Can Network Ties Help Facilitate Female Entrepreneurship?

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Abstract

We study whether peers can facilitate entrepreneurial growth for women in rural Nepal. Through an RCT, we vary if women attend a three-day training program with a randomly matched peer in the network versus alone and whether they attend an additional module in which they are encouraged to pool their network contacts. While the training significantly improves pro-business outcomes, pairing matters in the short-term only when the individual is paired with a close friend, and more so if this friend is central in the network. Making the indirect value of the network more salient only has modest positive effects. One year later, we find that while treated individuals have taken steps to open a business, those treated in pairs invest more in agriculture, with higher effects among those matched with friends with lower network centrality. We show that this can be due to motivational effects from central peers in the short term and ease of coordination with non-central peers in the longer term.

KEYWORDS: networks, entrepreneurship, RCT, peer effects.
JEL CLASSIFICATION: J16,J24,L14, L26, M53.

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1 Introduction

Peers can help individuals make beneficial and risky investments – they can provide information, insure against shocks, and increase aspirations. In particular, social networks can play an important role in boosting entrepreneurship, be it by providing financial support, and motivation, possessing complementary skills, or giving and taking advice. The gender gap in entrepreneurship in developing countries has been in part due to a lack of social networks for women. Business training programs are often prescribed to close the entrepreneurship gap, but evidence suggests that more than this might be needed (McKenzie & Woodruff 2014). In this paper, we study how leveraging social network ties in conjunction with an entrepreneurship training program can be a potential solution to improve entrepreneurship outcomes and the economic livelihood of women in rural settings.

We conduct an RCT in ~ 30 villages in rural Nepal where we first divide villages into a pure control or treatment group. In treated villages, we either pair women with members in the village (with varying social distances and network centralities) to attend a business training program, or ask them to attend the program alone or not attend it at all. Our sample is primarily employed in agriculture, but we find that 42% express a willingness to open businesses, but 28% do not think they are capable of doing so. Moreover, those who have opened up businesses also have lower risk aversion and higher aspirations. This suggests that a lack of perceived or actual capability, aspirations, and risk-taking can affect decisions to open businesses. In line with this, we provide a short three-day training program for which women would either be treated alone or treated in randomly chosen pairs. The training taught them how to do basic accounting, develop a business plan, and provided information on market access. Additionally, the training included a video on how being an entrepreneur made lives better for women in a similar context to improve aspirations.

We ask whether training women alone or in randomly formed network pairs can increase their likelihood of taking various steps to set up businesses. Moreover, we also randomise the implementation of an additional "connections module" in which we emphasize the importance of pooling network contacts to open businesses. In particular, paired trainees are asked to pool their network contacts and think of ways these contacts can help each other. This allows us to compare the direct value of a peer in terms of being trained with them with the indirect value of being able to access their network contacts. The key experimental variation we focus on is whether women attend the training alone versus paired randomly with a person chosen from their social network and whether or not they attended the connections module.

Our paper focuses on measuring the potential impact that network-sourced pairs have on improving entrepreneurship outcomes and increasing aspirations. Moreover, we leverage the

random variation in the identity of the peer to study if the treatment effect differs as a function of the network position of the peer in the short and long term. It has been shown that using documentaries of success stories from similar backgrounds helps increase aspirations (Bernard et al. 2014). In terms of business trainings, Field et al. (2016) shows that training in the presence of a friend helps improve business outcomes. In our paper, we disentangle this peer effect by randomly varying the network position of the peer and using social distance (i.e., how socially close the peer is) and centrality (i.e., how connected the peer is) as two explanatory factors. We hypothesize that support between pairs decreases with social distance (Goeree et al. 2010). The effect of centrality is more nuanced, where connecting to central people may provide access to a wider social network, improve aspirations, and help improve risk-sharing outcomes. At the same time, central people might not be incentivized to support individuals who are not friends and it may be difficult to collaborate with them.

We measure various immediate and long-term outcomes (after one year) to test the effect of the treatments. We measure the immediate outcomes at the end of the three training days. This includes the effect on aspirations (along various dimensions), readiness to invest in a business, steps to open a business such as willingness to take a loan or open a savings account, and take-up of additional mentoring and assistance. First, we find that across the board, training significantly improves outcomes. Second, we find that while the connections module has a higher treatment effect in terms of magnitude for most outcomes, the additional impact is only sometimes significant. This is even though women in this treatment arm pool about 6 contacts on average. This suggests that peers mainly have direct value in terms of immediate effects. Third, we find that being paired did not significantly improve outcomes on average, when compared to being trained alone, except for certain pair types depending on their network position. Interestingly, pairing is always beneficial when the matched person is a friend.[1] Moreover, when we interact this with the "centrality" of the peer i.e. how connected they are in the network, we find that pairing matters only when individuals are paired with a close friend who is central. Individuals paired with a central friend report a significantly higher willingness to open a business and are more likely to take up additional resources to help with setting up a business relative to those trained alone. This finding can help bridge the gap between training and take up of entrepreneurship by using a community-based approach. This is also largely in line with the literature on networks where central individuals exert greater influence over others. Finally, we find that those trained in a pair were significantly more likely to report wanting to open an agro-business relative to other businesses when compared to those trained alone.

One year later, we find that only 3% of our sample has opened up a new business and the

[1]We define a friend as a person who has a network distance less than or equal to 2 i.e. strictly lower than the median social distance equal to 3.

effects of the training are small and indistinguishable across treatment arms. However, we detect significant effects of the training in terms of steps taken to open a business: those who were trained are significantly more likely to have saved more, opened up a new savings account, and taken a loan when compared to those in pure control villages. Those who were trained with a peer have significantly higher monthly income (at 10%) level when compared to the pure control group. However, we find that this is driven by them having invested more and earned more from agriculture-related activities as opposed to non-agricultural businesses. For example, those trained with a peer have significantly higher agricultural investments than the pure control group and significantly higher agricultural profits when compared to those trained alone. We find that these results are driven by those paired with a friend during the training and those paired with someone who was less central. This suggests that while being paired with a central person might play a motivational role in the immediate term, being paired with a less central person can increase the chances of collaboration. Consistent with this, we find that the treatment groups are significantly more likely to report having spoken about opening businesses with others in the last year but among those who spoke to their matched peer, those paired with more central individuals were less likely to talk about borrowing money or opening a business and more likely to take advice around other matters.

The observed benefit from training with a peer can arise due to multiple mechanisms that differ in the short and longer term. First, we show that the effects of being matched with a central friend, compared to being treated alone, are larger than other pair categories for most outcomes and significant for take-up of additional assistance, even after controlling for the similarity between the peers along other dimensions such as age, caste, education, marital status, and income. We find that the effect of pairing with a specific type of peer is primarily due to motivation in the short run and the ability to collaborate in the long run. We provide evidence that suggests that pairing might provide motivation and boost morale in the short term. In line with this, we find that the majority of paired participants revealed that motivation was the reason why they thought pairing was beneficial. We also find that pairing significantly increases measures of reported self-efficacy relative to the control group (at 10%) while being treated alone does not. Moreover, the endline treatment effects are significantly higher for those matched with someone with a high in-degree (i.e. who are listed as friends by several others) as opposed to those who have a high outdegree (i.e. who list several others as their friends). This highlights the potential inspirational role played by a popular individual. Those matched with a more central person are also 8% more likely (significant at 5%) to say that pairing mattered because of encouragement, compared to those matched with less central person. However, in the long run, we find that those who were paired with a less central friend benefit as they are more likely to talk to each other about economic matters and earn higher agricultural profits. 38% of those trained in a pair reported reaching out to each other for advice, borrowing-lending money, and discussing

ideas about forming a business but talking about borrowing and/or businesses is significantly more likely if the other individual is less central in the network than the respondent. This highlights the differential role played by centrality in the short and long run.

We contrast this with other potential mechanisms through which pairs can help each other by leveraging social ties to garner access to a wider social network, improving learning from the training measured during or after the training, and using social ties to share risk. First, Treatment 3 was specifically designed to test the impact of pooling network contacts and we find small effects of this treatment. Second, we find that pairs did not necessarily learn better together. To this effect, we find that knowledge during and after the training is similar between treated and control groups, irrespective of whether women were paired or not. In line with this, we also do not see any impact on performance (i.e., profits) in a business game conducted during the training. Third, we show that the treated groups were not likely to have joined new cooperatives or increased the number of savings groups that they were already a part of. Treatment effects are also not differential by the level of risk-aversion of the peer indicating that neither did pairing lead to an increase in network-based measures of saving nor did it help to be matched with.

Our paper contributes to experimental literature on peer effects on learning and the impact of business training programs. Peer effects are important in various settings, from adopting new technology (Beaman et al. 2021) to learning about financial products (Banerjee et al. 2013, Jack & Suri 2014) and classroom interactions (Duflo et al. 2011, Zárate 2023). For example, Duflo et al. (2011) shows how ability-based peer effects exist, while Zárate (2023) shows that more socially central peers help better with academic performance. Similar to the latter, we show the importance of central and proximate peers for women's entrepreneurship in developing countries. With a novel design, we aim to tease apart why peer effects can improve the willingness to open a business. In the entrepreneurship literature, Lerner & Malmendier (2013) find that peer type matters in MBA classes. Being exposed to peers with prior business experience reduces unsuccessful entrepreneurial attempts. In our paper, we classify peer types depending on their network position: social distance and centrality and comment on this channel by showing if peers can provide skills or motivation to increase the number of entrepreneurial attempts and their success. This also allows us to distinguish between the effects of "bonding" and "bridging" social capital discussed in existing literature (Putnam 2000) in the context of female social networks and entrepreneurship.

There is significant heterogeneity in existing literature regarding the effect of business training programs (McKenzie & Woodruff 2014, McKenzie et al. 2021). Particularly looking at training with peer interactions, Cai & Szeidl (2017) illustrate the significant effects of being paired with higher-quality peers on firms' sales and profits. They highlight how indirect peer effects through access to larger networks benefited the treated individuals. In our paper, we

can measure the direct effect of being paired with a peer given that we mapped the underlying village network and comment on the indirect effect explicitly including a treatment arm to do so. Field et al. (2016) establish how training with a friend as a partner improves business outcomes. We explore if this effect is limited to friends by randomly varying social distance and the peer's centrality and commenting on the mechanisms through which peers could have positive effects. We find that the impact is limited to being paired with friends, particularly central ones. This finding suggests that social networks play an essential role in the decision to be an entrepreneur. Moreover, we find modest effects of training that emphasize the importance and potential of social ties in sharing risk and providing skills, thereby allowing us to contrast between the direct and indirect value of peers that existing work has not done. Stronger replications of this treatment arm that strengthen community ties can be a first step towards bridging the gender gap.

The rest of the paper is organized as follows. Section 2 describes the experiment and the data, followed by Section 3, which looks at the estimation strategy. Section 4 presents the results and Section 5 presents the mechanisms. Section 6 concludes.

2 Data and Experimental Design

We conduct our surveys and experiments in 30 villages in rural Nepal including a baseline sample with about 2800 women, the RCT and endline survey with 1200 women, and a follow-up survey with about 750 women.

2.1 Baseline Networks and Demographics

We conducted a detailed baseline survey with about 2800 women across all villages in our sample. We collected data on demographic characteristics such as age, caste, education, aspirations, wealth, source of income and marital status. Data on aspirations were collected in line with the procedure outlined in Bernard & Seyoum Taffesse (2014). We measured aspirations around agricultural investments, non-agricultural investments, and income. Finally, we also collected a list of women whom the individual reports being inspired from.

On average, a village comprised 70 households, with an average of 100 women per village. We used a village census to administer the network survey to every woman in the village ending up with a sample of $\sim$ 2800 women aged 18-60 years.

