The Social Lives of Married Women: Peer Effects in Female Autonomy and Investments in Children

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Abstract

In patriarchal societies, sticky norms affect married women's social circles, their autonomy, and the outcomes of intra-household bargaining. This paper uses primary data on women's social networks in Uttarakhand, India; the modal woman has only three friends, and over 80 percent do not have any friends of another caste. This paper examines the effect of a shock to friends' empowerment on a woman's autonomy, specifically physical mobility, access to social safety nets, and employment outside the household; perceived social norms; and an outcome of household bargaining: investments in her children. The analysis instruments for endogenous network formation using a woman's age and her caste network in the village. The key peer effect is the impact of having a friend who received an empowerment shock on a woman who did not receive that shock. The results show significant peer effects on only a few of the examined measures of women's autonomy. In contrast, peer effects exist on all considered outcomes of a daughters' diet and time spent on chores. The findings suggest a large decay rate between effects on own empowerment and peer effects. Interventions targeting child welfare through women's empowerment may generate second-order effects on intra-household decision-making, albeit with substantial decay rates, and thus benefit from targeted rather than randomized rollout. In contrast, interventions on gender roles and women's autonomy may be limited by the stickiness of social norms.

Keywords: Peer effects, household decision-making, India
JEL Codes: D13, D85, J13, O15

1 Motivation

Some norm-driven outcomes appear very difficult to alter. Female household bargaining power and child malnutrition in India are two classic examples that do not necessarily change with health interventions [Das Gupta et al., 2005], increases in income [Haddad et al., 2003] or access to information [Kabeer, 1999]. However, increasing evidence suggests that these very outcomes change rapidly under changing social norms or expectations [Munshi and Myaux, 2006, Jensen and Oster, 2009, Chong and La Ferrara, 2009, La Ferrara et al., 2012]. Intra-household bargaining is thus one area where peers, by changing social norms, may be expected to play a large role. Peer effects have been extensively examined in the cases of informational spillovers, technology adoption, and labor and marriage markets [Kohler et al., 2001, Conley and Udry, 2010, Miguel and Kremer, 2004, Foster and Rosenzweig, 1995, Oster and Thornton, 2012, Munshi and Rosenzweig, 2006, Banerjee et al., 2009, Conley and Udry, 2010]. But the impact of peer effects on social norm-driven behaviors, whether negative or positive, is less well understood, particularly outside the context of health-seeking behavior adoption [Munshi and Myaux, 2006, Christakis and Fowler, 2008, Lundborg, 2006]. In particular, we know little about the social networks of married women in patriarchal societies, and yet many development interventions are targeted to women.

Networks based on caste hierarchy may limit the network's ability to affect social norms, because information and norms are likely already common to the network and may be reinforced, instead of challenged, by network connections. This is consistent with theoretical and empirical evidence that homophily slows social learning and

therefore convergence in the adoption of new technologies [Behrman et al., 2002, Golub and Jackson, 2012, 2010, Alik-Lagrange and Ravallion, 2018]. Especially in traditional societies, social networks may be homogeneous and stratified by income or social hierarchy and thus reinforce social norms in the patterns of intra-household bargaining power [Mukherjee, 2017, Hoff and Pandey, 2006, Mayoux, 2001], which are often skewed to the male in the household. Therefore, understanding how peer effects, whether negative or positive, affect norm-driven household behavior can inform the design of interventions that target women's education and employment, as well as investments in children.

We use primary data from Uttarakhand, India, to document women's social networks in the presence of restrictive social norms and virilocal residence. Examining participation in a women's education program, *Mahila Samakhya*, we study the impact of having more empowered friends on three sets of outcomes. First, we examine female autonomy: (1) women's ability to leave the house without permission, (2) women's access to social safety nets and employment through the National Rural Employment Guarantee Act (NREGA), and (3) women's likelihood of working outside the household. Second, we consider perceived norms about gender roles: (1) the amount of education girls should receive relative to boys, and (2) whether employment or marriage is the best reason to educate girls compared with boys. Third, we consider a set of outcomes of intra-household bargaining: (1) children's food consumption and (2) time spent on chores. Our results show that empowered peers significantly improve women's physical mobility and the likelihood of working outside the household, but they have little effect on perceptions about gender roles. Finally,

using mother fixed effects, we find that women with more empowered friends feed their daughters a more protein-rich diet and have them spend less time on household chores, compared with women with fewer empowered friends. This last set of outcomes, all related to children's welfare, yields the most robust evidence of peer effects. This contrast suggests that peer effects may not be substantial on women's own outcomes, but may influence household decision-making with respect to children.

The modal woman in our sample lists only three friends with whom she interacts on a regular basis, although 62 percent of the sample participates in *Mahila Samakhya*. By contrast, the average American woman has eight close friends [Gallup, 2004]. The networks in our sample are homogeneous in caste, with only 16 percent of all women reporting any friends of another caste. We use these data to estimate peer effects on women's autonomy, perceptions of social norms on gender roles, and investments in children as a proxy for intra-household bargaining. This last set of outcomes reflects women's empowerment because women have been documented to invest more in their children than do fathers, and more empowered women to invest more equally in their sons and daughters than less empowered women do [Lundberg and Pollak, 1994, Oster, 2009, Beegle et al., 2001, Rosenzweig and Schultz, 1982, Maitra, 2004, Thomas et al., 2002, Quisumbing and de la Brière, 2000]. Therefore, finding that peers influence how resources are allocated to daughters would be indicative of a mechanism that works through intra-household bargaining.

We use the *Mahila Samakhya* program as a shock to participants' empowerment levels. We show that women who participate in the program are more likely to leave the house without permission, have access to government social safety nets,

and work off the family farm. In the peer effects literature, the reflection problem is often addressed using friends-of-friends to identify peer effects [Lee, 2007, Bramoullé et al., 2009, de Giorgi et al., 2010]. However, since social ties are endogenous, we use the likelihood of contact, specifically the number of women of the same caste in the village, as an instrument for networks. Since program participation is also likely endogenous, we use exposure to the program as an instrument. This analysis thus relaxes the restrictive assumption of separability of group formation and information flows within the group that is implicit in studies that randomize treatment within networks. Understanding network formation is important for policy design because several development interventions rely on altering network formation to enhance impact. Allowing individuals to select into participation not only yields a larger direct effect but also provides a truer estimate of the second-order spillovers. Finally, we relax the equally restrictive assumption of directed networks by estimating the impact of a participant friend's empowerment on her own nonparticipant friends. The directionality assumption is key to identification in the presence of the reflection problem but can lead to significant overestimates. Since we can isolate the marginal effect of friends' participation on nonparticipants, our identifying assumption is that participants affect their nonparticipant friends' autonomy and say in intra-household bargaining.

Our sample consists of 404 women and includes data on their ties to 942 friends and friends-of-friends from 69 randomly chosen villages, stratified into four program districts and two non-program districts.[1] *Mahila Samakhya* aims to increase female

[1]We collected data on 487 women and 1,132 of their friends, but 66 of these have some data missing and the networks of 17 of the women violated our exclusion restriction (discussed further

empowerment through education and has been in place in the study area since 1995. The program was rapidly scaled up between 2004 and 2008; data from the Indian Census, District-level Household and Facility Survey, and National Family Health Survey suggest that this scale-up was not systematically targeted at particular areas. As a result, we only sampled treated villages that received the program in the expansionary stage along with control villages that had not yet received the program.

2 Study Context

Following decades of local demand for a separate state, Uttarakhand was carved out of the state of Uttar Pradesh in November 2000. Small, scattered villages, comprising several clusters of houses isolated from others by the hilly terrain, pose challenges to the state's development. Many lack access to basic infrastructure including roads and schools, severely limiting contact with others. Households generally engage in subsistence-type agriculture, although the state also supplies migrant labor to Delhi and other urban centers. Caste hierarchy is strictly maintained in the villages, and most interactions are limited to members of the same caste.

Alcoholism and domestic violence are common problems in Uttarakhand. Almost 40 percent of Uttarakhandi men consume alcohol, compared with the national average of 32 percent, and 26 percent of all Uttarakhandi women have experienced physical violence [IIPS and ORC Macro, 2007]. Only 18 percent of these women— 5 percent of the overall population— have sought help to control or end the violence. Uttarakhandi women tend to have few social interactions outside the immediate fam-

below), yielding a final sample of 404 women and 942 friends.

ily. Firewood and water collection are women's tasks and often consume more than half the day. The remoteness of the region, lack of good roads, and stringent social norms mean that, once married, women are unable to visit friends or even parents regularly. As many as 47 percent of Uttarakhandi women reported not having the final say on visits to family and friends [IIPS and ORC Macro, 2007]. Focus group interviews and our survey data suggest that women's lives are defined by their husbands, children, and in-laws, and women seldom participate in the political process, even at the village level. Constrictive social norms thus restrict women to the narrow spheres of family and housework. In our qualitative field work, most women reported being in contact with fewer than five people outside their family.

Mahila Samakhya is a women's empowerment program that started in 1995 in the study area. The program is centered around weekly meetings of women's support groups, which are often the first time participants have had the chance to talk about themselves and think about their place in the household and society [Janssens, 2010]. Nussbaum [2000, p. 281] describes the program as attempting to "reconstruct the family by altering social norms and perceptions" and that by creating women's support groups, the program "transforms the family profoundly, making it no longer the sole source of personal affiliation." She adds that such support groups have transformative power because although getting the groups going can be an iterative process, once women start thinking about their lives, "it is difficult to go backward" [Nussbaum, 2000, p.290]. In Nussbaum's words, these tightly-knit support groups are "communities of equality and agency, rather than hierarchical communities that define women as in crucial ways passive before their destiny." In

addition to these groups, the program provides formal and informal education as a means to empowerment. Vocational training enables participants to earn an income through artisanry and store-keeping. Nussbaum [2000] notes that the program aims to empower women in their interactions with government officials and employers. In our study context, the program provides information on accessing social safety nets, particularly NREGA, which has been documented to have informational barriers to access [Ravallion et al., 2013].

