members' agreement about its importance, three features made a community kitchen garden an ideal club good for our purposes. First, and as mentioned earlier, SHG members were in broad agreement about its importance. Second, kitchen gardens were consistent with PRADAN's thematic focus: agriculture and related activities are among the initial themes on which PRADAN engages with the SHGs, so group members were used to discussing these topics in SHG meetings. Third, dietary diversity is very poor in this area. From the 2015-16 baseline data of the larger impact evaluation, only 7% of women in this block met the minimum dietary diversity requirements of 5 out of 10 food groups, and fewer than 20% reported eating any fruit, or vitamin-A rich vegetables. These consumption patterns are mirrored in their children, with only 6% meeting minimum dietary diversity requirements, and fewer than 20% reporting eating any vegetables or fruits. A community garden that is owned and run by the collective could potentially increase the intake of fruits and vegetables by these households, and in doing so, improve the health and nutrition of mothers and children. In other words, it would solve a clear community need. Fourth, kitchen gardens had several other desirable characteristics. Non-group members could be excluded from the produce, they required minimal other inputs besides labor (land is abundant), and clear informational content could be designed around their usefulness. We could then also use this content to test their retention of information on health, nutrition and dietary diversity that had been relayed in the session.

Since this is a field experiment, there is always the concern that women could over- or under-contribute to the kitchen garden, knowing that they will not be held to the number of hours they promise. To ensure incentive compatibility, the kitchen garden was implemented in the groups with the highest collective WTC in collaboration with PRADAN, and this was made clear to the members of the group at the time of the experiment.⁷

To facilitate the construction of the kitchen garden at the end of the experiment, PRADAN helped design a feasible model. Based on estimates of the average number of members in an SHG (10), their average household size (5) and the amount of fruits or vegetables each family eats in a day (750 gm),

⁶ More than 75% of the SHGs in our survey block were ethnically homogenous.

⁷ While constructing the kitchen garden in only one group out of 240 might seem like small odds, group members were not told how many groups were included in the experiment and would have had no way of discovering this number given the geographical spread of these groups.

they drew up a design that included (1) a community nursery, where fruit trees would be grown, to be transplanted in each member's home, (2) vegetable beds, where vegetables would be grown year-round and the produce shared among members. The details of this kitchen garden model are in the Appendix. The total cost of inputs was estimated to be INR 10,960 (~USD 170) per garden, and the total number of labor hours required to build and maintain it was estimated at 928 hours per year. This came to approximately 93 hours per year per member, or about 2 hours per week.

Willingness to contribute

We chose to elicit WTC labor hours (rather than willingness to pay, or WTP) so as to keep the choices realistic. Willingness to pay experiments typically elicit payments in the form of tokens or “fake” money, or by first providing participants with resources and then asking them to pledge those same resources to the good in question. These designs run the risk of participant behavior not accurately mirroring real-life decision making, either because they are unfamiliar with these mechanisms and do not fully understand what they are being asked to do, or because the stakes are not real. Eliciting truthful revelation in such scenarios is expensive either to the participants, or to the researchers, who must provide additional resources. We circumvent both issues by asking women to donate days of labor instead; they are familiar with the practice of contributing labor to other PRADAN activities such as the construction and maintenance of community assets.

Training and content of informational treatment

All CDCs underwent three days of intensive training in scripted information sessions conducted by members of the research team and PRADAN. The preamble to the information content introduced the CDC by name (crucial for caste identification), and then went on to motivate the problem of undernutrition and diet quality, talk about the different kinds of food groups and their importance, discuss ways to improve diet quality, and finally, to introduce the concept of kitchen gardens and collective management of kitchen gardens. Each SHG member was then given two bags, one empty and one containing beads, and was asked to transfer to the empty bag a number of beads equal to the number of hours she was willing to work in a week. This was to be done in private and without consulting other group members.