In addition to this, we require detailed network data to ensure experimental variation in the

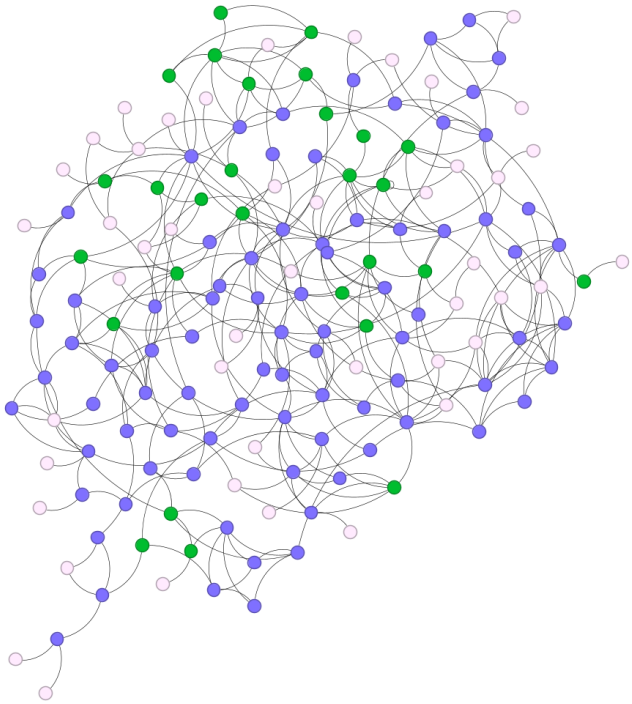


Figure 1: Graph of the social network in an example village. Women with and without an existing business are colored in green and blue respectively.

nature of pairs in the training. The networks questionnaire included questions designed to elicit information about social networks, inspired by Banerjee et al. (2013). These questions are meant to collect data on whom individuals report being friends with. The average number of connections in the undirected friendship network is ~ 5 links.

2.2 Baseline Findings

Baseline summary statistics are presented in Table B.1. The average age of women in our sample is 31 and 92% of them are married. Around 46% of our sample has no education. In the village network, we see that on an average women have five friends.

On average, women are seen to be risk averse with a risk-aversion level of around 4.6 where 6 stands for very risk averse and 1 stands for risk loving. Risk preferences were elicited using a choice experiment involving a series of lotteries and a fixed payment. We find that roughly 22% of women report having opened businesses already but 42% report a willingness to do so. 84% aspire to earn an income higher than their current income while 23% aspire to spend more on non-agricultural business expenditures than their current investment.

2.2.1 What are the barriers that prevent women from opening up businesses?

We find that women with a business have on average 20% higher income than the ones with no business. We correlate whether or not they have opened businesses already with their baseline characteristics. These results are shown in Table B.2. One of the main characteristics determining business ownership is age. Younger women are more likely to report having a business. Similarly, women who are more educated are more likely to have a business ownership – those with higher education are more likely to and those with no education are less likely. This is in line with what we would expect. Women who already have a business are also less risk averse. Naturally, they also have higher aspirations for investment in non-agricultural business.

When those who haven't opened up businesses were asked about why they haven't done so already, we find that 28% say that they feel they are not capable and 23% say that they lack the financial ability. We correlate willingness to open businesses with baseline demographics, networks, aspiration, and other variables such as risk aversion. These results are shown in Table B.3 and highlight how peers can help along various dimensions. We find that those who are more risk averse are correlated with not being willing to open businesses suggesting that risk-sharing with peers might assist in opening up businesses. Moreover, those who are more educated are correlated with being more likely to open businesses suggesting that skill complementarities with peers might be helpful as well. Finally, those who have higher aspirations are more willing to open businesses suggesting that peers can potentially be used to motivate and boost aspirations that can then be channelled into opening businesses.

2.3 Experimental Design

We conducted our experiment in September 2022 which consisted of a three-day entrepreneurship training motivated by the ILO SYIB module. The training typically lasted 3 hours per day and individuals were given 100 Rs/day (1 euro) for participation. The training focused on building a business plan, setting savings goals, increasing aspirations and market access.

Figure 2 represents our two-step randomisation design. First, we allocated villages to Pure Control and Treatment. Those in treatment villages were then randomly allocated either to the control group or one of the three treatment arms across all villages at an individual level.

From the universe of all women in the village, we exclude the ones that already have a non-agricultural business. The others get randomly allocated into one of the four groups.

- T0: No Training: This group of women do not receive training but live in Treatment

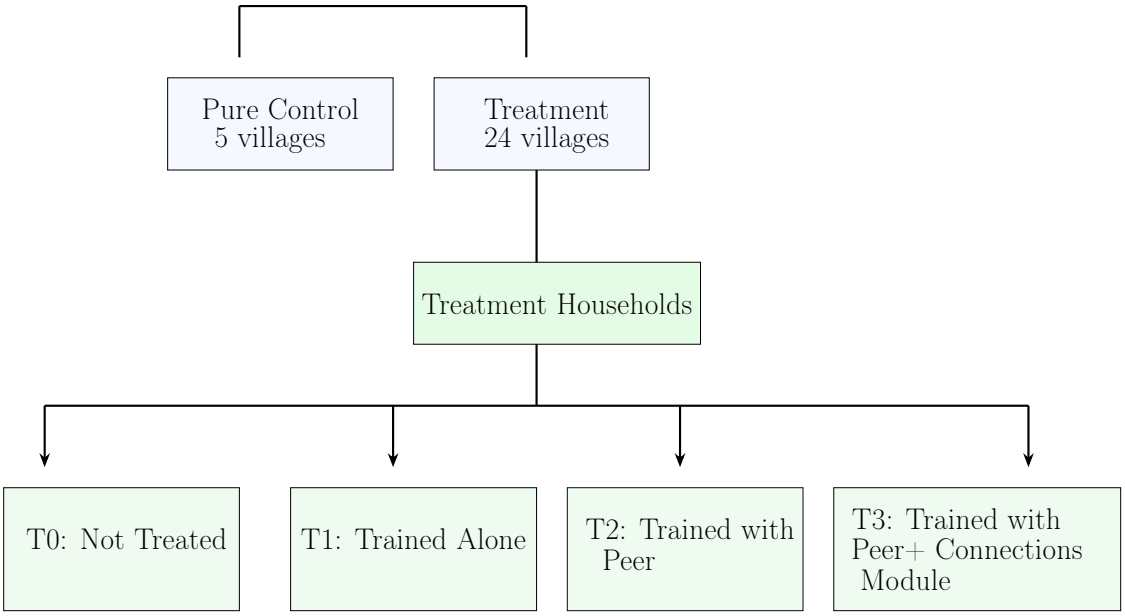


Figure 2: Experiment Design

villages. They can be thought of as groups to study potential spillovers with.

- T1: Women attend the training and set savings goals alone.
- T2: Women attend the training with a pair and set savings goals together. The pair vary in centrality and distance from each other.
- T3: Women attend the training with a pair and set savings goals together. In addition, the pair are provided with a 30-minute connection module that highlights the importance of networks and sharing contacts for entrepreneurship. The pair vary in centrality and distance from each other.

The Treatment with the connection module (T3) is identical to T2 except for the connection module. The connection module presents the participants with a list of reasons why relying on social networks is important to starting a business and asked them to pool their network contacts. We highlight three main reasons: i) Information ii) Complementarity in skills and iii) Risk pooling. The pairs in addition list their contacts that could potentially help them in opening up a business together. In addition to the direct value of being paired with a friend, T3 explores the indirect value by encouraging pairs to share contacts of people in their network they could rely on for opening a business. In addition to the 2-hour training, the connection module lasted for 30 minutes where we highlighted the indirect value of connections: financial support, advice and risk sharing.

Finally, we randomise individuals into T2 and T3 by stratifying along social distance and differences in centrality. This is to ensure that we were powered to detect heterogeneous effects by these characteristics and to ensure that T2 and T3 are balanced along these lines.

3 Estimation Strategy

We measure the impact of the training using various specifications that help us understand if the training is helpful in general, if it has higher returns for those who were paired, if it has higher returns for those who attended the connections module, and if it works for pairs with specific network and demographic characteristics.

3.1 Endline Outcomes

We will look at the effect of the treatment on four major endline outcomes meausured immediately after the training. This includes the Business Aspirations Index, Business Index, Take up Index, and Readiness to Invest. We measure these outcomes with our end-line survey. In each case, we construct a weighted average using the inverse-weighting method proposed in Anderson (2008). We create the following measures:

1. **Business Aspirations Index:** We compute a measure of business related aspirations including yearly non-agricultural investment, aspirations for monthly income, and savings. We elicit aspirations by following the procedure in Bernard & Seyoum Taffesse (2014). We ask individuals the minimum and maximum of the relevant variables in their neighbourhood, how much they currently do, and how much they wish to do in the corresponding time frame. We construct the weighted average of the individual's aspirations on all of these dimensions to create the index.

2. **Business Index:** For the business index, we construct a weighted average of various variables including whether the individual thinks they have the skills to open a business, on a scale of 1 to 5 how ready they are to start a business, if they are willing to submit their business plan for a hypothetical competition, whether they want to take a loan for the business, and whether they want to open a savings account for their business. These questions were framed as hypothetical questions.

3. **Takeup Index:** The takeup index is constructed by taking a weighted average of variables that indicate that the individual seeks additional assistance to set up a business. We ask the following questions related to the hypothetical takeup of options. We ask

if individuals would take up the opportunity of additional paid trainers and mentoring workshops in the next year. If so, we ask how much they would be willing to pay for each of those opportunities. We also ask if they were willing to take advice from members of their community regarding opening a business. All these variables are used to construct the take-up index.

4. **Readiness to Invest:** In addition to the above indices, we also measure the impact of the treatment on the the binary variable indicating whether the respondent reported that they were willing to invest in a business and if so, the kind of business that they would like to start.

3.2 Follow-up Outcomes

We also measure outcomes for a random subsample of ~ 750 individuals whom we survey one year after the training. These outcomes include whether or not the individual has opened a business, their monthly income, agricultural investments, agricultural profits, whether they have opened a new savings account, the amount of money they save, and whether they have taken a loan. In addition to these main economic outcomes, we also measure other outcomes including income aspirations, whether individuals sign up for a potential commitment savings account for their business from where they cannot take out funds unless they use it for business-purposes, record-keeping for agriculture, and other outcomes regarding community interactions around advice-taking and collaborations.

3.3 Empirical Specifications

We outline the various empirical specifications below.

3.3.1 Impact of Training

In the main specification where we study the impact of the treatments, our outcome variables are regressed on the treatment dummies using the specification described below:

$$Y_i = \alpha + \beta_1 T1_i + \beta_2 T2_i + \beta_3 T3_i + \epsilon_i$$

Y_i is an outcome measure for individual i, $T1_i$ is a dummy variable that takes value 1 if the individual was treated alone and 0 otherwise. Similarly, $T2_i$ is a dummy variable that

takes value 1 if the individual was treated with a pair and $T3_i$ is a dummy variable that takes value 1 if the individual was treated with a pair and an additional connection module that emphasizes the importance of networks. Importantly, in all specifications that follow, we compare the treatment groups with individuals in the pure control group for the main specification.Standard errors are clustered at the level of the village.

3.3.2 Impact of Training with Peer

In this specification, we club treatment 2 and 3 together and create an indicator variable that is equal to 1 for all women who are treated in a pair. We regress outcome variables on the treatment dummies using the specification described below:

$$Y_i = \alpha + \beta_1 T1_i + \beta_2 (T2_i + T3_i) + \epsilon_i$$

Y_i is an outcome measure for individual i, $T1_i$ is a dummy variable that takes value 1 if the individual was treated alone, $T2_i$+ $T3_i$ is a dummy variable that takes value 1 if the individual was treated with a pair. Standard errors are clustered at the level of the village.

3.3.3 Impact of peer types

We consider differences in outcomes for different pairs in treatments 2 and 3 compared to treatment 1. Let d_{ij} be the network distance between i and j and let ϕ_i be the network centrality (eg: number of connections) of agent i. First, we combine $T2$ and $T3$ and split individuals into friends and non-friends. We defined friends as pairs with social distance equal to 1 or 2 (d_{ij}=$\{1,2\}$). Then, we estimate the following regression:

$$Y_{iv} = \alpha + \beta_1 Friend + \beta_2 NonFriend$$

We exclude the control group in the above specification so that we can compare the effect of being trained with a friend or non-friend to being trained alone.

Then, in another specification, we classify peer type into four categories: Friend X Central, Friend X Noncentral, Non Friend X Central and Non Friend X Non Central. For any pair ij, i is assigned to the category friend-central if their matched "friend" j has weakly higher degree centrality compared to i, i.e ϕ_i- $\phi_j \leq 0$ 0 and i and j have a network distance less than or equal to 2.

$$Y_{iv} = \alpha + \beta_1 FriendXCentral + \beta_2 FriendXNonCentral + \beta_3 NonFriendXCentral + \beta_4 NonFriendXNonCentral + \epsilon_v$$

As before, we exclude the control group and compare the effect of being trained with a specific pair type to being trained alone. Note that this regression specification nests both the effects of centrality and distance.