Rollout is not always straightforward, as local men and women sometimes resist *Mahila Samakhya* because its benefits are less clear than those of, say, an employment guarantee scheme or a cash transfer program, and hinge upon changing long-held beliefs about gender roles, including women's beliefs about their own roles [Janssens, 2010, Nussbaum, 2000]. As a result, initially only a few women may participate, but as others see the benefits of participation, a critical mass of participants is built and the program takes hold in the village. Further, as the husbands and in-laws see the benefits of participation in terms of enhanced employability and increased household income, they reduce opposition over time. In addition to the education provided, participants meet more women, including those from other castes and religions, which in turn expands and diversifies their peer networks and exposes them to new information [Kandpal and Baylis, 2013].

The program enters a village through extensive consultations with local women to determine the program's rollout plan for the village. Thus, the actual form of the program varies from village to village, although rollout frequently begins with a literacy camp. Nominally, the program targets districts that have lower-than-average

rates of female education and school attendance, have low development scores, and are remote. In practice, although we find that participants and nonparticipants can differ from each other (further discussed in the following section), we observe limited significant differences between the treated and control districts, suggesting that the program is not targeted to preexisting levels of female autonomy. This also speaks to the external validity of our results.

Few other papers study *Mahila Samakhya*, but they find positive correlations between measures of female empowerment and participation [Janssens, 2010, Kandpal et al., 2013]. Although these studies are unable to identify the effects of own participants, Kandpal et al. [2013] show descriptively that participants in *Mahila Samakhya* have better access to the NREGA scheme as well as greater physical mobility and political participation. Kandpal et al. [2013] observe that even women who do not work outside the household nor have NREGA job cards are more likely to attend village council meetings and report being able to leave the house without permission. Since the direct effect of the vocational training provided through *Mahila Samakhya* should affect employment, the existence of such correlations for unemployed women who do not even have access to outside employment suggests that *Mahila Samakhya* may influence women's intra-household bargaining power not only through participation but also through the women's social networks. This paper attempts to extend the analysis presented by Kandpal et al. [2013] by estimating a causal effect of own and friends' participation in *Mahila Samakhya*.

3 Identification Strategy

We identify causal peer effects by instrumenting for the endogeneity of program participation using exposure to the program and for the endogeneity of networks using the number of other women in the village of the same caste. Essentially, this strategy is a difference-in-differences estimation using variation in the number of women old enough to participate in *Mahila Samakhya* in a given caste in a village. Thus, we effectively compare a woman in a program village with many other age-eligible women of the same caste in her village with another woman in a program village with few other age-eligible women of her caste, to that same difference in women in non-program villages, holding caste constant.

3.1 Endogeneity of Program Participation

Our instrument for participation in *Mahila Samakhya* is the number of years a participant has lived as an adult in a village with *Mahila Samakhya*.[2] This variable thus tells us the potential years of exposure of an adult to the program and is correlated with participation. Further, any effect of this variable on female empowerment likely works through participation in the program, rather than directly, and is driven by the year the program started in the village as there is little migration among married women in the region. However, because women often migrate at the time of marriage, their exposure to the program might have started in their natal village through a participant friend or parent. Since we do not know whether the woman's

[2]Here, adulthood is defined as age 16 or older because program participants cannot be younger than 16.

natal village had the program, exogamous matrimony might lead to measurement error, which in turn would bias the results downward, particularly in the first stage. Such downward bias might induce a weak instruments problem, but this does not appear to be the case. Alternatively, it may be that the movers are a particularly selected group such that they are more likely to participate and have differential outcomes. In this case, we would overestimate the relationship between exposure and participation. However, given that unmarried women do not participate in the program, exposure would have had to be indirect and thus the resultant bias is likely to be small. Finally, one might be concerned that our instrument for participation is problematic if participants' outcomes are affected by their mother's participation. But the program entered study villages between 2004 and 2008 when the average respondent was married at age 19; the average respondent was in her early thirties during our survey, so their mothers would not have been participants prior to the respondent's marriage.

3.2 Identifying Peer Effects

Much of the literature on peer effects, following Manski [1993], has focused on the econometric issue of separating the causal peer effect from that of correlated unobservables [Conley and Udry, 2010, Miguel and Kremer, 2004, Foster and Rosenzweig, 1995, Bandiera and Rasul, 2006]. Two ways of disentangling these effects are to (1) randomize the networks [Sacerdote, 2001, Zimmerman, 2003, Duflo and Saez, 2003] or (2) randomize an intervention or new technology at the friend level [Banerjee et al., 2012, Oster and Thornton, 2012, Godlonton and Thornton, 2012, Kremer and

Miguel, 2007]. These types of studies are relevant for policies that explicitly attempt to change network composition or information flow. However, often networks and information flows are predetermined, limiting the policy implications of such approaches. Our identification strategy uses instrumental variables to identify causal peer effects in the context of endogenously formed networks and information flows. Specifically, we instrument for social networks using caste.

We collected data on up to five of the women's friends. Only 42 of our final sample of 404 women listed five friends, so the top code does not appear to be restrictive and the exclusion restriction is likely to hold.[3] Further, we instrument for endogenous group formation, which crucially allows us to relax the assumption of separability of group formation and information flows. In this paper, we instrument for the network weights matrix W, and participation in *Mahila Samakhya*, X, of woman i in caste c and village v. Our first-stage regression equations are:

$$WX_{icv} = \alpha + \beta V Z_{icv} + \phi_c + \psi_v + \epsilon_{icv} \tag{1}$$

$$X_{icv} = \alpha + \gamma Z_{icv} + \phi_c + \psi_v + \epsilon_{icv} \tag{2}$$

where V is the number of same caste women in the village as an instrument for networks[4]; Z is the vector of instruments for participation; ϕ_c is a caste fixed effect;

[3]Our exclusion restriction would also be violated if nonparticipants were able simply to observe program activities without officially participating. However, in our observation of this program, the closeness of ties within the support group acted as a barrier to entry for nonparticipants, who reported feeling "intimidated" or "out-of-place" and could not explain to their in-laws and spouses why they were leaving the house since they were not participating in *Mahila Samakhya*.

[4]During data collection, we first listed the number of households by caste in each village, and then extrapolated the number of women in each caste in each village using the sex ratio (962/1000) and average household size (five) for Uttarakhand from the 2011 Census.

and ψ_v is a village fixed effect. We treat women of the same caste within a village as potential friends in keeping with the literature from India, which shows that caste networks determine social ties [Mukherjee, 2017, Hoff and Pandey, 2006, Munshi and Rosenzweig, 2006], particularly for women [Dyson and Moore, 1983].[5] We then generate two network weight matrices: one that identifies all self-reported friends, and a second that identifies all potential friends using caste as a proxy. To generate instruments for the true weighted participation of friends, we multiply the caste weights matrix with the vector of exposure to the program. These network-weighted instruments thus reflect the average number of years all potential friends have lived, as adults, in a village with the program.

The first stage thus yields predicted own and friends' participation, which we use in our second-stage regression equation as follows:

$$Y_{icv} = \alpha + \lambda \widehat{WX_{icv}} + \theta \widehat{X_{icv}} + \phi_c + \psi_v + \epsilon_{icv} \tag{3}$$

where Y is the outcome of interest for woman i in caste c and village v. Our identifying variation thus comes from older women in larger castes within a village compared with younger women in the same caste and older women in smaller castes.

Even after identifying the causal effect, the reflection problem remains. Lee [2007], Bramoullé et al. [2009] and de Giorgi et al. [2010] assume that social networks are directed.[6] We attempt to relax this assumption by estimating the marginal effect of

[5] Kandpal and Baylis [2013] show that the *Mahila Samakhya* program also serves to diversify peer networks, and that participants tend to have significantly more friends from other castes than do nonparticipants. Therefore, by using caste to instrument for self-reported friends, if anything, we underestimate the effect of the program; nonetheless, we find significant peer effects.

[6] The directionality assumption implies that the individual listing friends is the one being influ-

friends' participation on nonparticipants. Thus, the identifying assumption is that, given the norms governing household decision making, the *Mahila Samakhya* program affects a nonparticipant's intra-household bargaining power and her children's food consumption only through her participant friends. This is a considerably weaker directionality assumption. Correlated effects remain a source of bias in this analysis, but to the extent that village and caste fixed effects capture such effects, these concerns are mitigated by the inclusion of these fixed effects.

4 Data

We sampled six of 13 districts in Uttarakhand, four with the program and two without (the state of Uttarakhand is represented by the cross-hatched region in figure 1). The survey districts are represented with a dotted pattern in figure 1. The four dotted districts with a thick border are the surveyed program districts. The two dotted districts without a thick border are the surveyed non-program districts. The sample villages were randomly chosen.

We gathered data on networks by interviewing 487 randomly chosen women in 69 villages. We asked each of these women to list five people outside their households[7] with whom they were in contact on a regular (daily or weekly) basis. We then conducted follow-up interviews with two randomly selected women among these five friends. Then we asked each of the two follow-up interviewees about five of their closest friends, and interviewed two each of these friends-of-friends. Thus, starting

enced by her peers, while the peers are not equally influenced by the individual listing them.

[7]The question did not specify the gender of these five people; nonetheless, the respondents only listed women.

with one woman, the sampling strategy yielded a network of seven. The final data set contains 1,619 women belonging to 72 networks across 69 villages with 13 networks spanning more than one village. To address concerns about endogeneity arising from our sampling strategy, we only include the 487 initially selected women for whom we have complete information as our units of observation. In 17 of these cases, friends-of-friends listed the first woman as a friend, thus explicitly violating the exclusion restriction; the analysis below drops these observations.

Chandrasekhar and Lewis [2011] estimate large downward bias of up to 90 percent when using random draws or top coding to sample peer networks. In our field test, over 95 percent of the participants reported regularly communicating with fewer than five people outside their families, particularly prior to program participation. Five thus appeared to be an effective upper limit on network size in our sample. The modal woman listed three friends; only 42 of our full sample of 404 women reported five friends.[8] Given virilocal residence and strong caste hierarchy, it is not surprising that the modal woman only reported having three friends, the vast majority of whom were of the same caste. Our final sample thus contains 404 randomly chosen women (who have 942 friends), for whom we have complete information.