By the end of the training, CDCs were able to recite the scripted information from memory. Scripted sessions were essential to ensuring that message retention and delivery did not differ substantially across CDCs of different caste groups. CDCs who conducted the no information treatments had shorter scripts that introduced them, and then described and conducted the game, without any information on nutrition, health and diets.

Meetings were held in public venues such as schools or health centers, but efforts were made to ensure only group members were present. The CDC then delivered the information to the women and played

the WTC game, where each member privately indicated their WTC by transferring beads to the correct bag.

Survey

As soon as the game ended, women were asked to leave the venue with their two bags and participate in the survey. There was one enumerator per SHG woman, which eliminated the possibility of women conferring before being interviewed. The first module of the survey confirmed the number of labor hours volunteered and checked this against the number in the bag. In case of a discrepancy, the enumerator elicited the ‘final’ response on number of labor hours and recorded all three responses. The women were then administered a ten-question nutrition knowledge test (described below) that was based on information from the scripted BCC session. Questions were designed around aspects of health, nutrition, dietary diversity and agricultural practices. Each individual was scored out of ten, with one point for each correct answer and we use this score as a measure of knowledge retention. The women were then asked questions on basic demographic and socioeconomic characteristics, women’s time use and opportunity cost of labor, attitudes towards group members and concepts of trust, perception of the agent (including a question about identification of her caste), market access, and other information.

4. Empirical framework

Our experiment has two main outcomes of interest: individual WTC labor hours towards the creation and maintenance of a community kitchen garden⁸ and individual scores on the nutrition knowledge test, and two types of treatments: the information treatment and the co-ethnicity treatment. In this section we present our *a priori* hypotheses regarding the direction of impact of the treatment on these outcomes and describe how we propose to test these in the context of our experiment.

4.1 Testable hypotheses

The hypothesized relationship between the provision of information and individual WTC is fairly clear. We anticipate that providing information on the causes and consequences of undernutrition and introducing the importance of kitchen gardens would serve to increase the SHG members’ knowledge of both the problem and this potential solution, i.e. that information provision increases individual knowledge scores. This in turn increases the value that SHG members assign to the kitchen garden, and hence the number of hours they are willing to contribute to the management of the kitchen garden.

The effect of the co-ethnicity treatments on WTC are more complicated. Table 1 below lays out some of the hypothesized channels through which the co-ethnicity effect might manifest itself. We theorize that while information from co-ethnics might be valued higher because of the perception of

⁸ PRADAN uses this method to elicit contributions of labor hours to other projects, such as the construction of watershed management systems, so women in these areas are familiar with these methods.

trustworthiness, co-ethnic agents might also be perceived to possess no additional knowledge than the SHG member, leading to an undervaluation of this information and a reduction in the willingness to contribute. Or the fear of social sanctions or a desire for upward mobility may cause SHG members to assign greater value to information from a socially higher-placed agent and hence to ‘over-contribute’ to the club good in their presence. On the flip side, respondents higher in the caste hierarchy may undervalue information from an agent of a lower caste. However, they might also want to present themselves as generous and/or wealthy, and hence over-contribute. We should also mention here that these relationships are further complicated in the case of experiments geared towards provision of a good from which members of certain groups can be excluded. A desire to exclude could increase willingness to contribute when respondents assume an affinity with a similarly placed agent; on the other hand, valuations could be depressed if lower-placed respondents mistrust a higher-placed agent.

The hypothesized relationships described above and in Table 1 are not meant to be exhaustive, merely illustrative of the fact that the effect of co-ethnicity on the individual’s willingness to contribute is ambiguous, and hence worthy of greater investigation.