4 Results

4.1 Balance

Before proceeding with the results, we first check for balance in baseline characteristics among the control and treatment groups. We check for balance on baseline variables including demographic, network, and business characteristics such as income, sources of income, age, education, caste, network connections (i.e. degree centrality), and aspirations. First, we compare individuals in the pure control villages with treated individuals in treatment villages. We do this separately for each treatment status in Table C.2. We find that individuals in the pure control group and various treatment groups are similar along most characteristics. However, in order to ensure that our results are robust, we will present a robust version of all the above specifications where we use post double selection Lasso using the method in Belloni et al. (2014).

Next, we check for balance between all individuals in pure control and treated villages. This is going to be critical, especially for the results of the 1 year follow-up survey where we will separately compare the pure control group with the various treatment groups. Table C.1 shows that individuals in pure control and treatment villages are similar across almost all characteristics. Table C.1 shows that individuals in pure control and treatment villages are similar across almost all characteristics suggesting that imbalance is not a concern.

4.2 Endline Results

In this section, we look at the impact of the training immediately after the end of the third day of training. As seen from Table 1, the treatments do not affect business aspirations but Treatment 3 significantly increases an individual's stated readiness to invest in a business

by 14 percentage points. The effect is insignificant for T1 and significantly lower than the effect of T3 (at 10%).

The treatments also lead to a significant increase in the business index and take-up index. Note that the differences between Treatment 1,2, and 3 are not statistically significant for almost all outcomes implying (a) that pairing, on average, does not lead to a higher treatment effect, and (b) the connection module while leading to a treatment effect of higher magnitude in most cases, does not have a significant additional impact. This is despite the fact that individuals in T3 group shared 6 contacts on average. As shown in Table E.5 in the appendix, more connections were pooled among individuals in the same caste.

Table 1: Impact of the training

	(1)	(2)	(3)	(4)
VARIABLES	Business Aspirations	Ready to invest	Business Index	Take-up Index
Treatment 1	-0.0454	0.0680	0.387***	0.240***
	(0.0641)	(0.0474)	(0.0989)	(0.0835)
Treatment 2	-0.0483	0.0940*	0.344***	0.307***
	(0.0582)	(0.0467)	(0.112)	(0.0900)
Treatment 3	0.0236	0.141***	0.443***	0.253***
	(0.0726)	(0.0392)	(0.0867)	(0.0763)
Constant	-0.0768*	0.704***	-0.153*	-0.113*
	(0.0433)	(0.0283)	(0.0792)	(0.0622)
Observations	1,201	1,199	1,186	1,183
R-squared	0.001	0.016	0.036	0.028
Treatment 1==2	0.968	0.635	0.706	0.415
Treatment 2==3	0.288	0.432	0.379	0.534
Treatment 1==3	0.434	0.0910	0.455	0.829

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the control group as the base category. Standard errors are robust and clustered at the village level.

4.2.1 Training with a peer is marginally better

As seen above, we find that on average, being paired does not necessarily help improve the outcomes of the training. Table 2 shows that this is true even when we combine Treatment 2 and 3 into one indicator variable that is equal to 1 if the individual is in either arm. We find that pairing does not lead to significant additional improvement in endline outcomes when compared to Treatment 1, even though the effect is always larger in magnitude than that of not being paired. For example, being paired leads to a 12 percentage point increase (significant at 1%) in readiness to invest compared to a 7 percentage point increase (insignificant)

for being treated alone. However, this difference is not statistically significant.

Table 2: Does being paired help have better outcomes?

VARIABLES	(1) Business Aspirations	(2) Ready to invest	(3) Business Index	(4) Take-up Index
Treatment 1	-0.0454	0.0680	0.387***	0.240***
	(0.0641)	(0.0474)	(0.0989)	(0.0835)
Treatment 2 and 3	-0.0132	0.117***	0.392***	0.280***
	(0.0564)	(0.0314)	(0.0837)	(0.0718)
Constant	-0.0768*	0.704***	-0.153*	-0.113*
	(0.0433)	(0.0283)	(0.0791)	(0.0621)
Observations	1,201	1,199	1,186	1,183
R-squared	0.000	0.015	0.035	0.027
Treatment 1==Pair	0.660	0.212	0.949	0.478

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the control group as the base category. Standard errors are robust and clustered at the village level.

Table 3 shows the types of businesses individuals would want to open after being trained, conditional on being ready to invest. We find that those who are paired together during the training are more likely to want to open an agricultural business together when compared to the control group.

Table 3: Types of Businesses that individuals are willing to open

VARIABLES	(1) Agricultural Business	(2) Sewing	(3) Shop/Parlor	(4) Other Business
Treatment 1	0.0368	0.0370	-0.0923*	0.0184
	(0.0470)	(0.0341)	(0.0494)	(0.0173)
Treatment 2 and 3	0.116**	-0.0269	-0.0956*	0.00681
	(0.0436)	(0.0243)	(0.0471)	(0.0119)
Constant	0.513***	0.116***	0.346***	0.0239**
	(0.0335)	(0.0175)	(0.0401)	(0.00961)
Observations	915	915	915	915
R-squared	0.011	0.006	0.010	0.002

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the control group as the base category. Business type is equal to 1 if the individual reports wanting to open such a business and reports being ready to invest. Standard errors are robust and clustered at the village level.

4.2.2 Being trained with someone who is socially close is better

We now use the randomness in the identity of the matched peer in order to understand the conditions under which pairing can be helpful. We first distinguish between being paired with someone who is a friend.[2]

Table 4: Being paired with someone close in comparison to control

VARIABLES	(1) Business Aspirations	(2) Ready to invest	(3) Business Index	(4) Take-up Index
Treatment 1	-0.0601	0.0589	0.362***	0.219***
	(0.0624)	(0.0467)	(0.0921)	(0.0754)
Paired (Friend)	-0.0695	0.144***	0.428***	0.254***
	(0.0608)	(0.0337)	(0.0891)	(0.0751)
Paired (Not Friend)	-0.0301	0.0811**	0.326***	0.258***
	(0.0644)	(0.0384)	(0.0911)	(0.0663)
Constant	-0.0620	0.713***	-0.128*	-0.0913
	(0.0427)	(0.0268)	(0.0713)	(0.0563)
Observations	1,201	1,199	1,186	1,183
R-squared	0.001	0.015	0.033	0.023
Treatment 1== Paired with friend	0.905	0.0882	0.445	0.615
Treatment 1==Paired with nonfriend	0.713	0.579	0.707	0.517
Paired with friend==Paired with nonfriend	0.558	0.109	0.227	0.915

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the control group as the base category. Treated with a friend implies observations in Treatment 2 and Treatment 3 that are paired with someone with a social distance less than equal to two. Standard errors are robust and clustered at the village level.

As seen from the table above, being paired with a socially close individual is larger in magnitude than being paired with a non-friend for two crucial outcomes: readiness to invest and the business index. However, we are not powered to show that these differences are statistically significant. However, the difference between being paired with a socially close peer and being trained alone is significant for readiness to invest. On the contrary, the effect of being paired with an individual who is not socially close is not significantly different from being trained alone for any of the outcomes. In the robustness section, we run the same regression but use the characteristics of peers to classify pairs. We see that the effect of friendship is not driven by caste, education, wealth or age. This is important given the assortative nature of networks.

[2]We define an individual as a friend (or as socially close) if the network distance between them is strictly less than the median distance, equal to 3.

4.2.3 Being trained with a socially close and central person helps.

We further investigate who benefits from the intervention by considering the centrality of the individual, a person is matched with. As discussed before, this implies a two by two categorisation by social distance and centrality i.e. Socially close peers that are more central than the individual, socially close peers that are less central, non-close individuals that are more central and non-close individuals that are less central. We see that the training is more successful when individuals are paired with socially close individuals who are central in the social network. This is seen in Table 5 where we compare the pairs with Treatment 1 instead of the control group. "Friend X More Central" is an indicator variable that takes the value 1 if the pair is socially close and more central than i whereas "Friend X Less Central" is an indicator variable that takes the value 1 if the pair is socially close and less central than i.

Table 5: Impact of training with different friend type

	(1)	(2)	(3)	(4)
VARIABLES	Business Aspirations	Ready to invest	Business Index	Take-up Index
Friend x More Central	-0.00151	0.114*	0.153	0.119*
	(0.109)	(0.0653)	(0.156)	(0.0651)
Friend x Less Central	-0.0109	0.0506	-0.0583	-0.0140
	(0.0683)	(0.0467)	(0.0850)	(0.0729)
Not Friend x More Central	-0.0173	0.0159	0.0117	0.0665
	(0.0843)	(0.0570)	(0.154)	(0.0696)
Not Friend x Not Central	0.0519	0.0250	-0.0724	0.0372
	(0.102)	(0.0360)	(0.0878)	(0.0741)
Constant	-0.0606	0.741***	0.0580	0.107
	(0.0999)	(0.0612)	(0.128)	(0.0845)
Observations	681	682	671	670
R-squared	0.002	0.009	0.011	0.005
friendnoncentral==friendcentral	0.904	0.258	0.222	0.0514
friendnoncentral==nonfriendnoncentral	0.402	0.494	0.870	0.456
friendnoncentral==nonfriendnoncentral	0.940	0.518	0.645	0.199
central==noncentral	0.699	0.495	0.214	0.115
friend==nonfriend	0.727	0.132	0.401	0.980

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats Treatment 1 as the base category. Friend includes pairs that have social distance less than or equal to two and nonfriend includes pairs with social distance greater than two. Friend x More Central equals 1 when the individual the respondent is matched with is a friend and more central than the respondent. Standard errors are robust and clustered at the village level.

The effect of having a friend who is central in the pair positively affects readiness to invest, and take-up index when compared to Treatment 1– the difference is significant at 10%.

4.2.4 Robustness:

First, as shown in Table F.1 and F.2 the main results (studying the impact of the various treatment arms on endline outcomes) are largely robust to accounting for imbalance in baseline characteristics using the post double selection Lasso method in Belloni et al. (2014). $T2$ does not have an effect on readiness to invest anymore but the remaining effects are significant as in the main specification. Further, as shown in Table F.3 we find that the effect of being matched with a peer who is close and more central is still significantly higher for readiness to invest when we account for any imbalance in baseline characteristics using the post double selection Lasso method in Belloni et al. (2014).

4.2.5 Alternative explanations for the friend-central effect

Before proceeding with the longer term results, we also look at various characteristics beyond centrality to understand if there is any confounder that may be driving the effect of being paired with a central friend in the endline. This is to understand whether the effect of the network position of the peer persists even after controlling for baseline characteristics.

First, we construct a similarity index to assess if the similarity between the peers along various characteristics leads to stronger treatment effects in the endline. An individual in T2 or T3 is more similar to their peer if they are in the same income group, age group, caste, marital status, or education. We construct an index of these variables.[3] Table 6 shows these results where we compare T1 to various pair types and additionally control for similarity which is normalised to be between 0 and 1.[4] We find that the effect of being matched with a peer who is central on readiness to invest, business index, and take-up is still higher in magnitude than all other categories and is still significant for the take-up index.

[3] As before, we use the method proposed in Anderson (2008) to construct the index.
[4] This implies that similarity is equal to 1 for the most similar pairs in the sample.

Table 6: Effect of being matched with a Central Friend after controlling for Similarity

VARIABLES	(1) Business Aspirations	(2) Ready to invest	(3) Business Index	(4) Take-up Index
Friend x More Central	-0.00558	0.141	0.324*	0.193**
	(0.115)	(0.101)	(0.188)	(0.0833)
Friend x Less Central	-0.0148	0.0758	0.104	0.0556
	(0.0989)	(0.0811)	(0.135)	(0.0931)
Not Friend x More Central	-0.0215	0.0432	0.187	0.142
	(0.0988)	(0.0788)	(0.151)	(0.0853)
Not Friend x Not Central	0.0477	0.0521	0.102	0.112
	(0.141)	(0.0678)	(0.123)	(0.0891)
Similarity Index	0.00741	-0.0484	-0.311	-0.133
	(0.120)	(0.116)	(0.264)	(0.124)
Constant	-0.0606	0.741***	0.0582	0.107
	(0.1000)	(0.0611)	(0.127)	(0.0843)
Observations	681	682	671	670
R-squared	0.002	0.010	0.014	0.006
friendnoncentral==friendcentral	0.904	0.254	0.208	0.0435
friendnoncentral==nonfriendnoncentral	0.416	0.505	0.573	0.165
friendnoncentral==nonfriendnoncentral	0.935	0.530	0.980	0.412
central==noncentral	0.694	0.485	0.199	0.106
friend==nonfriend	0.733	0.122	0.422	0.944

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats Treatment 1 as the base category. We additionally control for the "Similarity Index" which is a weighted index of similarity along characteristics including income, age, caste, marital status, and education and also control for degree-centrality of the individual.