A threat to our identification would arise from network size and caste position being correlated; however, table 1 shows that there is limited variation in network size by caste and no discernable pattern within the caste hierarchy. Similarly, as

[8]A concern with this method of sampling networks might be that when respondents observe the number of questions asked about each friend, they might not list their full set of friends, which would result in omitted ties, and unobserved violations of the exclusion restriction. To avoid such bias, at the onset of the survey, we simply asked respondents to list the names of their friends and only asked detailed questions about these friends later in the survey.

table 2 shows, the age profiles of one of our key dependent variables, women working off the family farm, are comparable across castes and in treated versus untreated districts.

Program Placement

In addition to network formation and the program participation decision, another potential source of endogeneity might be that *Mahila Samakhya* was systematically placed in villages where women have a relatively high level of autonomy and are more likely to respond favorably to the treatment. Using data from the Indian censuses of 1991 and 2001 on village-level female autonomy matched to the year that *Mahila Samakhya* entered the smallest administrative unit (block), we compare the levels of autonomy in clusters that received *Mahila Samakhya* with those that did not. The results for t-tests of equality, which are presented in table A1 in the appendix, are not significantly different for the overall sex ratio, 0-6 sex ratio, or the ratios for scheduled castes or tribes. Similarly, the male-to-female literacy ratio and sex composition of the labor force do not vary between treated and untreated clusters.

Another threat to our internal validity may come about if untreated districts do not represent statewide trends and women in these districts are less (or more) empowered than average, implying that program placement was targeted. However, the nationally representative National Family Health Survey-3 [IIPS and ORC Macro, 2007] and District Level Household Survey-3 [Ministry of Health and Family Welfare and International Institute for Population Studies, 2010] show that women in untreated districts in our sample do not differ significantly from those in the rest of the state. For instance, the average age at marriage for Uttarakhandi women is

20.6, while it is 19.1 in our untreated sample, and 19.4 in our treated sample; 43 percent of all Uttarakhandi women work, while 49.8 percent of the untreated women in our sample do, and 50.6 percent of those in our treated sample do. The total fertility rate in the state is 2.6, which corresponds closely to the average family size of one boy and one girl in our untreated sample given that the women we observe are still in their child-bearing years. Finally, although 84 percent of the state has access to electricity, 90 percent of our untreated sample does. These comparisons do not indicate that the program was systematically targeted.

4.1 Summary Statistics

Our identification strategy exploits variation in caste and age-adjusted exposure to the program between participants and nonparticipants in treated and untreated districts. Therefore, table 2 compares participants with nonparticipants in treated districts and women in untreated districts. Across all the groups, the average woman is in her early thirties, although participants are about a year older, and the average husband is in his mid-to-late thirties. The average woman in the treated districts has a little less than eight years of education, and in the untreated districts, she has just over eight. The average husband has completed high school in all three groups. The households in our sample come from approximately the third quintile of the wealth index [Filmer and Pritchett, 2001]. Twenty-two, 26, and 6 percent of the participants, untreated women, and nonparticipants, respectively, are Brahmin. Untreated women are more likely to be literate (87 percent) compared with the participants (79 percent) and nonparticipants (74 percent). Participants tend to have slightly older children

(boys and girls ages 8 and 7) than do the nonparticipants (boys and girls ages 7 and 6.5) and untreated women (boys and girls ages 7 and 5.5). Family sizes are roughly similar, with all groups having a boy and girl, although participants have marginally larger families (2.5 children instead of 2), likely reflecting that they are slightly older.

Nonparticipants and untreated women have about three friends, and the participants report 3.75 friends; less than 20 percent in each group has any friend of another caste. Access to information is also low: less than 40 percent of the women in the untreated districts read any newspaper or magazine, and about 60 percent of participants and nonparticipants do. About 40 percent of all of the women ever watched television. Participation in the village council is one of the few variables that is significantly different between *Mahila Samakhya* participants and other women: half of all the *Mahila Samakhya* participants attended the village council, but only 16 percent of nonparticipants and 20 percent of the women in untreated districts did.

We use three sets of dependent variables: women's autonomy, perceived social norms about gender roles, and investments in children. The dependent variables examined for women's autonomy are (1) whether the woman works outside the household, (2) whether her name is on her household's NREGA identification card, as a measure of access to employment and government social safety nets, and (3) whether she can leave the house without permission to go to the market for routine purchases. The four variables measuring perceived social norms on gender roles are (1) how much education a boy should receive; (2) how much education a girl should receive (3) whether marriage or employment is the best reason to educate a boy; and (4)

whether marriage or employment is the best reason to educate a girl.[9] Finally, in addition to studying peer effects on female autonomy and social norms, we use mother fixed effects to consider the impact a woman's participant friends have on the food consumption of her children ages 15 years and younger. We examine investments in daughters using the following seven outcomes: (1) standardized bowls of protein-rich foods (chicken, meat, fish, and dal) consumed by children in the past 24 hours, (2) bowls of vegetables, (3) carbohydrates (bowls of rice and the number of flatbreads, chapati or roti in Hind), (4) time spent cleaning the house in the past 24 hours, (5) time spent cooking, (6) time spent gathering wood, and (7) time spent collecting water. We account for caste fixed effects in all the specifications.

The outcomes of female autonomy appear to vary substantially by women's participation in *Mahila Samakhya*. Table 3 shows that 76 percent of the participants, 51 percent of the nonparticipants, and 62 percent of the untreated women could leave the house without permission. Similarly, while only 82 percent of the participants have their names on the NREGA job card, 77 percent of the nonparticipants and only 18 percent of the untreated women do. Finally, 82 percent of the participants work outside the household, and 52 percent of the nonparticipants and 62 percent of the untreated women do. Perceived social norms about gender roles also reveal key differences: participants and nonparticipants report that boys and girls should get the same amount of education, while women in untreated districts report a slightly lower level of education for girls. While almost all participants suggest that em-

[9]For the last two questions, we asked respondents what in their view was the best reason to educate a boy or girl, with employment and marriage being the two options. For the analysis we recoded these variables so that employment is zero and marriage is one.

ployment is the best reason to educate boys, only 84 percent say so for girls. This discrepancy is even larger for the other two groups: 74 percent versus 67 percent for nonparticipants, and 96 percent versus 49 percent for untreated women. Interestingly, as shown in table 4, while participants' children consume more carbohydrates, the other child-level variables examined do not vary significantly between participants, nonparticipants, and untreated women.

Finally, to examine the nature of the variation underpinning our identification strategy, we compare the average age of women who work off the family farm by caste and treatment district. This comparison, which is presented in figure 2, shows that women in all four caste groups (non-Hindus, Brahmin, other upper castes, and Scheduled Castes, Tribes, and Other Backward Castes) and in treated and untreated districts are of similar ages.

5 Empirical Estimates of the Causal Peer Effect

To address the endogeneity of participation and network formation, we use the instruments described in the previous section: exposure to the program and the number of women in the village of the same caste weighted by program exposure. Village and caste fixed effects are included in all the specifications. Standard errors clustered at the village level and wild cluster bootstrapped standard errors are reported.[10]

[10]We also estimate peer effects using ordinary least squares regressions without instrumenting for endogenous program participation or network formation. The results presented in table A2 show that as the number of friends who participate in *Mahila Samakhya* increases from zero to 1.6, a nonparticipant is significantly more likely to work outside the household. The results on perceived norms about gender roles, presented in table A3, suggest that having participant friends causes respondents to increase the amount of education that they think boys and girls should receive. Finally, table A4 presents significant evidence of peer effects on investments in daughters. The

Our identification strategy is thus akin to a difference-in-differences specification that exploits being in a village with more women in the caste exposed to the program compared with being in the same village with fewer women in the caste exposed to the program, holding caste and age constant. Figure 3 presents a visual verification of the identifying variation in our instrument for participation for the two largest caste groups in our data (Brahmins and other upper castes). Women in villages where more women of their caste are likely to participate, that is, high saturation villages, are also more likely to participate in *Mahila Samakhya* than women in villages where few women of their caste participate, that is, low saturation villages. Similarly, figure 4 examines the variation in the first set of outcomes: Brahmin and upper caste women in high saturation villages are more likely to go out without permission or work off the family farm compared with those in low saturation villages. However, we do not observe a significant difference in the probability of having one's name on the household's NREGA job card across caste-level saturation of *Mahila Samakhya*.

The first stage of the IV estimation, presented in table 5, shows that both instruments— age-adjusted exposure to the program and within caste age-adjusted saturation of the program— are positively and significantly correlated with friends' participation in the program. The instruments are imprecisely but positively correlated with own participation. The friends' participation regression has an F-statistic

results show that having a mother who participates in *Mahila Samakhya* decreases the amount of time that daughters spend on cooking, cleaning, and collecting water. By contrast, the daughters of participants with participant friends spend more time on these activities. This increase may reflect that having more participant friends increases the mother's time spent away from home, causing the daughter to do some of the mother's chores. However, the results presented in tables A2, A3, and A4 are not causal since participants and nonparticipants may be different over unobservables that likely also affect bargaining outcomes, including those studied here.

of 33.92, while the own participation regression has an F-statistic of 27.96, suggesting that both instruments are strong. A one standard deviation change in the instrument for own participation affects the probability of own participation by 0.04 standard deviation, and a one standard deviation increase in the instrument for networks increases friends' participation by 0.07 standard deviation.

Causal direct and peer effects on female autonomy are presented in table 6. The corresponding marginal effects are presented in table 7. These results tell us whether own and friends' participation in *Mahila Samakhya* increases the three individual-level measures of the woman's autonomy. The marginal effects show that *Mahila Samakhya* increases female autonomy, as participants are 45 percent more likely to have their names on the household's NREGA job card and 75 percent more likely to work outside the household. The effect of friends' participation on nonparticipants, which requires the weakest directionality assumption, suggests that going from zero to 1.6 participant friends increases a nonparticipant's probability of working outside the home by 7 percent.

Table 8 presents the causal direct and peer effects on norms about gender roles, and table 9 presents the corresponding marginal effects. The only significant impact observed is that friends' participation decreases the likelihood of a nonparticipant saying that marriage is the best reason to educate girls. This lack of impact highlights the stickiness of social norms.