Table 1: Contrasting hypotheses on impact of co-ethnicity

Type of group	Hypothesis	Effect on WTC
Low SHG-High Agent: (L, H) group	Agent is higher on the hierarchy and is assumed to know more, higher quality information is valued more, desire to emulate high agent	+
	Fear of social sanctions from higher placed agent or her community	+
	Mistrust high agent to act in interest of low SHG members	-
	Overall	Ambiguous
High SHG-Low Agent: (H, L) group	Agent is assumed to know less than SHG member- information from lower-ethnicity agent is undervalued	-
	High SHG uncertain about ability of low agent to provide club good	-
	Group could want to show off to the agent	+
	Overall	Ambiguous
High SHG-High agent (H, H) /Low SHG-low agent (L, L)	Undervalue information from co-ethnic- co-ethnic agent is assumed to have no better knowledge than the members	-
	Implicit collusion with co-ethnic agent assumed- desire to exclude others	+

4.2 Econometric specification

The basic estimating equation for the outcomes of interest for individual i from group g is

$$Y_{ig} = \alpha + \beta GROUP_g + \gamma GROUP_g * INFO + \delta Z_{ig} + \epsilon_{ig}, \quad (1)$$

where

Y_{ig} refers to the outcome variable, which is WTC (in hours) or knowledge score (in points).

$GROUP_g$ refers to the messenger-SHG ethnicity grouping, and hence takes the values (H, H), (H, L), (L, H) and (L, L).

$INFO$ is a binary variable indicating whether the group received the information treatment.

Z_{ig} are the individual level covariates (from the baseline survey); and ϵ_{ig} is an individual-group error term, clustered at the level of the group.

We use ordinary least squares regression as our main specification. The experimental design described above allows us to isolate the impact of information on group members' willingness to contribute to a kitchen garden, as well as the added effect of ethnic affiliations between the group members and the community agent. For example, the difference in WTC between (H, H, info) and (H, H, no info) is the added effect of information, while the difference between (H, H, info) and (H, L, info) is the impact of the agent being from a lower caste than the caste of the group. In addition, the difference between (H, H, info) and (L, L, info) indicates whether the good is valued differently by each of the two types of SHGs.

In all estimates we control for four sets of variables⁹. At the individual level we control for demographic characteristics such as age, *marital status*, *caste (ST)*, *employment status*, education, dietary diversity (measured by number of food groups consumed),¹⁰ and *religion (Hindu)*. For household level variables we use household size, number of children under five, number of assets owned, total cultivatable land, *availability of vegetables from home farm* and *presence of family home garden* as controls. We also control for group-level characteristics such as tenure of group membership, group size, group

⁹ Italicized variables are binary variables with the base category indicated in parentheses.

¹⁰ Dietary diversity is measured by the number of different food groups consumed by the respondent in the 24 hours preceding the survey. These food groups are based on FAO guidelines for measuring individual and household dietary diversity.

cohesiveness and perceptions of agent’s ability.¹¹ In addition, we control for village level characteristics using village fixed effects.

5. Results

We analyze the effect of information and homophily on our main outcomes of interest: an individual’s willingness to contribute labor to the group-owned kitchen garden (measured in the number of beans they confirm having volunteered), and their knowledge scores on the nutrition knowledge test administered as part of the survey. Our six-way group design allows us to separately identify each of these effects. We begin by presenting some descriptive statistics on the various group-agent-information combinations, and then proceed to the regression results by specification.

5.1 Descriptive statistics

Table 2 describes individual, household, and SHG level characteristics for three distinct treatments – no information, information and no homophily, and information and homophily. Each set of treatments has a mix of high and low caste individuals, but *a priori* there is no reason to expect that they will differ on observables. The table presents also p-values for unadjusted tests of comparison across these sets of treatments.

An average respondent woman is 39 years old. Most of the women in our sample are married, and the majority does not have any formal education. By design, our sample is fairly evenly split between women from ST and OBC caste groups. About a fourth of the women in our sample are employed and on average women consume only 3-4 food groups out of 10 food groups in their daily diet. An average household has five members, owns seven assets out of a possible 24 and has 1 acre of cultivable land. About 36-38% of women in our sample have a kitchen garden in their household while about 42-50% grow vegetables on their farm. Most women have been associated with their group for approximately seven years, so groups are fairly mature. Most members perceived their group to be moderately cohesive, and around 58-66% of women gave a ‘high’ rating to the person who provided them with the BCC information.