Next, we show in Table E.2 that the effect magnitude of being matched with a central friend is higher than Treatment 1 (and significantly so for readiness to invest and the business index), especially if the matched peer is not in the upper caste, is unmarried, is older, and has lower income. In other words, the centrality of the peer improves outcomes relative to attending training alone if the peer is not privileged to open businesses along with other characteristics. Importantly, this shows that the network characteristics of the peer matter even after controlling for other potential confounders.

4.3 Long Term Effects after 1 year of Training

In the section above, we presented results based on immediate outcomes. In this section, we will be looking at outcomes based on a phone survey conducted in October 2023 i.e. one year after the training, with a random subset of the original sample comprising of $\sim$ 750 individuals. We will compare the treatment group with those in the pure control villages

while including a binary variable controlling for those in the spillover group i.e. control individuals in treated villages, as spillovers are likely to be active over this long time frame. To ensure that the pure control villages are not systematically different from the treated villages, we show a balance test in Table C.1 where we find that almost all characteristics are balanced between individuals in these villages. Moreover, we show in Table C.3 that the different treatment groups are balanced in this follow-up sample along various baseline characteristics. As before, we will also show that results are robust to inclusion of Lasso selected controls in accordance with the procedure outlined in Belloni et al. (2014).

We find that about 3% of individuals opened up businesses after one year of training. As shown in Table 7, we find that those who were treated alone or in pairs were not any more likely to have opened up businesses when compared to those in pure control villages. However, this effect is significantly larger than the effect on the spillover group. We detect negative spillovers in this group in terms of whether they have opened businesses.

Table 7: Long-term effect on Business and Agriculture Outcomes.

	(1)	(2)	(3)	(4)
VARIABLES	Opened New Business	Agriculture Profits	Investment in New Business	Investment in Agriculture
Spillover	-0.0395**	-5,397	-2,034*	5,527
	(0.0158)	(18,708)	(1,005)	(13,562)
Treated alone (T1)	0.00591	8,815	1,093	21,594
	(0.0212)	(17,347)	(1,495)	(17,357)
Treated with a pair	-0.00955	26,669	99.44	28,855**
	(0.0185)	(17,452)	(1,232)	(14,083)
Constant	0.0395**	102,770***	2,034*	98,576***
	(0.0158)	(13,463)	(1,005)	(8,965)
Observations	750	734	750	589
R-squared	0.007	0.008	0.005	0.007
Spillover=T1	0.0126	0.204	0.0487	0.409
Paired=Nonpaired	0.407	0.0773	0.530	0.680
Spillover=Paired	0.00923	0.0203	0.0212	0.0970

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats individuals in the pure control villages as the base category. Standard errors are robust and clustered at the village level.

At the same time, we find that those who were treated in a pair have significantly higher agricultural profits than those who were treated alone. Moreover, these individuals also have significantly higher agricultural investments when compared to the pure control group. Moreover, Table 8 shows that this translates into significantly higher monthly income for those who were treated in pairs, although the result is only significant at 10% and is not statistically distinguishable from the effect of being treated alone. Treatment also increases the savings amount, whether or not they have taken a loan, and their willingness to take up a commitment savings account where the saved money can only be withdrawn for business

purposes. These effects do not differ by whether the individual was trained alone or in a pair. However, those trained alone are significantly more likely to have opened a new savings account when compared both with the control group and those who were treated in a pair.

Table 8: Long-term effect on Economic Outcomes.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Monthly Income (Winsorised)	Savings (Winsorised)	New Savings Account	Taken a loan	Commitment Savings
Spillover	801.8	2,661*	0.0471	0.0502	0.0327
	(2,485)	(1,370)	(0.0426)	(0.0424)	(0.0620)
Treated alone (T1)	2,975	4,015***	0.107***	0.0874**	0.0633
	(2,561)	(1,280)	(0.0376)	(0.0381)	(0.0677)
Treated with a pair	4,436*	2,765*	0.0267	0.0759**	0.127**
	(2,372)	(1,373)	(0.0340)	(0.0322)	(0.0561)
Constant	22,921***	3,401***	0.197***	0.0674***	0.446***
	(1,837)	(825.5)	(0.0277)	(0.0186)	(0.0490)
Observations	749	744	752	752	751
R-squared	0.006	0.015	0.008	0.010	0.011
Spillover=T1	0.352	0.341	0.151	0.417	0.607
Paired=Nonpaired	0.344	0.400	0.0698	0.752	0.200
Spillover=Paired	0.109	0.937	0.658	0.496	0.0681

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats individuals in the pure control villages as the base category. Standard errors are robust and clustered at the village level. Income and Savings are winsorised to exclude outliers below the 5th percentile and above the 95th percentile.

In order to explore the observed increase in monthly income, agricultural profits, and investments for those treated in a pair, we combine treatment arms 2 and 3 as before and split them into two categories– whether they were matched to a friend or to a non-friend.Then, we compare the treatment effects for those two categories with the treatment effects for those who were trained alone. Tables 9 and 10 show the results. Similarly, we split the paired treatment arms into two categories– paired with a more central friend or a friend with the same or lower centrality (in terms of number of connections, as before). These results are reported in Tables 11 and 12.

Table 9: Long-term effect on Business and Agriculture Outcomes by Friendship Status

VARIABLES	(1) Opened New Business	(2) Agriculture Profits	(3) Investment in New Business	(4) Investment in Agriculture
Paired (Friend)	-0.00619	36,939**	-887.2	-464.6
	(0.0218)	(16,325)	(1,775)	(23,729)
Paired (Not Friend)	-0.0151	8,517	-678.0	6,733
	(0.0182)	(11,068)	(1,570)	(21,489)
Constant	0.0693***	69,090***	5,506***	84,854***
	(0.0190)	(21,500)	(1,817)	(17,984)
Observations	448	440	448	331
R-squared	0.005	0.026	0.007	0.012
Paired with friend==Paired with nonfriend	0.641	0.217	0.895	0.764

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats individuals who were treated alone as the base category. Standard errors are robust and clustered at the village level.

We find that agricultural profits are significantly higher for those who were paired with a friend compared to those who were treated alone. The treatment effect on those trained with a friend is equal to $\sim 34\%$ of the mean agricultural profits of those treated alone. While monthly income is higher in magnitude among those who were paired with a friend compared to those treated alone, we are not powered to detect differences. However, we find that those treated with a friend have significantly higher monthly income than those treated with someone who is not a friend. Unlike the immediate results in the endline survey, we find that being paired with a more central person is not helpful. In fact, we find that those who are treated with a less central person have significantly higher agricultural profits and they are significantly less likely to open a new business compared to those treated alone. This suggests that being matched with a more central individual may not be as beneficial in the long run but being matched with a friend is beneficial both in the short and long run. Moreover, these benefits of training do not translate into opening businesses but into investing more and earning more from agriculture.

Table 10: Long-term effect on Economic Outcomes by Friendship Status

VARIABLES	(1) Monthly Income (Winsorised)	(2) Savings (Winsorised)	(3) New Savings Account	(4) Taken a loan	(5) Commitment Savings
Paired (Friend)	2,417	-751.2	-0.0905*	-0.0199	-0.0320
	(2,481)	(1,739)	(0.0453)	(0.0370)	(0.0589)
Paired (Not Friend)	-1,979	-1,006	-0.0431	-0.0200	0.0998
	(2,262)	(1,383)	(0.0500)	(0.0436)	(0.0659)
Constant	25,494***	7,421***	0.259***	0.200***	0.468***
	(3,128)	(1,414)	(0.0449)	(0.0619)	(0.0876)
Observations	447	444	449	449	449
R-squared	0.006	0.001	0.008	0.003	0.013
Paired with friend==Paired with nonfriend	0.140	0.837	0.394	0.996	0.0527

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats individuals who were treated alone as the base category. Standard errors are robust and clustered at the village level.

Table 11: Long-term effect on Business and Agriculture Outcomes by Centrality of Peer

VARIABLES	(1) Opened New Business	(2) Agriculture Profits	(3) Investment in New Business	(4) Investment in Agriculture
Paired (More Central)	-0.00838	10,417	-1,147	-2,641
	(0.0235)	(15,846)	(2,018)	(20,010)
Paired (Less Central)	-0.0277*	33,385**	-1,234	24,467
	(0.0161)	(14,173)	(1,281)	(20,032)
Constant	0.0662***	72,259***	5,836**	89,870***
	(0.0227)	(24,842)	(2,258)	(20,667)
Observations	448	440	448	331
R-squared	0.007	0.024	0.007	0.016
Paired with central==Paired with noncentral	0.278	0.343	0.954	0.185

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats individuals who were treated alone as the base category. Standard errors are robust and clustered at the village level.

Table 12: Long-term effect on Economic Outcomes by Centrality of Peer

VARIABLES	(1) Monthly Income (Winsorised)	(2) Savings (Winsorised)	(3) New Savings Account	(4) Taken a loan	(5) Commitment Savings
Paired (More Central)	49.87	-313.2	-0.0896*	-0.0446	0.0684
	(2,065)	(1,623)	(0.0520)	(0.0417)	(0.0589)
Paired (Less Central)	1,699	-1,806	-0.0604	0.0190	0.0670
	(2,226)	(1,481)	(0.0468)	(0.0486)	(0.0610)
Constant	24,797***	6,978***	0.286***	0.219***	0.466***
	(3,216)	(1,353)	(0.0532)	(0.0658)	(0.0834)
Observations	447	444	449	449	449
R-squared	0.002	0.004	0.008	0.007	0.005
Paired with central==Paired with noncentral	0.531	0.335	0.555	0.258	0.983

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats individuals who were treated alone as the base category. Standard errors are robust and clustered at the village level.

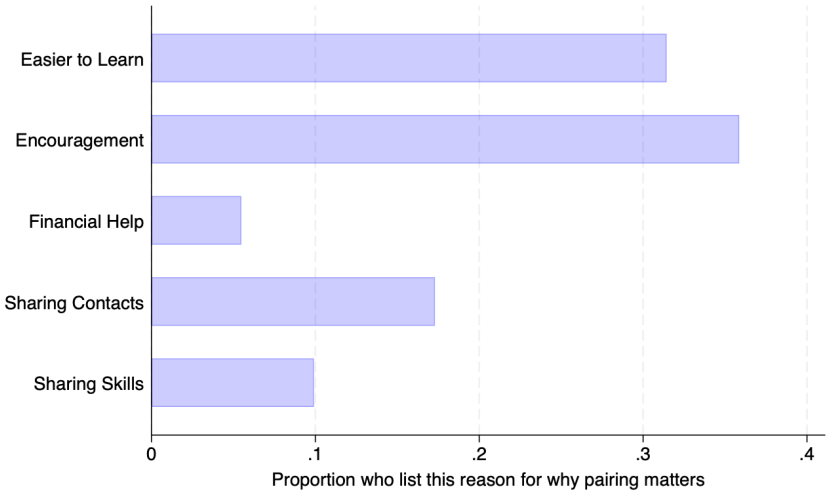
Further, the effect of being trained together on agricultural investments and profits 1 year later is consistent with the finding in the endline survey that those who were trained together were more likely to report wanting to open an agro-business. At the same time, while those who were treated alone are taking steps to open a business, we do not find any change in whether they actually do so or their economic outcomes. We will now discuss the mechanisms behind the various results that we have seen so far.

5 Mechanisms

We observe that, on average, being paired does not significantly improve outcomes in the training in the short run but can have meaningful effects in the longer term. Being with a central friend can help in the short term while being with a friend, and someone less central helps in the longer term. In order to study the role of these pairs, we consider various potential mechanisms. We posit that this is due to motivation in the short-term and ease to collaborate in the long-run.