Finally, using instruments for participation and networks and mother fixed effects, we examine the allocation of food and time spent on chores by female children. The results presented in table 10 and the marginal effects in table 11 show that girls

whose mothers participate in *Mahila Samakhya* eat more vegetables and spend less time on cooking. Interestingly, as also suggested by the OLS regressions, daughters of participants who have participant friends spend more time on cleaning, cooking, and water collection. This increase in housework may suggest that daughters pick up some of their mothers' chores when their mothers are away from home. In contrast, girls whose mothers do not participate but have friends who do tend to eat more protein and spend less time cleaning and gathering wood and water. In line with the literature suggesting that more empowered women invest more equally in children of both sexes compared with less empowered women, this result is suggestive of peer effects on intra-household bargaining.

6 Heterogeneity Analysis

In this section, we explore the heterogeneity of the peer effects in the woman's formal education and her age at marriage. We chose these variables because low formal educational attainment may indicate lack of access to information other than through social networks, and age at marriage is correlated with low initial bargaining power [Field and Ambrus, 2008, Maertens, 2013, Hahn et al., 2018]. These variables are not affected by participation in the program, as our question about schooling asked for education not received from *Mahila Samakhya* and program participants are married women.[11] Thus, we allow the effects of own and friends' participation

[11] Although having a mother (or mother-in-law) who participated in *Mahila Samakhya* may affect the woman's age at marriage, the program only entered the surveyed villages between 2004 and 2008, when the average respondent was 32 years, making it unlikely that these women would have had a mother or future mother-in-law who participated before they were married.

to vary in the woman having low education[12] and in her age at marriage.

As presented in table A5 in the appendix, the effects of own and friends' participation on many examined measures of female autonomy vary in the woman's having low education and her age at marriage. Indeed, even among women who have participant friends, low education reduces the likelihood of having one's name on the NREGA card. In contrast, among participants who married at a later age and have participant friends, low education nonetheless decreases the probability of working off the family farm. Conversely, as shown in table A6, we see little evidence of such heterogeneity in perceived social norms. Finally, table A7 presents evidence on the heterogeneity underlying the effect of friends' participation on investments in female children. The estimates suggest that women with low education may be particularly influenced by peers: higher protein consumption by daughters of nonparticipants with participant friends is associated with women who have low education but a later age at marriage. Similarly, the reduction in time spent on chores by girls is driven by nonparticipants with low education who have participant friends. These results are indicative of complex patterns in the observed peer effect and emphasize the importance of accounting for social networks and local context when designing interventions targeted at women.

The conceptual model presented in the appendix lays out how such heterogeneity analysis might help us think more systematically about learning and influence, although formally decomposing the peer effect into mechanisms is beyond the scope of this paper. We may believe that low education is more heavily correlated with social

[12]For our purposes, we define low education as four or fewer years of education because it is the modal point: 72.2 percent of the women in our sample had less than four years of education.

learning than other channels because, compared with women with more education, women who are less educated may have restricted access to information provided by newspapers or government campaigns, and may thus have a stronger response to learning from peers. In this case, these results would be suggestive of social learning being the dominant mechanism underlying the observed peer effects, and the interaction between low education and friends' participation in *Mahila Samakhya* should be positive for nonparticipants. Alternatively, if the information learned through social networks requires some formal education to be useful to women, then we expect the interaction term to be negative. Similarly, if we think that a young age at marriage is reflective of low initial intra-household bargaining power, women who have friends who participate in *Mahila Samakhya* may respond differently to social influence than nonparticipants with higher initial intra-household bargaining power. However, since these are proxy measures, the estimates are merely suggestive of learning and influence. A formal decomposition of the mechanisms underlying the observed peer effects is beyond the scope of this paper.

7 Sensitivity Analyses

We conducted a number of placebo tests to examine whether the estimated peer effects are merely an artifact of the data. The first such test is of the variation underpinning our identification. We examine whether the variables presented in table 2 that are plausibly unaffected by *Mahila Samakhya* (all except the number of friends; friends of other castes; and whether the woman has ever read a newspaper,

watched television, or participated in the village council) are uncorrelated with own or friends' participation. Table A8 in the appendix indeed reports no significant effects.

Another concern about our results may be that they are driven by the 42 women who were top-coded, that is, those who reported having five friends. The accordingly re-estimated peer effects are robust to the exclusion of these women from our sample, with most of the coefficients remaining unchanged. However, as may be expected from a loss of 10 percent of the sample, some estimates are less significant than with the full sample. There may also be some concern that our program exposure instrument is picking up non-linearities associated with a woman's age that are also correlated with those villages that were exposed to the program. We test this by explicitly including nonlinear terms for age in the regression (age-squared, log(age)) and find our results substantively unchanged.

An issue with disentangling correlated and contextual effects arises if women are more likely to list people of their own caste and age as friends. Let us assume for the moment that women of some specific age in the treated villages are more likely to participate, more empowered, and more likely to list more women who share those same characteristics as friends. This situation would lead them to list more women like them as part of their network, and we would observe that having friends who look like them would more likely result in higher bargaining power. But we should also see this phenomenon– women of a certain age being more likely to list friends of the same caste, age range, and higher levels of empowerment– in untreated districts. And here that increased empowerment would not be related to treatment or partic-

ipation. Thus, this concern would only be an issue if (1) unobservables correlated with the probability of listing a friend, such as caste, likelihood of participation, and empowerment, are different across treated and untreated villages, or (2) if there is something about having a participant friend that makes empowered women more likely to list her as a friend, along with being more likely to list women that are similar across caste. It is difficult to completely rule out the first possibility, although we note the similarity between treated and untreated women, and participants and nonparticipants, across observables that are not affected by *Mahila Samakhya*. Furthermore, if anything, women who are "empowered" by our measures are less likely to list people who are of the same caste as friends [Kandpal and Baylis, 2013], which would run counter to the second argument.

Finally, despite the analysis of program placement on pages 11 and 12, one may be concerned that the two non-program districts were different on unobservables from the four program districts. To determine whether these non-program districts are driving our results, we drop all observations from these two districts from the sample, and re-estimate the bargaining power and food intake regressions on only the observations from program districts. Although, unsurprisingly, we lose power by dropping these two districts, the results do not change in magnitude or direction, suggesting that the two non-program districts are not driving our key findings.[13]

[13]We also examined a number of alternative specifications, including other instrumental variables. Qualitative interviews revealed that the program participants tend to have slightly older sons and spend more time collecting firewood. Parents-in-law and husbands may perceive leaving a young son at home as neglecting one's duties, so women with young children are often unable to leave the house for extended periods of time as required to attend program meetings. At the same time, women who spend more time in the forest collecting firewood may feel more isolated and may be more interested in the community-building activities of the program. Hence, we tested sons' age and time to collect fuel as alternative instruments for participation; the results are similar to the

Here we mention a few caveats. The paper would benefit from panel data tracking women and their peer networks. Further, we are unable to extrapolate past autonomy and children's food consumption and time use to welfare in general. In particular, there are unclear impacts on the extensive margin if daughters of participants are given more food, but spend more time on chores. The policy implications from this analysis must therefore involve caution, since we only consider one part of a much larger picture.

8 Conclusion

This paper asked whether peers affect household decision-making. We used caste networks to identify causal peer effects and participation in a community-level women's empowerment program, *Mahila Samakhya* to identify shocks to female autonomy. We showed that women who do not participate in the program but have friends who do are more likely to leave the house without permission and work outside the household. But on most other outcomes of a woman's autonomy, including perceived social norms, we found limited evidence of peer effects. This lack of effect may be indicative of the stickiness of social norms and is consistent with emerging evidence that a gap in aspirations and ability worsen outcomes, at least in the short run [Mukherjee, 2017]. Finally, we used mother fixed effects to examine investments in children. Here, our results showed a robust set of peer effect: having participant friends leads nonparticipants to feed their daughters a more protein-rich diet and

ones presented above. However, program exposure is our preferred instrument because it relies on program rules and therefore is more likely to meet the exclusion restriction.

have them spend less time on chores. These results provide a lower bound of the true extent of peer effects, because by instrumenting for networks using caste, we are ignoring any peer effects that may arise from *Mahila Samakhya* diversifying or expanding networks.

Our estimates of the peer effects also relax two restrictive assumptions often made in the literature: separability of group formation and information flows, by instrumenting for networks, and the directionality of network ties, by examining the impact of friends' participation on nonparticipants' bargaining power. Not assuming separability of group formation and information flows within the groups also has implications for policy targeting. We find that *Mahila Samkhya* participation increases the likelihood of working off the family farm by 75.1 percentage point, while having friends who participate in *Mahila Samakhya* increases a nonparticipant's ability to work off the family farm by 6.9 percentage points, relative to a baseline of 55 percent. These estimates suggest a decay of 90.8 percent from the program's direct effect to its spillovers through social networks. One targeting option might have been to randomize *Mahila Samakhya* within a group. Then, by hypothesis of why randomization matters, the expected effect of the randomized program on employment would be smaller than 75.1 percentage points, and the resultant spillovers would be 91 percent smaller. When targeting an intervention, it is thus important to ask whether the intervention is likely to generate second-order spillover effects with substantial decay rates.

Why do constrictive social norms persist in the absence of an intervention like *Mahila Samakhya*, and how do networks interact with such norms? Akerlof (1980)

notes that norms that are disadvantageous to individuals may persist due to social sanction or the fear thereof. As described in Janssens [2010] and Nussbaum [2000], *Mahila Samakhya* changes social norms in an iterative, grassroots-driven process that strengthens social ties while expanding and diversifying networks. Women in untreated districts often told us that even if they wanted to work, attend village council meetings, or have a greater say in the household, they were stymied by the fear of being ostracized for such actions. They spoke of "having nowhere to go" or "no one to turn to". In contrast, *Mahila Samakhya* participants have opportunities to interact with their peers away from home, which strengthens their ties and creates a support group. One participant reported that her *Mahila Samakhya* friends helped her reason with her husband and in-laws when initially the family did not allow her to feed her daughter as well as her son. Another participant said that her husband's treatment of her improved after she joined *Mahila Samakhya* because he was worried that he would be publicly shamed for his behavior toward her. The program also provides new information about roles for women inside and outside the household. For instance, one participant said that just knowing that women were successful lawyers, professors, and entrepreneurs changed her outlook on life as well as her aspirations for her daughter.