We see that most characteristics are well balanced across arms. However, there are few differences, notably, in the number of food groups consumed by women, assets owned by the household and how group members rated the information provider. All of these covariates have been controlled for in the econometric model.

¹¹ Group cohesiveness and agent ability is measured using a 3-point scale.

Table 2: Descriptive statistics by treatment arm

Characteristics	(1)	(2)	(3)	P-values		
	No information (N=746)	Information & homophily (N=728)	Information & no homophily (N=764)	(1) - (2)	(2) - (3)	(1) - (3)
	Mean/ Proportion					
Respondent woman characteristics						
Age in years	39.01 (12.28)	39.16 (12.07)	39.24 (11.78)	0.81	0.90	0.71
Respondent woman is currently married	86.46	84.89	86.52	0.38	0.36	0.97
<i>Education</i>						
No formal education	59.25	61.4	62.17	0.39	0.75	0.24
Less than or up to class 4	14.34	16.76	16.75	0.20	0.99	0.19
Between class 5 and class 8	13.27	10.85	11.39	0.15	0.74	0.26
Between class 9 and graduation	13.14	10.99	9.69	0.20	0.40	0.03**
<i>Caste</i>						
Scheduled Tribe	48.12	49.86	50	0.50	0.95	0.46
Other Backward Caste	51.34	49.86	49.21	0.57	0.80	0.40
Religion of respondent woman: Hindu	82.57	84.48	88.61	0.32	0.01**	0.00***
Respondent woman is employed	26.62	28	28.72	0.55	0.75	0.36
Number of food groups consumed out of sum of 10 (24 hour recall)	3.62(1.31)	3.87(1.33)	3.97(1.33)	0***	0.13	0***
Household characteristics						
Assets out of a sum of 24	7.57 (2.9)	7.6(2.87)	7.21(2.86)	0.83	0.01**	0.01**
Household size	4.73(1.75)	4.81(1.86)	4.71(1.74)	0.38	0.26	0.80

Number of children under 5 years	0.39(0.63)	0.41(0.64)	0.35(0.6)	0.53	0.07*	0.24
Total cultivable land (acre)	1.12(1.45)	1.04(1.26)	1.01(1.11)	0.26	0.65	0.10
Household has a kitchen garden	38.47	36.35	36.66	0.44	0.90	0.50
Household grows vegetables on farm	50	42.58	43.72	0.00***	0.65	0.01**
Group characteristics						
Number of months the woman has belonged to her self-help group	87.34(58.81)	85.39(63.64)	82.84(59.6)	0.54	0.42	0.14
Total group members present for the experiment from each group	9.87(2.55)	9.48(2.22)	10.03(2.6)	0.00***	0***	0.21
Members who said produce from the kitchen garden should be split equally between members	73.19	72.53	68.98	0.77	0.13	0.07*
<i>Group cohesion (scale of 0-4)</i>						
Members who perceived their group to be least cohesive (0-1)	20.38	19.92	17.54	0.82	0.23	0.16
Members who perceived their group to be moderately cohesive (2)	73.59	75.14	77.49	0.49	0.28	0.07*
Members who perceived their group to be most cohesive (3-4)	6.03	4.95	4.97	0.36	0.98	0.36
<i>Agent characteristics (scale of 0-4)</i>						
Members who gave the information provider overall 'low' rating (0-2)	9.12	7.55	7.59	0.27	0.97	0.28
Members who gave the information provider overall 'moderate' rating (3)	33.38	28.71	26.57	0.05*	0.35	0.00***
Members who gave the information provider overall 'high' rating (4)	57.51	63.74	65.84	0.01**	0.39	0.00***

Source: Authors' calculations.