First, we asked the perceptions of women who attended the training in pairs as to how pairing was useful rather than training alone. Figure 3 shows the responses to this question. Most of them reported receiving encouragement and support from their pair was a credible channel. 33% of women paired report having received encouragement from their partnered peer. This is followed by 31% of the women who report the training was easier to grasp due to being paired in the training.

Figure 3: Why does pairing matter?



We now proceed with disentangling various mechanisms that can explain how pairing can help and why the effects are heterogeneous by centrality and distance.

5.1 Do pairs learn better together?

Learning can be a potential mechanism driving friends to be able to help each other learn better. We ask five questions that measure knowledge gained in the course of the training and take the proportion of correct responses to be the index. We collect this measure for both treatment and control groups. The questions are as follows: (a) What do you understand by a business, (b) What characteristics are required to be a successful entrepreneur, (c) What do you mean by fixed assets, (d) What sector does a beauty parlour come under, and (e) Above what break even percentage does the business become risky? The measure of knowledge is kept brief due to logistical constraints and is therefore likely to be noisy. The knowledge index is composed of the responses to these questions.

We also measure knowledge gained by the training by two additional variables measured during the training: game profit and yearly profit. Game profit records the performance on the first day of the training where women played an investment and saving game. Yearly Profit on the other hand was measured on the last day of the training, which is the amount of profit made in the exercise involving the business plan. Table 13 shows that these outcomes do not differ by whether the individual was trained alone or with a peer. However, it is important to note that paired individuals make a profit equal to about the double of that made by those treated alone, even though the difference is not statistically significant.

Table 13: Effect on Learning during and after the training.

VARIABLES	(1) Knowledge Index	(2) Profit (Game)	(3) Profit (Business Plan)
Treatment 1	0.724***		
	(0.0954)		
Treatment 2 and 3	0.671***	-6.208	465,002
	(0.102)	(83.79)	(459,637)
Constant	-0.0690	299.0***	458,013**
	(0.0847)	(71.94)	(173,290)
Observations	1,110	725	723
R-squared	0.115	0.000	0.002
Treatment 1==Pair	0.470		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the Control Group as the base category in Column 1 and Treatment 1 as the base category in Column 2. Standard errors are robust and clustered at the village level.

It can also be the case that women who attended the training with a friend may have been able to better discuss the material being taught. If this is the case then women treated with a friend should perform better in the knowledge and performance in the training. Table E.3 shows that the effect of being trained with a friend on knowledge during training, measured in terms of performance in the profit-making exercises, is much higher than treatment 1 and much higher than being trained with a non-friend, even though we are not powered to detect differences. Table E.4 shows that the effect is not very different by the type of peer in terms of combination of social distance and centrality, even though the profit made in the business plan is almost 1.5-2 times higher among those matched with a central friend than others.

5.2 Do pairs provide indirect value in terms of access to network connections?

Impact of Treatment 3: Contact pooling and access to connections is the third channel that we look at. Treatment 3 i.e. where women were paired during the training and a connection module was designed to check if this is at work. This treatment does fare better in terms of magnitude but the effects are not significantly different compared to Treatment 2. On an average, women in Treatment 3 pool 6 friends. Moreover, we find that there is no difference as a function of age, degree, education and income of the peer, as shown in Table E.5. Being in the same caste leads to one additional friend being listed in the connection module. Further, we do not find heterogeneous effects by a number of contacts pooled in Treatment 3 as shown in Table E.6.

5.3 Do pairs help each other share risk?

Impact on Network-Based Methods of Savings: One year following the training, we measured the number of savings group that the respondent was a part of and whether they had joined a new cooperative in the village. We do not find any effects on these variables. This suggests that the treatments, especially the paired treatments, did not lead to an increased involvement with the network in terms of saving together and sharing risks. These results are shown in Table 14.

Table 14: Treatment effects on Network-Based Measures of Saving

	(1)	(2)
VARIABLES	Number of Savings Groups	Joined Cooperative in last year
Spillover	-0.221	0.0558
	(0.257)	(0.0559)
Treated alone (T1)	0.168	0.0464
	(0.268)	(0.0350)
Treated with a pair	0.0609	0.0178
	(0.244)	(0.0346)
Constant	1.916***	0.0955***
	(0.229)	(0.0270)
Observations	751	752
R-squared	0.009	0.004
Spillover=T1	0.0112	0.868
Paired=Nonpaired	0.273	0.312
Spillover=Paired	0.0123	0.521

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the Control Group as the base category. Standard errors are robust and clustered at the village level.

Heterogeneity by Risk Aversion: In addition to this, we do not find any heterogeneous effects by baseline risk aversion of the matched peer. As seen in Table E.7, being paired with a peer that is less risk-averse does not impact the outcomes of the training.

Alternative Measures of Centrality: Finally, we also do not find effects of a peer being more central when we use eigenvector centrality as a measure of influence. This also suggests that risk-sharing might not be a relevant mechanism. As seen in Table E.8, when we define friend central differently using eigenvector centrality instead of degree centrality, it does not have differential effects compared to the other categories or compared to being treated alone.

5.4 Do pairs encourage each other?

Another possible channel driving peer effects in the endline could be encouragement. This effect is in line with the fact that friends who have more friends are likely to be 'popular' and, therefore, are better at encouraging. Majority of individuals say that pairing benefitted them because of encouragement.

We find that those matched with a more central person are also 8% more likely (significant at 5%) to say that pairing mattered because of encouragement, compared to those matched with less central person. In line with this, those matched with peers with a higher indegree (i.e. those who are "popular") had higher treatment effects on endline outcomes as shown in Table 15.

Table 15: Treatment effect by Peer's Indegree and Outdegree

	(1)	(2)	(3)	(4)
VARIABLES	Business Aspirations	Ready to invest	Business Index	Take-up Index
Heterogeneity by Peer's Indegree				
Treatment 1	-0.0454	0.0680	0.387***	0.240***
	(0.0641)	(0.0474)	(0.0989)	(0.0835)
Treatment 2 and 3	-0.0215	0.0943***	0.314***	0.199**
	(0.0605)	(0.0327)	(0.0935)	(0.0732)
T2/T3 X Peer's Indegree	-0.00455	0.00752*	0.0262**	0.0236**
	(0.00557)	(0.00422)	(0.0124)	(0.0106)
Constant	-0.0768*	0.704***	-0.153*	-0.113*
	(0.0433)	(0.0283)	(0.0792)	(0.0622)
Observations	1,191	1,189	1,176	1,173
R-squared	0.001	0.016	0.037	0.028
Heterogeneity by Peer's Outdegree				
Treatment 1	-0.0454	0.0680	0.387***	0.240***
	(0.0641)	(0.0474)	(0.0989)	(0.0835)
Treatment 2 and 3	0.0307	0.132***	0.377***	0.305***
	(0.0681)	(0.0402)	(0.110)	(0.0785)
T2/T3 X Peer's Outdegree	-0.0222*	-0.00563	0.00354	-0.0137
	(0.0130)	(0.0118)	(0.0299)	(0.0199)
Constant	-0.0768*	0.704***	-0.153*	-0.113*
	(0.0433)	(0.0283)	(0.0792)	(0.0622)
Observations	1,191	1,189	1,176	1,173
R-squared	0.001	0.015	0.035	0.026

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the Control Group as the base category. Standard errors are robust and clustered at the village level.

This also translates into higher measures of self-efficacy for those who were paired, as shown in Table 16.

Table 16: Treatment effects on Self Efficacy

	(1)	(2)	(3)
VARIABLES	Can Manage Difficult Problems	Confident to deal with Events	Accomplish Goals
Treatment 1	0.0406	0.0623	0.0635
	(0.0632)	(0.0486)	(0.0533)
Treatment 2 and 3	0.0426	0.0719*	0.0824*
	(0.0402)	(0.0394)	(0.0415)
Constant	0.308***	0.285***	0.289***
	(0.0346)	(0.0316)	(0.0349)
Observations	1,202	1,203	1,202
R-squared	0.002	0.005	0.006
T1==T2/T3	0.977	0.839	0.710

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the Control Group as the base category. Standard errors are robust and clustered at the village level.

5.5 Are pairs likely to help each other and/or collaborate in future?

Lastly, we find that individuals paired with friends report being more likely to want to open a business together compared to those paired with non-friends. As shown in Table 17, we find that individuals are more likely to report being willing to open business with a friend rather than a random individual. When asked to report if they were likely to open a business with the individual they were paired with, being friends has a strong and significant effect. This reinforces the argument that distance between pairs matters as they make plans together. Centrality, importantly, does not have a differential effect on these outcomes.

Table 17: Wanting to start a business together.

VARIABLES	(1) Pairs will meet in Future	(2) Pairs will start Business Together
Friend x More Central	0.113**	0.143**
	(0.0444)	(0.0655)
Friend x Less Central	0.105***	0.155**
	(0.0357)	(0.0559)
Not Friend x More Central	0.0122	0.0742
	(0.0268)	(0.0563)
Degree	0.00496	0.0116
	(0.00427)	(0.0131)
Constant	0.813***	0.229**
	(0.0461)	(0.0942)
Observations	436	435
R-squared	0.029	0.022
friendnoncentral==friendcentral	0.795	0.858
friendnoncentral==nonfriendnoncentral	0.0436	0.219
friendnoncentral==nonfriendcentral	0.0436	0.219
central==noncentral	0.671	0.470
friend==nonfriend	0.0107	0.0320

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the Control Group as the base category. Both the variables are self-reported willingness to meet and start a business together respectively, as measured during the endline survey. Standard errors are robust and clustered at the village level.

Further, we find that one year later, individuals who are in the treatment group are also significantly more likely to report discussing business-related concerns with their social networks. This is shown in Table 18. When asked whether they spoke to their matched peer, we find that 35% of individuals in treatment 2 and 41% of individuals in treatment 3 report speaking to their matched peer. When asked what they spoke about, 85% report speaking to the peer for advice, 10% report interacting to borrow/lend money, and 5% report speaking about setting up businesses.

Importantly, as shown in Table 19, among those who did speak to their matched peer, those matched with a weakly more central peer were less likely to talk about borrowing or businesses and more likely to take general advice. This highlights the potential role played by ease of collaboration and corroborates the previous findings that those matched with less central individuals earn higher agricultural profits and invest more in agriculture compared to those matched with more central individuals.

Table 18: Follow-up survey and Network Communication

VARIABLES	(1) Talk to anyone about business	(2) Talk to matched peer
Spillover	0.0194	
	(0.0273)	
Treated alone (T1)	0.0548*	
	(0.0280)	
Treated with a pair	0.0874***	
	(0.0297)	
Treated with a friend + module (T3)		0.0607
		(0.0596)
Constant	0.0226	0.353***
	(0.0154)	(0.0527)
Observations	751	260
R-squared	0.019	0.004
Spillover=T1	0.320	
Paired=Nonpaired	0.325	
Spillover=Paired	0.0229	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats the Pure Control Group as the base category. Both the variables are self-reported and show whether an individual talked to anyone or to the matched peer about businesses during the one year after the intervention. Standard errors are robust and clustered at the village level.

Table 19: Talking to Matched Peer

VARIABLES	(1) Talk to matched peer	(2) Talk to matched peer for borrowing or business
Paired (More Central)	0.0805	-0.173*
	(0.0526)	(0.0837)
Constant	0.336***	0.256***
	(0.0416)	(0.0797)
Observations	260	99
R-squared	0.007	0.056

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6 Conclusion

Peer effects can be leveraged to help women succeed as entrepreneurs. We find that business training with a community member can increase the initial willingness to open a business and lead individuals to take steps to do so in the long run. Moreover, those trained with a peer

are more likely to report wanting to open an agro-business immediately after the training. Consistent with this, those trained with a peer invest and earn more from agriculture in the long run. However, many of these effects are not statistically distinguishable from the effects of being treated alone.

Given that our field experiment is designed to disentangle the effect of having different types of peers from the network, we then show that specific kinds of pairs (in terms of their network centrality and social distance) help improve outcomes relative to being trained alone. In particular, we find that being paired with a friend i.e. someone with low social distance, helps improve outcomes in the short run and long run. On the other hand, being paired with a more central person i.e. someone who is more popular in the network, helps improve outcomes in the short run but does not benefit individuals in the long run. We suggest that central friends can provide short-term motivation but non-central friends are easier to collaborate with in the longer term.