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9 Figures and Tables

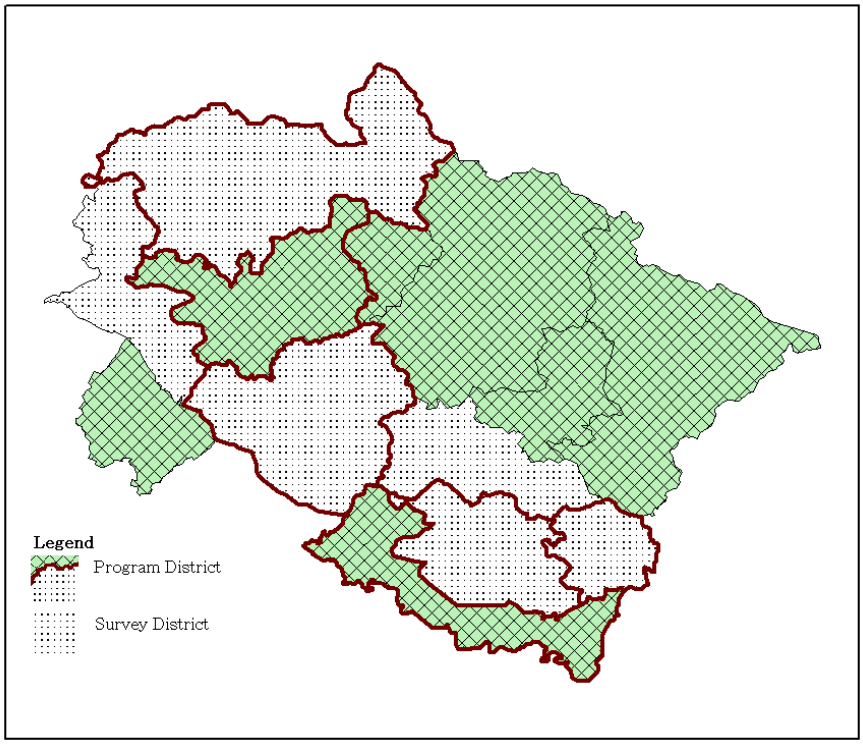

Figure 1: Uttarakhand

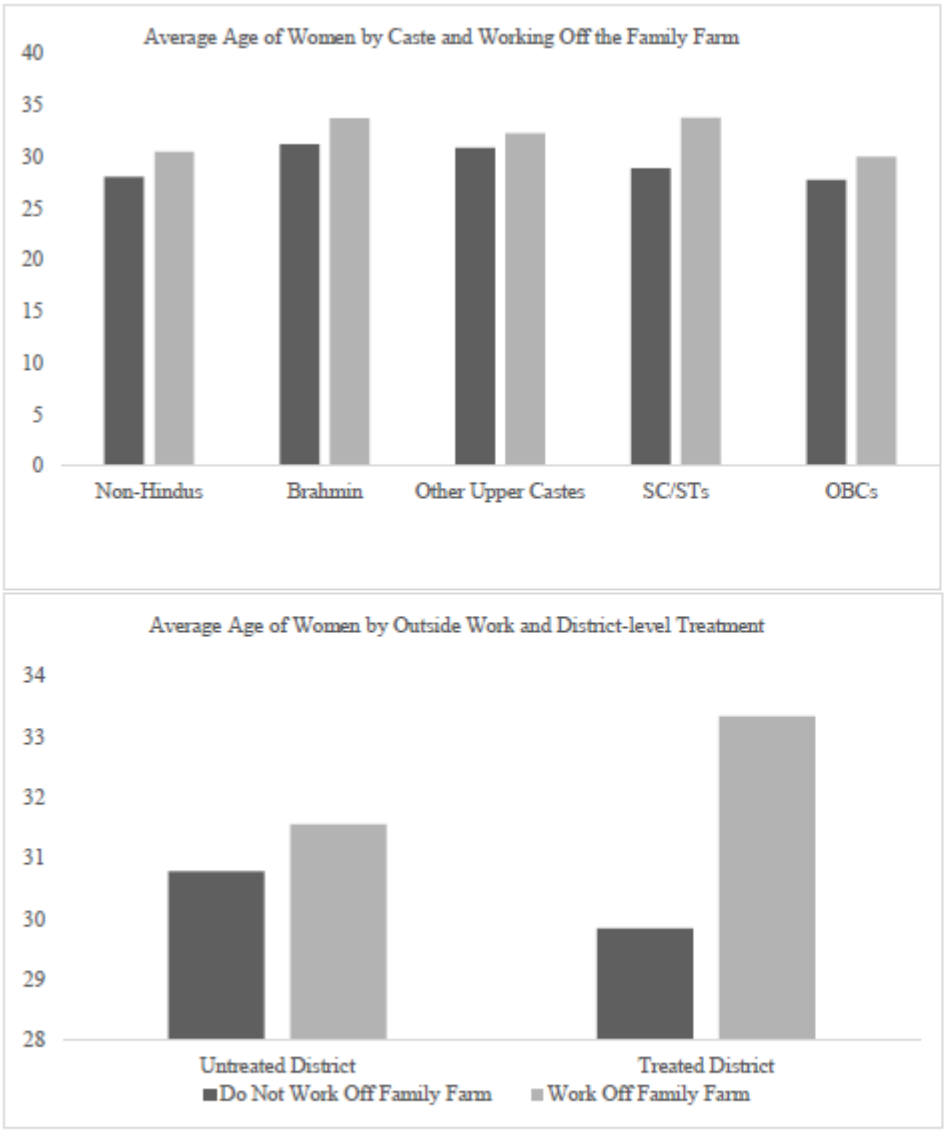

Figure 2: Variation in Age, Caste and Working Off the Family Farm

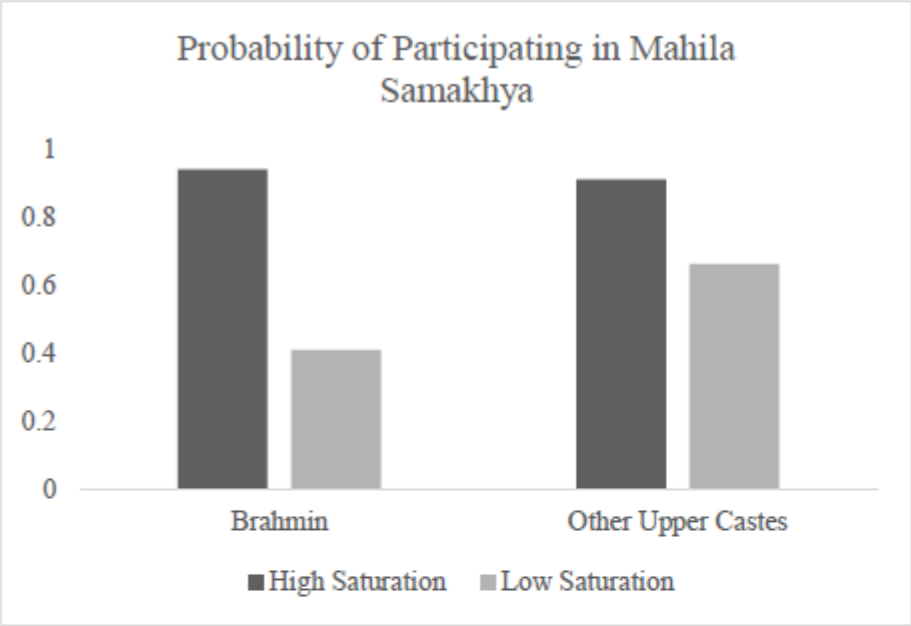

Figure 3: Covariation in Participation in *Mahila Samakhya* and Within-Caste Program Saturation in Village