Legend: *p < 0.10; **p < 0.05; ***p < 0.01. Standard deviations are reported in parentheses.

5.2 Effect of information

First, we measure the overall effect of information and of homophily on our outcomes, using the full sample. Table 3 shows the coefficients on (1) a binary variable that takes the value of 1 if the group received information, and 0 otherwise, (2) a binary variable that takes value 1 if the group was matched to an agent of the same type, and 0 otherwise. We find that there is no impact of BCC on an individual's WTC. However, as hypothesized, there is a significant positive impact on an individual's nutrition knowledge score of 0.34 points ($p < 0.01$). It is important to note that this BCC effect does not separately account for the homophily between agent and group.

When we examine just the impact of homophily (regardless of the provision of information), we find, interestingly, that there is no impact of having an agent of the same caste as the group on either outcome. Just being matched to an agent of the same caste does not significantly impact an individual's WTC.

Table 3: The impact of provision of information and of homophily, full sample

	(1)	(2)	(3)	(4)
	WTC	Nutrition	WTC	Nutrition
	(# of beans)	knowledge score	(# of beans)	knowledge score
	b(se)	b(se)	b(se)	b(se)
Group received BCC	-0.71 (0.86)	0.34*** (0.09)		
Group matched with same-caste agent			-0.02 (0.84)	-0.17 (0.10)
Observations	2,238	2,238	2,238	2,238
R2	0.201	0.193	0.200	0.189
Mean value in base group	9.60	7.14	8.84	7.39

Adjustments made for individual, household and group characteristics

Adjustments made for village and SHG clusters

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Standard deviations are reported in parentheses.

In order to isolate the effect of BCC and abstract from the homophily between agent and group, we then estimate the effect of receiving information on the subsample of respondents who were matched with an agent from the same caste. We find that receiving nutrition information did not have a significant impact on the number of beans individuals volunteered. However, we find that the retention of the information being provided is greater in this subsample, with a positive and significant increase of 0.38 in the score on the nutrition knowledge test. The increase in the knowledge score is slightly greater than

in the full sample model, suggesting that information received from an agent of the same caste is better retained.

Table 4: Effect of information, subsample of groups matched to same-caste agents

	(1)	(2)
	WTC	Nutrition
	(# of beans)	knowledge score
	b/se	b/se
Group got BCC	-1.69	0.38***
	(0.94)	(0.07)
Observations	1474	1474
R2	0.300	0.192
Mean value in base group	9.60	7.14

Adjustments made for individual, household and group characteristics

Adjustments made for village and SHG clusters

*p < 0.10; **p < 0.05; ***p < 0.01. Standard deviations are reported in parentheses.

Next, we examine is whether information from ST and OBC agents is inherently valued differently. If so, then we would hypothesize that the effect of information on WTC and nutrition knowledge will be mediated by the caste of the agent *regardless of* the caste of the group. To test this, we estimate our basic regression equation, but include binary variables for the group being matched with a low caste agent and for receiving information, and then an interaction of both (Table 5). The results from this specification are noteworthy. First, we find that being matched to a low agent significantly *reduces* an individual's WTC, by almost 5 beans. This is a large effect. One hypothesis is that being matched with a low agent reduces retention of information and hence the valuation of the club good. However, in column 2, we find the opposite effect. Being matched to a low caste agent significantly *increases* the individual's score on the nutrition knowledge test by 0.41. This suggests that other factors are affecting the WTC, for example, a lack of confidence that the low caste agent will be able to deliver the club good or facilitate its construction.

Table 5: Effect of information from a low (ST) agent, full sample

	(1)	(2)
	WTC	Nutrition
	(# of beans)	knowledge score

	b/se	b/se
Group matched with ST agent	-4.99** (1.54)	0.41** (0.15)
Group got BCC	-1.71 (1.37)	0.23* (0.11)
Group matched with ST agent AND group got BCC	2.03 (1.72)	0.24 (0.17)
Observations	2238	2238
R2	0.235	0.211
Mean value in base group	11.71	7.21

Adjustments made for individual, household and group characteristics

Adjustments made for village and SHG clusters

*p < 0.10; **p < 0.05; ***p < 0.01. Standard deviations are reported in parentheses.