Finally, we use our experiment to compare the direct value of peers to their indirect value in terms of providing access to the wider social network. To do this, we study the effect of a treatment arm which makes the social network of the peer more salient and encourages the pair to share their network contacts. While contact pooling has a higher effect on certain outcomes, we find that this additional effect is not significant when compared to the arm where individuals are paired without pooling contacts. This suggests that the direct value of being connected with a friend can be more important than the indirect in terms of increasing the effectiveness of the training program. Stronger interventions might be needed to lead to the formation of new network ties that boost entrepreneurship.

Appendix

A Theoretical Framework

In this theoretical framework, we specifically focus on the role of heterogeneity in the network characteristics of the pair on their outcomes when they attend the training together. There are two variables of interest: distance between the participant and the person they are matched with i.e. d_{ij} and the network centralities of the pair i.e. ϕ_i and ϕ_j. This can be interpreted as the number of connections they have in the underlying social network.

Consider the following utility function where agent i chooses the level of effort (savings, business effort etc) depending on private and social returns.

$$U(e_i) = \underbrace{\theta_0 e_i}_{\text{private returns to effort}} + \underbrace{\theta_1 \alpha(d_{ij})(e_i e_j)}_{\text{returns depending on peer effort}} + \underbrace{\beta_0 \phi_j e_i}_{\text{direct effect of peer centrality}}$$

$$+ \underbrace{\beta_1 f(\phi_i - \phi_j) e_i}_{\text{effect of gap between centralities}} + \underbrace{\lambda \alpha(d_{ij}) f(\phi_i - \phi_j) e_i}_{\text{interaction between distance and centrality}} - \underbrace{c(e_i)}_{\text{cost of effort}}$$

where $c''(e_i) > 0$. d_{ij} is the network distance between i and j. (Degree) Centrality of i and j is ϕ_i and ϕ_j. Note that $\alpha : R^+ \to R^+$ and $f : R \to R^+$ are functions that map network characteristics to positive scalars. Note the following additional assumptions:

1. $\theta_0 > 0$: i.e. there are positive private returns to effort.
2. $\theta_1 > 0$ and $\alpha' < 0$ i.e. there are positive complementarities falling with distance.
3. We will not make any further assumptions on the shape of f but without loss of generality, assume that $\beta_1 > 0$ and $\lambda > 0$.

We do not make assumptions on β_0. This can be positive if getting matched with a more central partner is inspirational, for example. Alternatively, it can be negative, if getting matched to a central partner implies that the partner may not be able to help out in future as they are more likely to be busy etc.

Let us first derive an expression for optimal effort e_i^*.

$$c'(e_i^*) = \theta_0 + \theta_1\alpha(d_{ij})e_j + \beta_0\phi_j + \beta_1 f(\phi_i - \phi_j) + \lambda\alpha(d_{ij})f(\phi_i - \phi_j)$$

A.1 Effects of Treatment Arms

Let's consider the differences in treatment effects across arms. Let us assume, without loss of generality, that costs are quadratic in effort so $c(e_i) = e_i^2$. T3 likely increases β_1 to β_1' and λ to λ' by making the scope for social support and sharing of contacts more salient among the pairs. Then, the optimal effort for individuals in different treatment arms is as follows:

1. T1: $e_i^* = \frac{1}{2}\theta_0$
2. T2: $e_i^* = \frac{1}{2}(\theta_0 + \theta_1\alpha(d_{ij})e_j + \beta_0\phi_j + \beta_1 f(\phi_i - \phi_j) + \lambda\alpha(d_{ij})f(\phi_i - \phi_j))$
3. T3: $e_i^* = \frac{1}{2}(\theta_0 + \theta_1\alpha(d_{ij})e_j + \beta_0\phi_j + \beta_1' f(\phi_i - \phi_j) + \lambda'\alpha(d_{ij})f(\phi_i - \phi_j))$

Under the assumptions made so far, it is already clear that $e_{iT1}^* < e_{iT2}^* < e_{iT3}^*$.

A.2 Heterogeneous Effects of Distance and Centrality

Consider the following proposition.

Proposition 1.

$$\frac{\partial e_i^*}{\partial d_{ij}} = \theta_1\alpha'(d_{ij})e_j + \lambda\alpha'(d_{ij})f(\phi_i - \phi_j) \quad < 0.$$

This directly follows from our assumption that α falls with network distance i.e. $\alpha' < 0$. The direct effect of distance (via effort complementarities) and the interaction effect (via interaction with peer centrality) is higher when the matched person is closer.

Proposition 2.

$$\frac{\partial e_i^*}{\partial \phi_j} = \beta_0 + \beta_1\frac{\partial f(\phi_i - \phi_j)}{\partial \phi_j} + \lambda\alpha(d_{ij})\frac{\partial f(\phi_i - \phi_j)}{\partial \phi_j} \quad > 0$$

under the above cases if and only if:

1. $f'_{\phi_j} < 0$ *and* $\beta_0 > \tau(\phi_i, \phi_j, d_{ij}) > 0$ *where* τ *is a threshold depending on agent's absolute centralities and the distance between them. It is easy to check that this threshold is equal to* $-\beta_1 f'_{\phi_j} - \lambda\alpha(d_{ij}) f'_{\phi_j} > 0$ *in this case.*

2. $f'_{\phi_j} > 0$ *and* $\beta_0 > \tau(\phi_i, \phi_j, d_{ij})$ *where* τ *is a threshold depending on both agent's centralities and the distance between them and* $\tau < 0$.

The effect of centrality is more involved. The derivative can be computed as above. The sign of the above derivative depends on the shape of f and the magnitude and sign of β_0. Under the first condition, β_0 i.e. the direct return from peer's centrality (eg: inspiration, perceived social support in future etc) must be positive and large enough. Under the second condition, β_0 doesn't have to be large and positive and can be negative as well. However, it should not be too negative i.e. must not fall below the specified threshold.

Intuition behind Proposition 2

In order to understand what the proposition implies intuitively, consider the following cases depending on the shape of f.

1. Case 1: Only incentives to share contacts matter i.e. $\frac{\partial f(\phi_i - \phi_j)}{\partial(\phi_i - \phi_j)} < 0$: In this case, individuals do not wish to share contacts or socially support those who are different to them in terms of centrality as there are no incentives to share or support. Support can also involve being willing to collaborate with the person in future or motivate them and boost their aspirations.

   Example:
   $$f = k - (\phi_i - \phi_j)^2 \text{ where k } > 0.$$

2. Case 2: Only altruism matters i.e. $\frac{\partial f(\phi_i - \phi_j)}{\partial(\phi_i - \phi_j)} > 0$: In this case, individuals wish to share contacts or socially support those who are more different to them in terms of centrality as they are altruistic and want to help others in their community.

   Example:
   $$f = k + (\phi_i - \phi_j)^2 \text{ where k } > 0.$$

3. Case 3: Both matter i.e. $\frac{\partial f(\phi_i - \phi_j)}{\partial(\phi_i - \phi_j)} < 0$ until a threshold value of $\phi_i - \phi_j$ after which $\frac{\partial f(\phi_i - \phi_j)}{\partial(\phi_i - \phi_j)} > 0$: In this case, individuals wish to share contacts or socially support those who are similar to them in terms of centrality (as there are incentives to share) but become altruistic if the other person's centrality falls below a threshold.

Example:

$$f = (\mid \phi_i - \phi_j \mid -k)^2 \text{ where k } > 0.$$

Let us analyze the proposition for Case 1.

$f'_{\phi_j} > 0$ if and only if $\phi_i > \phi_j$. In that case, condition 2 of the proposition applies and higher centrality of peer is beneficial. This makes sense: if my centrality is very high, then in a world where only incentives matter, my matched peer's centrality must also be very high for me to share contacts and provide social support. The direct effect of my peer's centrality (i.e. β_0), if negative, (due to peer being more busy etc) should not be too negative otherwise a higher centrality of peer will decrease optimal effort.

Case 2 is analogous and the reverse of this. In that case, $f'_{\phi_j} < 0$ if and only if $\phi_i > \phi_j$ since i's altruism is more likely to be at work if j is less central than i. Condition 1 of the proposition applies. β_0 must be very large and positive for the peer's centrality to have a positive effect on optimal effort.

The third case is a combination of cases 1 and 2 and depends on the threshold gap between the two centralities. If the gap is too high, case 2 will apply and altruism will be at work. If the gap is low, then case 1 will apply and incentives will matter more.

As a result, we can predict the effect of distance and centrality under all possible cases. For example, if we find that those matched to central peers choose higher business effort, then we know that the conditions in proposition 2 must be true. We can then check if pairs with different centralities shared fewer contacts with each other under T3 (to assess the shape of f) and if higher centrality is beneficial for those in T2 (to assess the sign of β_0).

B Baseline Tables

Table B.1: Summary Statistics

	Mean	SD
Age	37.98	(10.85)
Divorced	0.00141	(0.0375)
Married	0.918	(0.274)
Unmarried	0.0669	(0.250)
Widow	0.0134	(0.115)
Higher Education (Class 11, 12)	0.104	(0.305)
Informal_education	0.126	(0.332)
No Education	0.326	(0.469)
Primary (Class 1-5)	0.155	(0.362)
Secondary (Class 6-10)	0.249	(0.432)
University	0.0402	(0.196)
Belongs to Upper Caste	0.334	(0.472)
Degree Centrality	4.604	(2.167)
Eigen Vector Centrality	0.00966	(0.0130)
Own Non Agr. Business (Yes/No)	0.220	(0.415)
Feel not Capable	0.277	(0.448)
Willingness to Open Non Agr. Business	0.419	(0.494)
Risk Aversion (1-6)	4.610	(1.406)
Aspirations- Annual Non Agr. Investments	592607.8	(2991506.9)
Aspirations- Monthly Income	556120.4	(13902715.0)
Aspirations- Annual Agr. Investments	307888.2	(1716845.5)
Income Aspirations > Current Income	0.845	(0.362)
Non Agr Exp Asp > Current Exp	0.246	(0.431)
Observations	2840	

Table B.2: Correlations between whether or not an individual has opened a business and their baseline characteristics.

	Own Non Agr. Business
Age	-0.0944***
Divorced	0.00270
Married	-0.0354
Unmarried	0.0499**
Widow	-0.0250
Higher Education (Class 11, 12)	0.129***
Informal_education	-0.00791
No Education	-0.181***
Primary (Class 1-5)	0.00828
Secondary (Class 6-10)	0.00354
University	0.221***
Belongs to Upper Caste	-0.00835
Degree Centrality	-0.0563**
Eigen Vector Centrality	-0.0569**
Risk Aversion (1-6)	-0.0910***
Aspirations- Annual Non Agr. Investments	0.138***
Aspirations- Monthly Income	0.0127
Aspirations- Annual Agr. Investments	-0.0244
Income Aspirations > Current Income	-0.0303
Non Agr Exp Asp > Current Exp	0.374***

Table B.3: Correlations between whether or not an individual is willing to open a business and their baseline characteristics.

	Willingness to Open Non Agr. Business
Age	-0.391***
Divorced	0.0187
Married	-0.0508*
Unmarried	0.0965***
Widow	-0.0826***
Higher Education (Class 11, 12)	0.167***
Informal_education	-0.104***
No Education	-0.300***
Primary (Class 1-5)	0.0367
Secondary (Class 6-10)	0.251***
University	0.100***
Belongs to Upper Caste	-0.0558**
Degree Centrality	0.0157
Eigen Vector Centrality	0.00563
Feel not Capable	-0.00718
Risk Aversion (1-6)	-0.103***
Aspirations- Annual Non Agr. Investments	0.104***
Aspirations- Monthly Income	-0.0188
Aspirations- Annual Agr. Investments	0.0428*
Income Aspirations > Current Income	0.0129
Non Agr Exp Asp > Current Exp	0.212***

Table B.4: Correlations between number of network connections and baseline characteristics.