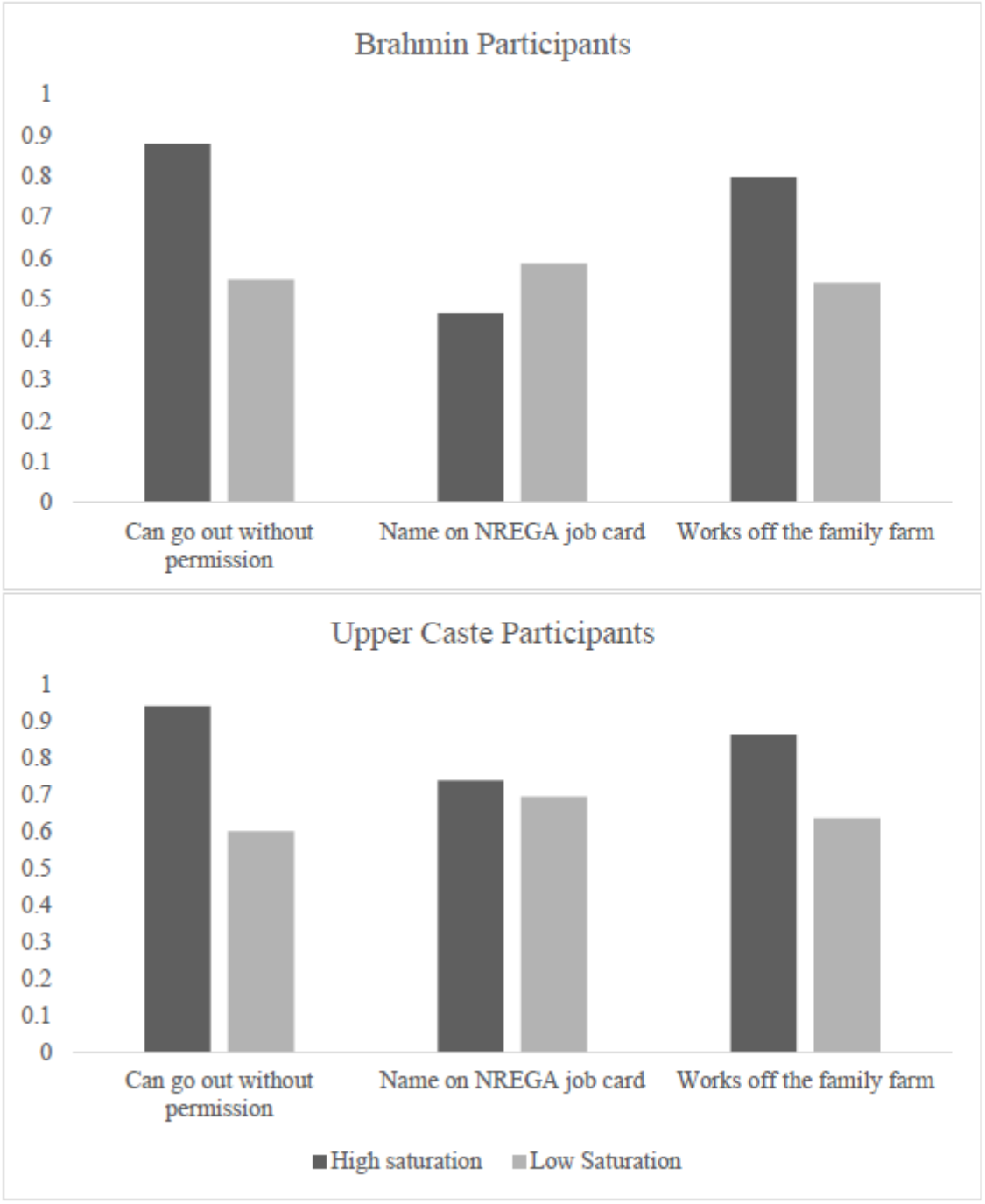

Figure 4: Covariation in Female Bargaining Power and Within-Caste Program Saturation in Village

Caste	Mean	Standard Deviation	Observations
Non-Hindus	3.84	0.77	19
Brahmin	3.16	1.04	81
Other Upper Castes	3.76	0.89	226
SC/ST/OBCs	3.33	1.00	78

Table 1: Network Size by Caste Hierarchy

	Treated Districts						Untreated Districts		
	Participants			Nonparticipants					
Variables	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.
Woman's Age	32.88	7.56	207	30.69	7.43	73	31.22	6.96	124
Woman's Age at Marriage	19.24	3.06	198	18.59	3.04	64	19.69	3.19	121
Husband's Age	38.14	8.75	207	37.04	10.17	73	36.83	8.05	124
Woman's Years of Education	7.24	4.69	207	7.89	4.61	73	8.13	5.09	124
Less than Four Years of Education	0.23	0.42	207	0.21	0.41	73	0.19	0.39	124
Husband's Years of Education	10.74	2.97	202	10.88	3.16	70	10.16	3.20	111
Quintile of Asset Index	2.76	1.41	207	3.01	1.35	73	3.35	1.36	124
Brahmin	0.22	0.44	207	0.06	0.23	73	0.26	0.44	124
Literate	0.79	0.41	205	0.74	0.44	72	0.87	0.34	124
Age of Sons	8.47	7.49	207	7.14	7.09	73	6.94	7.65	124
Age of Daughters	6.89	7.00	207	6.58	7.06	73	5.45	6.01	124
Number of Sons	1.32	0.95	207	1.16	0.83	73	1.08	0.76	124
Number of Daughters	1.22	1.13	124	1.00	0.63	73	1.02	1.05	124
Number of Friends	3.75	0.78	207	3.22	0.96	73	2.75	0.88	124
Any Friends of Other Castes	0.19	0.35	207	0.16	0.37	73	0.15	0.39	124
Ever Read Newspaper or Magazine	0.63	0.48	205	0.57	0.49	72	0.37	0.49	124
Ever Watched Television	0.24	0.43	203	0.24	0.43	72	0.18	0.38	123
Participation in Village Council	0.51	0.50	205	0.16	0.37	70	0.21	0.41	117

Table 2: Summary Statistics

	Treated Districts						Untreated Districts		
	Participants			Non-paricipants					
Variables	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.
Female Autonomy									
Can Go Out Without Permission	0.82	0.39	207	0.51	0.50	73	0.62	0.49	124
Name on NREGA Job Card	0.82	0.39	207	0.77	0.43	73	0.18	0.38	124
Works Off Family Farm	0.76	0.43	207	0.55	0.50	73	0.57	0.49	124
Social Norms									
How Much Education Should Boys Get	15.23	1.28	195	13.88	1.56	69	14.02	2.03	118
How Much Education Should Girls Get	15.23	1.28	195	13.88	1.56	69	13.86	2.35	118
Marriage is Best Reason to Educate Boys	0.02	0.19	206	0.03	0.23	73	0.02	0.18	119
Marriage is Best Reason to Educate Girls	0.16	0.54	206	0.19	0.59	73	0.72	0.96	122

The variable "Doesn't Need Permission" refers to a woman being able to leave the house without permission.

The variable "Has Name on NREGA Card" refers to a woman being able to access the government's rural employment guarantee scheme, NREGA, by having her name on the household's NREGA job card.

The variable "Works Outside Household" refers to the woman working for pay outside her home.

The variables on "How Much Education" refer to the number of years of schooling a woman said a child should receive.

The variables on "The Best Reason to Educate" refer to whether a woman said that marriage was the best reason to educate a child.

Table 3: Female Autonomy and Social Norms: Dependent Variables

	Treated Districts						Untreated Districts		
	Participants			Non-paricipants					
Variables	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.
Proteins Consumed in Past 24 Hours (bowls)	3.39	2.59	394	3.03	2.22	128	3.13	3.67	209
Vegetable Consumed in Past 24 Hours (bowls)	1.50	1.33	394	0.89	1.12	128	1.19	1.40	209
Carbohydrates Consumed in Past 24 Hours†	6.55	5.12	394	3.89	5.01	128	5.29	5.20	209
Time Spent Cleaning in Past 24 Hours (hours)	1.08	0.86	394	0.89	0.95	128	0.95	0.87	209
Time Spent Cooking in Past 24 Hours (hours)	1.18	0.91	394	0.93	0.97	128	1.04	0.95	209
Time Spent Gathering Wood in Past 24 Hours (hours)	1.21	0.92	394	0.91	0.98	128	0.97	0.89	209
Time Spent Collecting Water in Past 24 Hours (hours)	1.03	0.80	394	0.77	0.86	128	0.98	0.87	209

Proteins include the bowls of lentils, chicken, fish, dairy products, and meat.
Vegetables include the bowls of all vegetables.
Carbohydrates include the bowls of rice plus number of flatbreads(chapati/roti).

Table 4: Standardized Bowls of Food Consumed and Time Spent on Chores by Children Younger than 15 in the Past 24 Hours: Dependent Variables

	Own Participation	Friends' Participation
Age-adjusted Exposure to Program	0.010	0.036*
	(0.021)	(0.019)
	[0.572]	[0.057]
Same Caste*Age-adjusted Exposure to Program	0.002	0.044***
	(0.001)	(0.007)
	[0.072]	[0.087]
Constant	1.143***	1.358
	(0.165)	(1.017)
Observations	404	404
Sanderson-Windmeijer F-statistic	27.96	33.918
p-value for Robust Regression F	0.000	0.000

Caste and block fixed effects included in all specifications.

Standard errors clustered by village in parentheses.

Wild cluster bootstrapped p-values in square brackets.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Instrumenting for Endogenous Variables

	Doesn't Need Permission	Has Name on NREGA Card	Works Outside Household
Own Participation	−1.011	0.591	1.118
	(0.644)	(0.381)	(1.092)
	[0.436]	[0.119]	[0.310]
Friends' Participation	−0.012	−0.001	0.040**
	(0.013)	(0.005)	(0.017)
	[0.163]	[0.026]	[0.042]
Own Participation*Friends' Participation	0.099*	−0.023	−0.030
	(0.055)	(0.021)	(0.041)
	[0.098]	[0.226]	[0.384]
Constant	0.920	0.998**	−0.829
	(0.669)	(0.500)	(1.165)
Wooldridge Robust Regression F	1.11	0.989	2.275
p-value for Robust Regression F	0.352	0.403	0.088

Caste and block fixed effects included in all specifications.

Standard errors clustered by village in parentheses.

Wild cluster bootstrapped p-values in square brackets.

404 women; 249 participants, 147 nonparticipants.

The variable "Doesn't Need Permission" refers to a woman being able to leave the house without permission.
The variable "Has Name on NREGA Card" refers to a woman being able to access the government's rural employment guarantee scheme, NREGA, by having her name on the household's NREGA job card.
The variable "Works Outside Household" refers to the woman working for pay outside her home.

Table 6: Female Autonomy: Instrumented Regressions

	Doesn't Need Permission	Has Name on NREGA Card	Works Outside Household
Effect of Own Participation on Participants	-0.491	0.448	0.751*
	(0.367)	(0.294)	(0.428)
Effect of Friends' Participation on Participants	0.395*	-0.112	0.050
	(0.212)	(0.101)	(0.149)
Effect of Friends' Participation on Nonparticipants	-0.020	-0.001	0.069**
	(0.022)	(0.009)	(0.029)

Caste and block fixed effects included in all specifications.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard errors clustered by village in parentheses.
404 women; 249 participants, 147 nonparticipants.
The variable "Doesn't Need Permission" refers to a woman being able to leave the house without permission.
The variable "Has Name on NREGA Card" refers to a woman being able to access the government's rural employment guarantee scheme, NREGA, by having her name on the household's NREGA job card.
The variable "Works Outside Household" refers to the woman working for pay outside her home.