5.3 Effect of homophily

We are also interested in estimating the pure effect of homophily, conditional on receiving nutrition information. Table 6 presents the results from estimating our regression model on the subsample of individuals who received information. We find that there is no impact of being matched to an agent of the same caste on the WTC or on the nutrition knowledge score.

Table 6: Effect of homophily, conditional on receiving information

	(1)	(2)
	WTC	Nutrition
	(# of beans)	knowledge score
	b/se	b/se
Group matched with agent from same group	-0.61 (0.86)	0.03 (0.12)
Observations	1492	1492
R2	0.215	0.200
Mean value in base group	8.84	7.39

Adjustments made for individual, household and group characteristics

Adjustments made for village and SHG clusters

*p < 0.10; **p < 0.05; ***p < 0.01. Standard deviations are reported in parentheses.

Lastly, we disentangle the impact of being matched with an agent who was higher or lower on the caste hierarchy, conditional on receiving nutrition information. For brevity, we denote higher- or lower-caste as being *relative to the individual* on the caste hierarchy. Table 7 presents these estimates for the subsample that received the information treatment. The first two columns show the effect of being matched with a higher-caste agent, while the last two columns show the same effect when the group is matched with a lower-caste agent.

We find that conditional on receiving information, being matched with a higher-caste agent has two seemingly opposing effects. First, it raises the WTC by a large and significant 3.5 beans. Second, it significantly reduces the nutrition knowledge score by 0.75. The greater WTC is therefore clearly not an outcome of improved knowledge retention or valuation of the club good. Instead, this result appears to be consistent with an alternative set of hypotheses: for example, that individuals have greater faith in the ability of the higher caste agent to actually facilitate the construction of the kitchen garden, or that they feel coerced into volunteering a higher number of labor hours.

The effect of being matched to a lower-caste agent operates in exactly the opposite manner. It reduces the WTC (column 3, though this result is statistically insignificant), but significantly increases retention of the information being provided. The lack of a link between increased information retention and WTC could again be due to factors such as limited confidence in the ability of the agent to provide the club good.

Table 7: Effect of higher agent, conditional on receiving information

	(1) WTC (# of beans) b/se	(2) Nutrition knowledge score b/se	(3) WTC (# of beans) b/se	(4) Nutrition knowledge score b/se
Group matched with Higher agent	3.47** (1.21)	-0.75*** (0.15)		
Group matched with Lower agent			-2.04 (1.15)	0.61*** (0.13)
Observations	738	738	754	754
R2	0.292	0.253	0.250	0.190
Mean value in base group	7.44	7.57	10.80	7.49

Adjustments made for individual, household and group characteristics

Adjustments made for village and SHG clusters

*p < 0.10; **p < 0.05; ***p < 0.01. Standard deviations are reported in parentheses.

5.4 Other covariates

As mentioned in section 5.2, each regression equation controlled also for several individual-, household- and group-level characteristics. We discuss several associations of interest below.

Education

Relative to the category of no education, those individuals who had completed between grades 5 and 8 exhibited significantly greater retention of the nutrition information, with the coefficient on those with grade 9 or higher years of schooling being greater than those with grades 5-8. In addition, those individuals with grade 9 and higher schooling also volunteered a significantly greater number of labor hours towards the construction of the club good relative to the base category.

Dietary diversity of the woman, existing home garden

Women who reported eating a greater number of food groups also volunteered a greater number of labor hours towards the kitchen garden, and this was significant in all but one regression specification. This can be attributed to a better understanding of the importance of dietary diversity based on their own experiences. Surprisingly, women eating more diverse diets scored lower on the nutrition knowledge test.