	Degree Centrality
Age	-0.00765
Divorced	0.0460*
Married	0.0823***
Unmarried	-0.0857***
Widow	-0.0250
Higher Education (Class 11, 12)	-0.0422*
Informal_education	0.0439*
No Education	-0.0731***
Primary (Class 1-5)	0.0189
Secondary (Class 6-10)	0.0858***
University	-0.0588**
Belongs to Upper Caste	0.0700***
Own Non Agr. Business (Yes/No)	-0.0563**
Willingness to Open Non Agr. Business	0.0157
Risk Aversion (1-6)	-0.0690***
Aspirations- Annual Non Agr. Investments	-0.0322
Aspirations- Monthly Income	-0.0255
Aspirations- Annual Agr. Investments	0.00108
Income Aspirations > Current Income	-0.0163
Non Agr Exp Asp > Current Exp	-0.0290

C Balance Checks

Table C.1: Balance test comparing Control and Treated Villages

	Control	Treatment	p-value
Income	22517.415	25922.361	0.162
Income Source- Agri.	0.927	0.851	0.041
Income Source- Business	0.111	0.085	0.569
Income Source- Job	0.021	0.027	0.420
Income Source- Remit.	0.007	0.013	0.347
Income Source- Other	0.045	0.045	0.971
Age	39.533	39.128	0.760
Elementary Education	0.185	0.161	0.339
Higher Education	0.077	0.086	0.736
Informal Education	0.324	0.293	0.471
Univeristy Education	0.007	0.010	0.697
Secondary Education	0.268	0.261	0.820
Degree	4.619	5.082	0.025
Brahmin	0.052	0.088	0.565
Chhetri	0.216	0.296	0.581
Newar	0.460	0.395	0.755
Tamang	0.202	0.159	0.679
Dalit	0.059	0.020	0.289
Other	0.010	0.043	0.066

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

Table C.2: Balance Test for the Endline Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Control	T1	T2	T3	(0) vs. (1), p-value	(0) vs. (2), p-value	(0) vs. (3), p-value	(1) vs. (2), p-value	(1) vs. (3), p-value	(2) vs. (3), p-value
Income	23199.708	26253.382	24382.716	28570.368	0.299	0.573	0.065	0.488	0.457	0.167
Income Source-Agri.	0.912	0.847	0.823	0.850	0.061	0.136	0.104	0.684	0.922	0.641
Income Source-Business	0.102	0.069	0.078	0.107	0.346	0.495	0.920	0.761	0.165	0.336
Income Source-Job	0.029	0.008	0.029	0.034	0.003	0.973	0.823	0.139	0.247	0.819
Income Source-Remit.	0.015	0.020	0.008	0.000	0.643	0.188	0.021	0.286	0.062	0.151
Income Source-Other	0.052	0.044	0.033	0.043	0.663	0.241	0.625	0.481	0.939	0.571
Age	40.040	39.496	37.613	38.940	0.653	0.036	0.347	0.055	0.537	0.100
Elementary Education	0.165	0.173	0.177	0.154	0.749	0.631	0.692	0.921	0.539	0.493
Higher Education	0.079	0.077	0.091	0.094	0.906	0.680	0.521	0.598	0.299	0.889
Informal Education	0.319	0.282	0.292	0.291	0.451	0.399	0.470	0.838	0.879	0.964
Univeristy Education	0.006	0.004	0.021	0.009	0.720	0.079	0.767	0.076	0.554	0.273
Secondary Education	0.242	0.270	0.267	0.291	0.404	0.508	0.175	0.946	0.527	0.527
Degree	4.502	5.373	5.264	5.202	0.001	0.002	0.002	0.689	0.409	0.793
Brahmin	0.061	0.085	0.086	0.107	0.560	0.491	0.303	0.921	0.390	0.211
Chhetri	0.228	0.323	0.284	0.321	0.306	0.528	0.339	0.277	0.962	0.334
Newar	0.443	0.371	0.403	0.393	0.574	0.764	0.711	0.328	0.561	0.678
Tamang	0.205	0.145	0.144	0.150	0.408	0.347	0.385	0.979	0.910	0.876
Dalit	0.048	0.028	0.012	0.009	0.467	0.172	0.157	0.404	0.382	0.687
Other	0.017	0.048	0.070	0.021	0.137	0.046	0.645	0.530	0.240	0.114

Table C.3: Balance Test for the Follow-up Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Spillover	Control	T1	T2/T3	(1) vs. (2), p-value	(1) vs. (3), p-value	(1) vs. (4), p-value	(2) vs. (3), p-value	(2) vs. (4), p-value	(3) vs. (4), p-value
Income	24220.194	27369.437	28594.149	26531.553	0.472	0.288	0.414	0.806	0.830	0.551
Income Source-Agri.	0.921	0.899	0.845	0.827	0.643	0.142	0.068	0.255	0.237	0.742
Income Source-Business	0.079	0.067	0.045	0.037	0.750	0.319	0.145	0.425	0.208	0.595
Income Source-Job	0.036	0.050	0.013	0.033	0.426	0.026	0.842	0.045	0.464	0.225
Income Source-Remit.	0.006	0.025	0.032	0.003	0.219	0.135	0.667	0.739	0.107	0.102
Income Source-Other	0.042	0.059	0.026	0.033	0.418	0.412	0.576	0.154	0.162	0.674
Age	39.861	41.403	38.897	38.040	0.483	0.611	0.323	0.115	0.039	0.276
Elementary Education	0.230	0.101	0.206	0.177	0.015	0.598	0.189	0.026	0.042	0.462
Higher Education	0.079	0.101	0.058	0.110	0.646	0.664	0.494	0.217	0.756	0.030
Informal Education	0.315	0.345	0.258	0.267	0.709	0.450	0.502	0.157	0.129	0.874
Univeristy Education	0.006	0.000	0.006	0.013	0.307	0.965	0.377	0.334	0.028	0.464
Secondary Education	0.261	0.210	0.310	0.300	0.316	0.347	0.413	0.036	0.038	0.840
Degree	4.698	4.376	5.614	5.196	0.182	0.001	0.022	0.000	0.000	0.111
Brahmin	0.073	0.092	0.090	0.097	0.828	0.813	0.756	0.959	0.900	0.796
Chhetri	0.212	0.252	0.348	0.313	0.807	0.388	0.538	0.130	0.257	0.402
Newar	0.418	0.454	0.342	0.413	0.872	0.709	0.982	0.174	0.547	0.156
Tamang	0.218	0.151	0.148	0.133	0.541	0.503	0.400	0.949	0.668	0.544
Dalit	0.067	0.025	0.019	0.007	0.296	0.298	0.171	0.647	0.358	0.407
Other	0.012	0.025	0.052	0.037	0.516	0.194	0.134	0.209	0.283	0.515

D Attrition

Table D.1: Correlation of Follow-up Survey Attrition with Treatment Status

VARIABLES	(1) Attrition
Spillover	-0.0449
	(0.0508)
Treated alone (T1)	-0.0501
	(0.0448)
Treated with a pair	-0.0540
	(0.0431)
Constant	0.425***
	(0.0335)
Observations	1,204
R-squared	0.002
Spillover==T1	0.925
T1=Paired	0.928
Spillover=Paired	0.837

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

E Mechanisms

Table E.1: Effect of being matched with a Peer with Varying Characteristics

	(1)	(2)	(3)	(4)
VARIABLES	Business Aspirations	Ready to invest	Business Index	Take-up Index
Peer is Upper Caste	0.0544	0.0525	0.152*	0.0351
	(0.0918)	(0.0381)	(0.0792)	(0.0704)
Peer has higher Education	-0.0685	-0.0490	-0.0322	0.0113
	(0.0455)	(0.0433)	(0.112)	(0.0753)
Peer has higher Income	-0.193***	0.0650*	0.0308	-0.0199
	(0.0555)	(0.0377)	(0.0701)	(0.0554)
Peer is Married	0.115	0.0381	-0.0117	0.0758
	(0.0826)	(0.0392)	(0.0979)	(0.0676)
Peer is Younger	-0.0107	-0.0861**	-0.224**	-0.0876
	(0.0562)	(0.0400)	(0.0898)	(0.0777)
Constant	-0.110**	0.787***	0.276***	0.131**
	(0.0511)	(0.0357)	(0.0504)	(0.0470)
Observations	713	713	701	701
R-squared	0.015	0.023	0.017	0.005

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression compares individuals within the paired treatment arms. Standard errors are robust and clustered at the village level.

Table E.2: Effect of being matched with a Central Friend after controlling for Other Characteristics

VARIABLES	(1) Business Aspirations	(2) Ready to invest	(3) Business Index	(4) Take-up Index
Friend x More Central	0.0983	0.202**	0.504**	0.105
	(0.138)	(0.0905)	(0.218)	(0.105)
Friend x Less Central	0.103	0.157*	0.345*	-0.0135
	(0.114)	(0.0865)	(0.187)	(0.117)
Not Friend x More Central	0.0977	0.123	0.425*	0.0659
	(0.113)	(0.0922)	(0.224)	(0.118)
Not Friend x Not Central	0.148	0.126*	0.314	0.0347
	(0.118)	(0.0722)	(0.189)	(0.101)
Peer is Upper Caste	0.0574	0.0371	0.142	0.0615
	(0.0885)	(0.0387)	(0.0832)	(0.0724)
Peer has higher Education	-0.0864*	-0.0708	-0.0547	-0.0197
	(0.0456)	(0.0445)	(0.107)	(0.0612)
Peer has higher Income	-0.180***	0.0530	0.0142	0.00105
	(0.0581)	(0.0398)	(0.0762)	(0.0475)
Peer is Married	-0.00310	-0.0675	-0.309*	0.0317
	(0.0811)	(0.0719)	(0.164)	(0.0890)
Peer is Younger	-0.0333	-0.110**	-0.304***	-0.0907
	(0.0552)	(0.0395)	(0.0911)	(0.0670)
Constant	-0.0624	0.727***	0.0297	0.0987
	(0.100)	(0.0632)	(0.127)	(0.0836)
Observations	681	682	671	670
R-squared	0.016	0.036	0.039	0.011
friendnoncentral==friendcentral	0.954	0.374	0.310	0.0896
friendnoncentral==nonfriendnoncentral	0.548	0.389	0.731	0.221
friendnoncentral==nonfriendnoncentral	0.948	0.522	0.570	0.494
central==noncentral	0.711	0.569	0.227	0.146
friend==nonfriend	0.739	0.176	0.540	0.906

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression compares individuals within the paired treatment arms. Standard errors are robust and clustered at the village level.

Table E.3: Learning by whether pairs are friends or not

VARIABLES	(1) Knowledge Index	(2) Profit (Game)	(3) Profit (Business Plan)
Paired (Friend)	-0.0321	38.04	710,254
	(0.114)	(88.03)	(732,986)
Paired (Not Friend)	0.0190	19.59	531,114
	(0.0892)	(83.63)	(587,443)
Constant	0.621***	278.4***	395,838**
	(0.0552)	(65.84)	(163,578)
Observations	725	725	723
R-squared	0.001	0.002	0.005
Friend==Non Friend	0.616	0.780	0.841

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats Treatment 1 as the base category. Standard errors are robust and clustered at the village level.

Table E.4: Learning by type of pair

VARIABLES	(1) Knowledge Index	(2) Profit (Game)	(3) Profit (Business Plan)
Friend x More Central	-0.0678	0.996	867,927
	(0.139)	(96.62)	(880,202)
Friend x Less Central	-0.0809	19.49	413,558
	(0.117)	(95.36)	(642,707)
Not Friend x More Central	0.000830	-3.338	489,008
	(0.103)	(89.57)	(823,871)
Not Friend x Not Central	-0.00374	8.157	509,319
	(0.0954)	(96.37)	(596,980)
Degree	0.0251**	11.41	80,176
	(0.00920)	(8.275)	(95,897)
Constant	0.520***	239.4***	37,455
	(0.0730)	(78.45)	(600,891)
Observations	684	684	683
R-squared	0.006	0.006	0.005
friendnoncentral==friendcentral	0.920	0.568	0.219
friendnoncentral==nonfriendnoncentral	0.466	0.769	0.943
friendnoncentral==nonfriendcentral	0.466	0.769	0.943
central==noncentral	0.932	0.825	0.391
friend==nonfriend	0.445	0.871	0.627

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats Treatment 1 as the base category. Standard errors are robust and clustered at the village level.

Table E.5: Correlation of Number of Contacts Pooled and Similarity with Peer

VARIABLES	(1) Number of links pooled in T3
Same age group	-0.155
	(0.710)
Same Caste	1.346**
	(0.619)
Peer has same education	0.187
	(0.405)
Same Income (Quartile)	-0.0959
	(0.578)
Same Marital Status	-0.474
	(0.591)
Constant	5.881***
	(0.730)
Observations	216
R-squared	0.068

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression compares individuals in Treatment Arm 3 with each other. Standard errors are robust and clustered at the village level.