Table 7: Total Effects from Interacted Regressions: Female Autonomy

	How Much Education Should Boys Receive	How Much Education Should Girls Receive	Best Reason To Educate Boys	Best Reason To Educate Girls
Own Participation	0.724	0.352	0.359	0.043
	(2.433)	(2.397)	(0.380)	(1.802)
	[0.547]	[0.561]	[0.469]	[0.489]
Friends' Participation	−0.004	−0.026	0.000	−0.025
	(0.075)	(0.071)	(0.001)	(0.015)
	[0.061]	[0.126]	[0.354]	[0.155]
Own*Friends' Participation	−0.114	−0.074	−0.015	0.027
	(0.148)	(0.127)	(0.015)	(0.054)
	[0.764]	[0.546]	[0.331]	[0.217]
Constant	14.192***	14.434***	−0.367	−1.162
	(2.037)	(2.030)	(0.405)	(1.914)
Observations	382	382	398	401
Wooldridge Robust Regression F	0.821	0.246	0.909	0.708
p-value for Robust Regression F	0.487	0.864	0.441	0.550

Caste and block fixed effects included in all specifications.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Standard errors clustered by village in parentheses.

Wild cluster bootstrapped p-values in square brackets.

The variables on "How Much Education" refer to the number of years of schooling a woman said a child should receive.

The variables on "The Best Reason to Educate" refer to whether a woman said that marriage was the best reason to educate a child.

Table 8: Social Norms: Instrumented Regressions

	How Much Education Should Boys Receive	How Much Education Should Girls Receive	Best Reason To Educate Boys	Best Reason To Educate Girls
Effect of Own Participation on Participants	0.175	−0.003	0.280	0.169
	(1.766)	(1.877)	(0.301)	(1.532)
Effect of Friends' Participation on Participants	−0.511	−0.444	0.152	0.087
	(0.495)	(0.516)	(0.074)	(0.275)
Effect of Friends' Part. on Nonparticipants	−0.007	−0.045	0.001	−0.043*
	(0.134)	(0.127)	(0.002)	(0.027)

Caste and block fixed effects included in all specifications.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard errors clustered by village in parentheses.
The variables on "How Much Education" refer to the number of years of schooling a woman said a child should receive.
The variables on "The Best Reason to Educate" refer to whether a woman said that marriage was the best reason to educate a child.

Table 9: Total Effects from Interacted Regressions: Social Norms

	Protein Consumption	Vegetable Consumption	Carbohydrates Consumption	Cleaning Activities	Cooking Activities	Wood Gathering	Water Collection
Own Part.*Female Child	0.016	0.048	0.207	−0.326***	−0.267**	−0.208	−0.252***
	(0.405)	(0.121)	(0.218)	(0.080)	(0.070)	(0.117)	(0.034)
	[0.952]	[0.302]	[0.738]	[0.038]	[0.050]	[0.143]	[0.020]
Friends' Part.*Female Child	0.053**	−0.007	0.032	−0.011*	−0.007	−0.016*	−0.027***
	(0.020)	(0.008)	(0.062)	(0.004)	(0.008)	(0.007)	(0.004)
	[0.103]	[0.802]	[0.262]	[0.630]	[0.533]	[0.615]	[0.913]
Own*Friends' Part.*Female Child	−0.043	0.011	−0.058	0.053**	0.031**	0.033*	0.060***
	(0.022)	(0.015)	(0.108)	(0.015)	(0.011)	(0.013)	(0.007)
	[0.465]	[0.264]	[0.378]	[0.997]	[0.995]	[0.991]	[0.997]
Child's Age	0.020	−0.004	−0.035	−0.007	−0.008	−0.013*	−0.016*
	(0.031)	(0.017)	(0.031)	(0.009)	(0.006)	(0.006)	(0.007)
Female Child	−0.045	0.017	0.064	0.074	0.064	0.070	0.036
	(0.119)	(0.055)	(0.248)	(0.039)	(0.054)	(0.040)	(0.030)
Constant	4.004***	1.311***	5.925***	1.064***	1.169***	1.192***	1.098***
	(0.229)	(0.127)	(0.150)	(0.067)	(0.052)	(0.040)	(0.054)
Observations	731	731	731	731	731	731	731

Mother fixed effects included in all specifications.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard errors clustered by village in parentheses.
Wild cluster bootstrapped p-values in square brackets.
This sample consists of 361 boys and 370 girls under the age of 15 born to 353 mothers.
Proteins include the bowls of lentils, chicken, fish, dairy products, and meat.
Vegetables include the bowls of all vegetables.
Carbohydrates include the bowls of rice plus number of flatbreads(chapati/roti).

Table 10: Gender Differences in Investments in Children Younger than 15: Instrumented Household Fixed Effects on Children's Time Use in the Past 24 Hours

	Protein Consumption	Vegetable Consumption	Carbohydrates Consumption	Cleaning Activities	Cooking Activities	Wood Gathering	Water Collection
Effect of Own Participation on Daughters	-0.183	0.119**	-0.189	-0.068	-0.103**	-0.031	0.044
	(0.365)	(0.059)	(0.634)	(0.070)	(0.049)	(0.084)	(0.039)
Friends' Part. on Participants' Daughters	0.052	0.011	-0.076	0.216 ***	0.107***	0.082	0.016***
	(0.143)	(0.078)	(0.368)	(0.063)	(0.025)	(0.066)	(0.026)
Friends' Part. on Nonparticipants' Daughters	0.075***	-0.010	0.046	-0.018**	-0.106	-0.025***	-0.038***
	(0.029)	(0.013)	(0.012)	(0.009)	(0.012)	(0.009)	(0.006)

Mother fixed effects included in all specifications.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard errors clustered by village in parentheses.
Proteins include the bowls of lentils, chicken, fish, dairy products, and meat.
Vegetables include the bowls of all vegetables.
Carbohydrates include the bowls of rice plus number of flatbreads(chapati/roti).

Table 11: Total Effects from Interacted Regressions: Peer Effects in Children's Time Use in the Past 24 Hours

Appendix Tables

Variables	Untreated	Treated	Difference	t-test	Observations
Sex Ratio (M/F)	1.02	0.99	-0.02	-0.52	47
	(0.03)	(0.02)	(0.04)		
Sex Ratio 0-6 (M/F)	1.07	1.05	0.02	1.76	47
	(0.01)	(0.01)	(0.01)		
Ratio of Scheduled Caste Pop (M/F)	1.06	1.04	0.02	0.61	47
	(0.03)	(0.01)	(0.03)		
Ratio of Scheduled Tribe Pop (M/F)†	0.34	0.32	0.01	0.08	47
	(0.14)	(0.09)	(0.17)		
Literacy Ratio (M/F)†	1.05	1.08	-0.03	-1.86	47
	(0.01)	(0.01)	(0.02)		
Ratio of Total Workers (M/F)†	1.05	1.01	0.04	1.75	47
	(0.02)	(0.01)	(0.03)		
Ratio of Main Workers (M/F)†	1.09	1.04	0.05	1.73	47
	(0.03)	(0.01)	(0.03)		
Ratio of Non-workers (M/F)	0.87	0.95	-0.09	-1.57	47
	(0.05)	(0.02)	(0.05)		

†The distributions of the underlying variables for this ratio were significantly different from normal; they were thus logged and the ratio of the resultant variables was used here.
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A1: Block-level Data from Indian Censuses of 1991 and 2001 on Female Autonomy

	Doesn't Need Permission	Has Name on NREGA Card	Works Outside Household
Own Participation	0.108	0.072	0.022
	(0.128)	(0.109)	(0.076)
Friends' Participation	−0.002	0.001	0.032**
	(0.016)	(0.006)	(0.014)
Friends' Participation*Own Participation	0.035	−0.009	−0.014
	(0.025)	(0.011)	(0.015)
Constant	−0.036	1.079***	0.251
	(0.308)	(0.330)	(0.159)
Observations	404	404	404

Caste and block fixed effects included in all specifications.

Standard errors clustered by village in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Female Autonomy: OLS Regressions

	How Much Education Should Boys Receive	How Much Education Should Girls Receive	Best Reason To Educate Boys	Best Reason To Educate Girls
Own Participation	0.181	0.037	0.014	0.088
	(0.250)	(0.254)	(0.052)	(0.073)
Friends' Participation	0.002	−0.003	−0.009	−0.025**
	(0.066)	(0.066)	(0.008)	(0.010)
Own Participation*Friends' Participation	−0.023	−0.024	0.016	0.034*
	(0.061)	(0.062)	(0.013)	(0.017)
Constant	14.054***	14.120***	1.123***	0.638**
	(0.441)	(0.411)	(0.066)	(0.253)
Observations	382	382	398	401

Caste and block fixed effects included in all specifications.

Standard errors clustered by village in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Social Norms: OLS Regressions

	Protein Consumption	Vegetable Consumption	Carbohydrates Consumption	Cleaning Activities	Cooking Activities	Wood Gathering	Water Collection
Own Participation*Female Child	−0.013	0.051	0.019	−0.322***	−0.225**	−0.194**	−0.227**
	(0.260)	(0.167)	(0.654)	(0.107)	(0.109)	(0.093)	(0.104)
Friends' Participation*Female Child	0.043	−0.006	0.034	−0.007	−0.006	−0.009	−0.023**
	(0.026)	(0.014)	(0.077)	(0.010)	(0.009)	(0.017)	(0.011)
Own*Friends' Participation*Female Child	−0.033	0.007	−0.065	0.051***	0.028*	0.027	0.056***
	(0.033)	(0.026)	(0.106)	(0.017)	(0.015)	(0.021)	(0.018)
Female Child	−0.019	0.026	0.194	0.071	0.045	0.057	0.021
	(0.170)	(0.112)	(0.364)	(0.057)	(0.033)	(0.043)	(0.041)
Child's Age	0.020	−0.004	−0.035	−0.007	−0.008	−0.014*	−0.016**
	(0.023)	(0.016)	(0.040)	(0.008)	(0.008)	(0.008)	(0.007)
Constant	2.918***	1.309***	5.919***	1.065***	1.171***	1.195***	1.098***
	(0.162)	(0.119)	(0.326)	(0.062)	(0.064)	(0.058)	(0.057)
Observations	731	731	731	731	731	731	731

Mother fixed effects included in all specifications.
Standard errors clustered by village in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
This sample consists of 361 boys and 370 girls under the age of 15 born to 353 mothers.