We also asked women if they currently had a kitchen garden. In almost all specifications, women with a kitchen garden were more likely to volunteer labor hours, and also scored higher on the nutrition knowledge test. Since these were women who understood the amount of time and effort that would go into the maintenance of a garden of this type, their voluntary contribution of time was an informed choice.

Caste of individual

Individuals belonging to an ST caste group volunteered significantly lower labor hours towards the group kitchen garden, with effect sizes in the range of 2-3 hours, a fairly large effect. This did not coincide with their nutrition knowledge scores, as they often scored significantly higher on the test than other caste groups. This may reflect the higher opportunity cost of their time.

Group cohesion

Individuals were asked a series of questions regarding the cohesiveness of the group they belonged to. These included: (1) Do you trust other members of your group to make decisions that are in the best interest of the whole group, (2) Do you trust other members of your group to make decisions that are in YOUR best interest, (3) During the last six months, did your SHG collectively or along with other community members demand any entitlements related to health from government frontline workers, and (4) In the past six months has there been any instance where community group members came together to negotiate for their rights at a village facility. Each of these questions was scored as 1 if the respondent said yes, and 0 otherwise, and the scores on all 4 questions were added up to an index ranging from 0 to 4. Based on the variability in this index, we classified groups with scores of 0 and 1

as ‘not cohesive’, those with a score of 2 as ‘moderately cohesive’, and those with scores of 3 and 4 as ‘very cohesive’.

With the exception of the last two models (where we looked at the effect of being paired with a higher or lower agent, conditional on receiving information) individuals belonging to more cohesive groups consistently and significantly volunteered a greater number of labor hours towards the kitchen garden, with the coefficient on ‘very cohesive’ being on average twice as large as the coefficient on ‘moderately cohesive’. Regardless of information provision or the presence or absence of homophily, therefore, individuals who belong to a group that has engaged in collective action or who display a greater amount of trust in their fellow group members are significantly more likely to volunteer their time to the club good.

Perceived quality of the agent

Each individual was asked a series of yes/no questions about their perception of the agent. These were – (1) The agent communicated messages clearly and patiently until all members understood them, (2) The agent was an engaging speaker and was able to keep the attention of the women, (3) The agent summarized important actions to be taken at the end of the meeting, and (4) Compared to yourself, do you think the agent knows more about nutrition and kitchen gardens. Each question was given a score of 1 if the individual responded yes, and 0 if she disagreed. These scores were then added up to create an index of agent ability ranging from 0 to 4. Based on the variation in this index, we treated scores of 0, 1 and 2 collectively as the base category. A moderately able agent was one who got a score of 3, and an agent with a score of 4 was ‘most able’.

With the exception of one specification, those individuals paired with more able agents scored significantly higher on the nutrition knowledge test relative to the base category, with the coefficient on ‘most able’ being approximately twice as large as that on ‘moderately able’. This indicates that regardless of caste homophily, the ability of an agent to convey information clearly and demonstrate a command over the subject matter and the attention of women had a strong impact on the amount of information individuals were able to retain.

6. Conclusion

In this paper we test the effect of providing information in group settings on the willingness to contribute to group-owned public goods such as a community kitchen garden. We also test how the effect of information is mediated by homophily effects, that is, shared ethnicity with the agent providing the information. We do this using a multi-arm RCT conducted with SHGs in the eastern Indian state of West Bengal. We cross-randomize our two treatments – the *information treatment*, i.e. whether the group receives any nutrition information motivating the need for a kitchen garden, and the *homophily treatment*, i.e. the caste of the agent relative to the caste of the group and elicit each individual’s

willingness to contribute labor hours to the construction and maintenance of the kitchen garden. We also administer a knowledge test to assess the individual's retention of information. Our cross-randomization allows us to identify the separate effects of information and of homophily on willingness to contribute and knowledge retention. We design our experiment to account for incentive compatibility constraints, and other location- and group-specific constraints discovered during our field testing and scoping visits.