Table E.6: Heterogeneous Treatment Effects by Number of Contacts Shared

VARIABLES	(1) Business Aspirations	(2) Ready to invest	(3) Business Index	(4) Take-up Index
Treatment 1	-0.0454	0.0680	0.387***	0.240***
	(0.0642)	(0.0474)	(0.0990)	(0.0835)
Treatment 2	-0.0483	0.0940*	0.344***	0.307***
	(0.0582)	(0.0467)	(0.112)	(0.0900)
Treatment 3	-0.0161	0.144**	0.472***	0.195
	(0.135)	(0.0622)	(0.145)	(0.131)
T3 X Number of contacts pooled	0.0647	0.0251	0.00580	0.101
	(0.200)	(0.0862)	(0.173)	(0.182)
Constant	-0.0768*	0.704***	-0.153*	-0.113*
	(0.0433)	(0.0283)	(0.0792)	(0.0622)
Observations	1,188	1,184	1,171	1,168
R-squared	0.001	0.019	0.039	0.029

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Standard errors are robust and clustered at the village level.

Table E.7: Effect of Peer Risk Aversion

VARIABLES	(1) Business Aspirations	(2) Ready to invest	(3) Business Index	(4) Take-up Index
Treatment 1	-0.0109	-0.00888	0.110	0.0726
	(0.0131)	(0.0739)	(0.0972)	(0.0796)
Treatment 2 and 3	0.0213	0.0541	0.0758	0.0625
	(0.0176)	(0.0505)	(0.0619)	(0.0646)
Risk Averse	0.00881	-0.0560	-0.129	-0.155**
	(0.0160)	(0.0577)	(0.0822)	(0.0716)
t1 X Risk Averse	-0.00330	0.0387	0.0553	0.0909
	(0.0215)	(0.0826)	(0.120)	(0.106)
t2t3 X Risk Averse	-0.00810	-0.0150	0.00374	0.0567
	(0.0335)	(0.0638)	(0.101)	(0.0866)
Constant	-0.0966***	0.803***	0.139**	0.0894*
	(0.00769)	(0.0480)	(0.0609)	(0.0503)
Observations	872	868	857	856
R-squared	0.004	0.026	0.077	0.063

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: Standard errors are robust and clustered at the village level.

Table E.8: Impact of friend type (by eigen vector centrality)

VARIABLES	(1) Business Aspirations	(2) Ready to invest	(3) Business Index	(4) Take-up Index
Friend x More Central	-0.0279	0.0723	0.0332	0.0256
	(0.0924)	(0.0557)	(0.108)	(0.0682)
Friend x Less Central	0.00261	0.0782	0.0536	0.0575
	(0.0833)	(0.0459)	(0.0905)	(0.0782)
Not Friend x More Central	0.000900	0.00589	-0.100	0.110
	(0.0846)	(0.0550)	(0.131)	(0.0803)
Not Friend x Not Central	0.0577	0.0354	-0.0102	-0.0103
	(0.112)	(0.0367)	(0.0997)	(0.0717)
Eigen	0.551	1.605	0.849	0.854
	(3.403)	(1.188)	(2.424)	(1.470)
Constant	-0.128**	0.756***	0.243***	0.107*
	(0.0600)	(0.0501)	(0.0809)	(0.0517)
Observations	681	682	671	670
R-squared	0.002	0.012	0.004	0.005
friendnoncentral==friendcentral	0.641	0.880	0.849	0.671
friendnoncentral==nonfriendnoncentral	0.576	0.142	0.218	0.555
friendnoncentral==nonfriendnoncentral	0.985	0.236	0.440	0.245
central==noncentral	0.551	0.533	0.488	0.520
friend==nonfriend	0.547	0.159	0.257	0.841

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: This regression treats Treatment 1 as the base category. Standard errors are robust and clustered at the village level.

F PDS Lasso Results

F.1 Endline Outcomes

Table F.1: Impact of the training (Main Effects)

	(1)	(2)	(3)	(4)
VARIABLES	Business Aspirations	Ready to invest	Business Index	Take-up Index
Treatment 1	-0.0286	0.0668**	0.344***	0.205***
	(0.0643)	(0.0334)	(0.0767)	(0.0563)
Treatment 2	-0.0428	0.0725**	0.241***	0.250***
	(0.0492)	(0.0323)	(0.0744)	(0.0604)
Treatment 3	-0.00122	0.121***	0.346***	0.194***
	(0.0663)	(0.0312)	(0.0753)	(0.0582)
Constant	-0.0784**	1.084***	0.578***	0.559***
	(0.0388)	(0.0506)	(0.132)	(0.113)
Observations	1,168	1,166	1,154	1,151
Number of groups	0	0	0	0
Treatment 1==2	0.812	0.875	0.211	0.434
Treatment 2==3	0.500	0.149	0.191	0.333
Treatment 1==3	0.714	0.121	0.987	0.831

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table F.2: Impact of the training (Paired vs T1)

	(1)	(2)	(3)	(4)
VARIABLES	Business Aspirations	Ready to invest	Business Index	Take-up Index
Treatment 1	-0.0316	0.0676**	0.343***	0.205***
	(0.0643)	(0.0333)	(0.0764)	(0.0566)
Treatment 2 and 3	-0.0271	0.100***	0.296***	0.223***
	(0.0498)	(0.0271)	(0.0633)	(0.0524)
Constant	-0.0722*	1.074***	0.569***	0.562***
	(0.0397)	(0.0513)	(0.134)	(0.115)
Observations	1,168	1,166	1,154	1,151
Number of groups	0	0	0	0
Treatment 1 == Pair	0.940	0.302	0.514	0.703

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table F.3: Impact of the training by friend type

VARIABLES	(1) Business Aspirations	(2) Ready to invest	(3) Business Index	(4) Take-up Index
Friend x More Central	-0.00494	0.0863**	0.0916	0.101*
	(0.0895)	(0.0439)	(0.101)	(0.0554)
Friend x Less Central	-0.0117	0.0413	-0.0829	-0.0193
	(0.0623)	(0.0452)	(0.106)	(0.0663)
Not Friend x More Central	-0.0262	0.00768	-0.00868	0.0512
	(0.0782)	(0.0489)	(0.114)	(0.0656)
Not Friend x Not Central	0.0573	0.0169	-0.0937	0.0424
	(0.0963)	(0.0405)	(0.0964)	(0.0730)
Constant	-0.0449	1.073***	0.557**	0.532***
	(0.106)	(0.0770)	(0.222)	(0.111)
Observations	679	680	669	668
Number of groups	0	0	0	0
friendnoncentral==friendcentral	0.935	0.383	0.157	0.0860
friendnoncentral==nonfriendnoncentral	0.401	0.559	0.924	0.370
friendnoncentral==nonfriendnoncentral	0.839	0.610	0.586	0.453
central==noncentral	0.616	0.634	0.163	0.251
friend==nonfriend	0.668	0.151	0.501	0.913

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

F.2 Follow up Outcomes

Table F.4: Long Term Effects on Business and Agricultural Outcomes

VARIABLES	(1) Opened New Business	(2) Agriculture Profits	(3) Investment in New Business	(4) Investment in Agriculture
Spillover	-0.0385***	-3,322	-1,804**	6,883
	(0.0148)	(20,608)	(782.3)	(11,866)
Treated alone (T1)	0.0124	9,678	1,861	25,977
	(0.0230)	(19,278)	(1,762)	(17,342)
Treated with a pair	-0.00399	27,499	689.8	32,332**
	(0.0194)	(19,670)	(1,234)	(14,426)
Constant	0.0651***	103,667***	3,830***	77,223***
	(0.0191)	(14,787)	(1,129)	(9,986)
Observations	726	709	726	571
Number of groups	0	0	0	0
Spillover=T1	0.00298	0.223	0.0175	0.305
Paired=Nonpaired	0.364	0.0584	0.450	0.726
Spillover=Paired	0.00247	0.0214	0.00672	0.0258

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table F.5: Long Term Effects on Economic Outcomes

VARIABLES	(1) Monthly Income (Winsorised)	(2) Savings (Winsorised)	(3) New Savings Account	(4) Taken a loan	(5) Commitment Savings
Spillover	-1,114	2,212*	0.0528	0.0498	0.0330
	(2,529)	(1,281)	(0.0429)	(0.0438)	(0.0609)
Treated alone (T1)	1,707	3,564***	0.103***	0.104***	0.0456
	(2,378)	(1,229)	(0.0378)	(0.0396)	(0.0673)
Treated with a pair	2,648	2,569*	0.0222	0.0864**	0.120**
	(2,319)	(1,456)	(0.0349)	(0.0338)	(0.0565)
Constant	18,323***	3,757***	0.184***	0.0836**	0.380***
	(2,515)	(1,216)	(0.0413)	(0.0339)	(0.0712)
Observations	725	720	727	727	726
Number of groups	0	0	0	0	0
Spillover=T1	0.248	0.209	0.222	0.228	0.816
Paired=Nonpaired	0.567	0.462	0.0525	0.630	0.132
Spillover=Paired	0.0976	0.783	0.506	0.310	0.0548

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table F.6: Long Term Effects on Business and Agricultural Outcomes by Friendship Status

VARIABLES	(1) Opened New Business	(2) Agriculture Profits	(3) Investment in New Business	(4) Investment in Agriculture
Paired (Friend)	-0.00545	38,376**	-854.2	-694.6
	(0.0203)	(16,646)	(1,669)	(23,256)
Paired (Not Friend)	-0.00993	2,935	-221.8	1,193
	(0.0177)	(10,434)	(1,529)	(21,772)
Constant	0.0402***	112,651***	2,767**	124,662***
	(0.0146)	(12,804)	(1,313)	(16,870)
Observations	454	446	454	334
Number of groups	0	0	0	0
Paired with friend==Paired with nonfriend	0.807	0.113	0.682	0.934

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table F.7: Long Term Effects on Business and Agricultural Outcomes by Centrality of Peer

VARIABLES	(1) Opened New Business	(2) Agriculture Profits	(3) Investment in New Business	(4) Investment in Agriculture
Paired (More Central)	-0.00379	656.9	-507.6	-10,079
	(0.0224)	(13,982)	(1,905)	(20,727)
Paired (Less Central)	-0.0303**	39,849***	-1,611	29,767
	(0.0152)	(13,520)	(1,268)	(20,083)
Constant	0.0455***	111,586***	3,127**	120,169***
	(0.0167)	(12,832)	(1,487)	(15,136)
Observations	454	446	454	334
Number of groups	0	0	0	0
Paired with central==Paired with noncentral	0.0674	0.0452	0.368	0.0760

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table F.8: Long Term Effects on Economic Outcomes by Friendship Status

VARIABLES	(1) Monthly Income (Winsorised)	(2) Savings (Winsorised)	(3) New Savings Account	(4) Taken a loan	(5) Commitment Savings
Paired (Friend)	1,069	-818.6	-0.0914**	-0.0152	-0.0301
	(2,904)	(1,701)	(0.0415)	(0.0360)	(0.0595)
Paired (Not Friend)	-3,486	-1,025	-0.0490	-0.00883	0.0925
	(2,684)	(1,462)	(0.0489)	(0.0414)	(0.0613)
Constant	27,861***	7,169***	0.291***	0.154***	0.526***
	(2,252)	(894.5)	(0.0257)	(0.0338)	(0.0505)
Observations	453	450	455	455	455
Number of groups	0	0	0	0	0
Paired with friend==Paired with nonfriend	0.0706	0.864	0.429	0.824	0.0446

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table F.9: Long Term Effects on Economic Outcomes by Centrality of Peer

VARIABLES	(1) Monthly Income (Winsorised)	(2) Savings (Winsorised)	(3) New Savings Account	(4) Taken a loan	(5) Commitment Savings
Paired (More Central)	1,167	-688.6	-0.0949*	-0.0298	0.0558
	(1,656)	(1,730)	(0.0507)	(0.0366)	(0.0542)
Paired (Less Central)	1,836	-1,971	-0.0608	0.0118	0.0737
	(2,112)	(1,372)	(0.0448)	(0.0468)	(0.0623)
Constant	25,895***	7,416***	0.303***	0.155***	0.510***
	(1,792)	(977.8)	(0.0325)	(0.0330)	(0.0493)
Observations	453	450	455	455	455
Number of groups	0	0	0	0	0
Paired with central==Paired with noncentral	0.771	0.345	0.494	0.343	0.787

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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