Table A4: Gender Differences in Investments in Children Younger than 15: Household Fixed Effects Without Instruments for Participation and Networks

	Doesn't Need Permission	Has Name on NREGA Card	Works Outside Household
Own Participation	7.327	0.674	1.543
	(4.634)	(3.876)	(3.624)
Friends' Participation	2.464	−0.107	3.125
	(5.463)	(4.889)	(4.814)
Own*Friends' Participation	−9.633	0.983	−3.241
	(7.037)	(5.740)	(5.980)
Less than Four Years of Education	−6.061	10.484*	12.992
	(7.257)	(5.526)	(8.895)
Low Ed.*Own Participation	0.194	−6.935	−13.857
	(10.562)	(7.225)	(11.022)
Low Ed.*Friends' Participation	7.034	−16.163*	−20.378
	(10.663)	(8.117)	(13.540)
Low Ed.*Own*Friends' Participation	0.630	12.172	20.961
	(14.305)	(10.015)	(15.489)
Age at Marriage	0.060	0.100	0.065
	(0.156)	(0.166)	(0.155)
Own Participation*Age at Marriage	−0.359	0.053	−0.088
	(0.224)	(0.207)	(0.193)
Friends' Participation*Age at Marriage	−0.097	−0.160	−0.172
	(0.247)	(0.249)	(0.267)
Own*Friends' Participation*Age at Marriage	0.470	−0.028	0.185
	(0.333)	(0.298)	(0.315)
Low Education*Age at Marriage	0.270	−0.233	−0.884*
	(0.394)	(0.265)	(0.454)
Own Participation*Age at Marriage*Low Education	0.096	0.027	1.045*
	(0.562)	(0.353)	(0.552)
Friends' Participation*Age at Marriage*Low Education	−0.320	0.390	1.323*
	(0.578)	(0.387)	(0.700)
Own*Friends' Participation*Age at Marriage*Low Education	−0.139	−0.143	−1.496*
	(0.757)	(0.485)	(0.778)
Constant	−0.902	−0.180	−0.449
	(3.401)	(3.182)	(2.818)
Observations	376	376	376

Caste and village fixed effects in all specifications.
Standard errors clustered by village in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: Female Autonomy: Heterogeneity Analysis

	How Much Education Should Boys Receive	How Much Education Should Girls Receive	Best Reason To Educate Boys	Best Reason To Educate Girls
Own Participation	6.508	7.345	0.972	7.983
	(13.406)	(14.301)	(3.114)	(6.634)
Friends' Participation	−4.590	−0.381	−2.073	11.599
	(24.107)	(23.487)	(2.942)	(7.431)
Own*Friends' Participation	−1.584	−6.013	−0.615	−14.009
	(20.553)	(21.416)	(4.249)	(10.232)
Less than Four Years of Education	−20.627	3.683	−2.515	4.860
	(19.239)	(16.654)	(2.713)	(11.160)
Low Ed.*Own Participation	20.482	−2.481	2.575	−7.803
	(20.272)	(22.164)	(3.899)	(13.112)
Low Ed.*Friends' Participation	30.710	−7.025	3.582	−7.607
	(30.811)	(22.485)	(4.081)	(16.041)
Low Ed.*Own*Friends' Participation	−29.894	7.407	−3.514	11.613
	(30.581)	(29.513)	(5.444)	(18.432)
Age at Marriage	0.036	0.087	−0.059	0.334
	(0.608)	(0.612)	(0.124)	(0.262)
Own Participation*Age at Marriage	−0.380	−0.467	0.011	−0.328
	(0.613)	(0.648)	(0.169)	(0.334)
Friends' Participation*Age at Marriage	0.269	0.097	0.087	−0.596
	(1.046)	(0.997)	(0.173)	(0.408)
Own*Friends' Participation*Age at Marriage	0.109	0.371	−0.030	0.642
	(0.945)	(0.956)	(0.230)	(0.517)
Low Education*Age at Marriage	0.964	0.079	0.208	−0.003
	(0.900)	(0.797)	(0.129)	(0.539)
Own Participation*Age at Marriage*Low Education	−1.083	−0.264	−0.191	0.180
	(1.032)	(1.092)	(0.198)	(0.658)
Friends' Participation*Age at Marriage*Low Education	−1.383	0.024	−0.310	0.023
	(1.408)	(1.067)	(0.191)	(0.753)
Own*Friends' Participation*Age at Marriage*Low Education	1.480	0.099	0.292	−0.249
	(1.482)	(1.430)	(0.270)	(0.895)
Constant	14.378	12.888	2.071	−5.708
	(14.271)	(14.577)	(2.035)	(4.770)
Observations	358	358	370	373

Caste and village fixed effects in all specifications.
Standard errors clustered by village in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6: Social Norms: Heterogeneity Analysis

	Protein Consumption	Vegetable Consumption	Carbohydrates Consumption	Cleaning Activities	Cooking Activities	Wood Gathering	Water Collection
Own Participation*Female Child	−1.515	−0.736	1.965	−0.692	−0.104	−0.174	−0.570
	(1.117)	(1.652)	(1.515)	(0.515)	(0.938)	(0.462)	(0.569)
Friends' Participation*Female Child	0.289	−0.096*	0.665	0.056	0.135	0.045	−0.063
	(0.501)	(0.041)	(1.209)	(0.053)	(0.079)	(0.088)	(0.092)
Own*Friends' Participation*Female Child	−0.203	0.290	−0.654	0.136	−0.094	0.007	0.195
	(0.525)	(0.230)	(1.049)	(0.079)	(0.121)	(0.129)	(0.128)
Own Part.*Female Child*Low Educ.	−0.083	−1.428	−33.909	−0.035	1.830	2.507*	2.512
	(5.629)	(3.557)	(19.568)	(3.511)	(4.214)	(1.083)	(2.420)
Own Part.*Female Child*Age at Marriage	0.073	0.040	−0.084	0.019	−0.003	0.000	0.017
	(0.049)	(0.081)	(0.090)	(0.027)	(0.051)	(0.027)	(0.030)
Friends' Part.*Female Child*Age at Marr.	−0.012	0.004**	−0.028	−0.003	−0.006	−0.002	0.003
	(0.021)	(0.002)	(0.050)	(0.002)	(0.004)	(0.004)	(0.004)
Friends' Part.*Female Child*Low Ed.	−9.014**	−7.453	−91.291	−20.252***	−16.948**	−2.990	−15.161**
	(3.496)	(6.831)	(46.400)	(4.436)	(5.001)	(4.548)	(4.566)
Own*Friends'Part.*Female Child*Low Ed.	9.604*	7.868	99.133	20.882***	17.362**	2.860	15.408**
	(3.887)	(7.076)	(49.988)	(4.343)	(5.191)	(4.626)	(4.643)
Own*Friends' Part.*Female Child*Age at Marr.	0.009	−0.014	0.024	−0.005	0.005	0.000	−0.008
	(0.023)	(0.012)	(0.044)	(0.004)	(0.006)	(0.006)	(0.006)
Own*Friends' Part.*Female Child*Low Ed*Age at Marr.	−0.544*	−0.442	−5.520	−1.159***	−0.959**	−0.153	−0.852**
	(0.217)	(0.393)	(2.801)	(0.240)	(0.288)	(0.258)	(0.258)
Own Part.*Female Child*Low Ed.*Age at Marr.	0.056	0.106	2.015	0.006	−0.125	−0.152*	−0.147
	(0.282)	(0.216)	(1.165)	(0.207)	(0.258)	(0.066)	(0.144)
Friends' Part.*Female Child*Low Ed.*Age at Marr.	0.505*	0.416	5.066	1.123***	0.938**	0.162	0.839**
	(0.198)	(0.380)	(2.595)	(0.246)	(0.278)	(0.253)	(0.254)
Low Ed.*Age at Marr.*Female Child	0.003	0.036	0.269	0.055	0.034	0.014	0.065*
	(0.039)	(0.038)	(0.231)	(0.036)	(0.062)	(0.028)	(0.032)
Low Ed.*Female Child	−0.038	−0.720	−5.270	−1.082	−0.665	−0.283	−1.244
	(0.761)	(0.693)	(4.338)	(0.753)	(1.167)	(0.529)	(0.643)
Age at Marriage*Female Child	−0.006	−0.009	0.014	0.006	0.028	0.008	−0.006
	(0.015)	(0.012)	(0.056)	(0.014)	(0.045)	(0.017)	(0.013)
Female Child	0.064	0.208	−0.099	−0.054	−0.483	−0.114	0.151
	(0.305)	(0.192)	(1.043)	(0.283)	(0.807)	(0.324)	(0.255)
Child's Age	0.019	−0.004	−0.048	−0.008	−0.010	−0.013	−0.018**
	(0.032)	(0.019)	(0.037)	(0.010)	(0.007)	(0.007)	(0.007)
Constant	4.075***	1.301***	6.060***	1.038***	1.156***	1.163***	1.096***
	(0.237)	(0.142)	(0.188)	(0.068)	(0.055)	(0.050)	(0.046)
Observations	686	686	686	686	686	686	686

Mother fixed effects included in all specifications.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Standard errors clustered by village in parentheses
This sample consists of 327 boys and 330 girls under the age of 15 born to 319 mothers.

Table A7: Investments in Children: Heterogeneity Analysis

	Own Participation	Friends' Participation	Own*Friends' Participation
Woman's Age	(0.73)	(0.73)	(0.71)
Woman's Age at Marriage	(0.66)	(0.67)	(0.61)
Husband's Age	(0.73)	(0.73)	(0.71)
Woman's Years of Education	(0.72)	(0.72)	(0.71)
Less than Four Years of Education	(0.72)	(0.71)	(0.72)
Husband's Years of Education	(0.80)	(0.81)	(0.75)
Quintile of Asset Index	(0.74)	(0.74)	(0.74)
Age of Sons	(0.73)	(0.74)	(0.70)
Age of Daughters	(0.72)	(0.71)	(0.72)
Number of Sons	(0.75)	(0.77)	(0.73)
Number of Daughters	(0.74)	(0.72)	(0.78)

Village and caste fixed effects included in all specifications.

Standard errors clustered by villages.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A8: Placebo Regressions: p-values from Instrumented Regressions