In almost all cases we find that providing information leads to a significant increase in a respondent's knowledge score. This finding is consistent with the conventional wisdom that information is important in changing behavior and that interventions that attempt to change behavior without providing information are often unable to generate impacts. Our novel findings relate to the interplay of the agent's caste with the provision of information. When groups are matched with low-caste (ST) agents, information provision has a larger impact on knowledge retention, indicating that information from low-caste agents is retained better. Conversely, being matched with a higher-caste agent than oneself has a significant and large negative effect on the knowledge score. This could arise from an inherent mistrust of information provided by higher-caste agents, leading women to discount the content of their messages.

Contrary to our expectations, we find no pure effect of homophily on WTC, indicating that having a same-caste agent does not inherently impact one's valuation of the public good or one's willingness to contribute. When restricted to the subsample where same-caste agents and groups, eliminating the possible confounding impacts of homophily, the effect of nutrition information is heightened.

While there is no pure effect of being matched with a same-caste agent of the same caste, caste does seem to matter. Being matched with a low-caste (ST) agent significantly lowers an individual's willingness to contribute labor hours, even if it significantly increases their score on the knowledge test. This effect is seen regardless of the caste affiliation of the respondent. We may observe these opposing effects on information retention and implicit valuation based on that information because of individuals' limited confidence in the ability of the low-caste agent to provide the public good. High-caste agents may be perceived to be less trustworthy (so information they provide is disregarded), but to have greater access to the resources needed to deliver services (thereby encouraging individuals to volunteer a higher number of labor hours).

We also find that group cohesion significantly increases an individual's willingness to contribute. Engaging groups in activities that build trust and cohesion may thus be a critical component to increasing and sustaining participation in collective action initiatives. This may mean that less mature or less cohesive groups may be less able to effect change and may not be ready to act as vehicles for NGO- or government-led interventions.

The ability of the agent to conveying information clearly and to appear in command of the subject matter is critical in determining knowledge retention. Respondents who were paired with more articulate and confident agents scored significantly higher on the knowledge test; the effect of having an agent of highest perceived ability was higher even than the impact of provision of information. This means that just providing training is not enough, interventions need to invest also in the development of soft skills. PRADAN already incorporates this learning, with each training session being divided into content and delivery, but other programs would do well to follow this model, so that they equip frontline workers with the skills needed to effectively communicate with and reach out to a diverse group of beneficiaries who may or not be co-ethnics.

Both the data and qualitative evidence from the field indicates that the opportunity cost of time varies widely for different caste groups, mediating their ability to participate in group-based interventions and activities that require time and effort. Interventions that advocate the adoption of time-intensive practices, as in the maintenance of kitchen gardens, should expect different ethnic groups to respond differently to these interventions, and this should be considered in the design of similar programs.

Finally, although we only tested the effect of caste and identity using only one message, the long-term retention of information and possible spillover effects on other behaviors are open questions that deserve further research.

Our findings have several implications for projects that aim to deliver services to the rural poor by leveraging existing women's groups. Our results are consistent with the global evidence that nutrition-sensitive interventions are more successful when combined with social and behavior change communication, a fact this is increasingly being acknowledged in the Indian policy landscape as well. It is noteworthy that the first meeting of the National Council on India's Nutritional Challenges recently recommended the establishment of a Social and Behavior Change Strategy Group. This makes our results are policy relevant. The larger implications of our work, however, pertain to the design of service delivery systems. In developing country settings like India, many services are provided through frontline workers who belong to the communities they serve, and it is crucial to understand how caste and other divisions can bolster or undermine otherwise well-designed interventions. While many of our findings have been accepted and adopted by grassroots organizations that have a strong local presence and a deep understanding of the local context, they are yet to make it into the policy discourse. We hope that this research informs development policies going forward.

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Appendix

Kitchen garden model developed by PRADAN

