

# Refugee Networks and Cooperation

Evidence from a Social-Network Experiment with  
Syrian Refugees in Lebanon and Jordan \*

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## **Abstract**

This paper considers how group structure shapes cooperation in refugee communities. Expanding on theories that high-density networks provide easy access to internal information and facilitate in-group punishment, I argue that in resource-poor contexts such as most refugee communities, network density comes with a trade-off. Although dense networks facilitate cooperation by helping to overcome the free-rider problem, they make cooperation less effective by constraining access to external information about diverse resources. To test my theory, I designed and conducted a social-network field experiment informed by 15 months of qualitative fieldwork in Syrian refugee communities. The experimental design varies the structure of groups of Syrian refugees in Lebanon and Jordan responding to public goods vignettes. We observe higher engagement in response to collective problems among high-density groups, and we find that low-density groups draw on a wider range of resources. The results suggest that when groups do not have the internal resources to mitigate their problems, community-driven programming should focus on linking beneficiaries to external resources rather than the unrealistic goal of supporting internal capacity.

## 1 Introduction

The Helween and Sharqi refugee camps are located in Lebanon's Bekaa Valley, where hundreds of thousands of Syrians live in rented apartments, garages, and informal camps.<sup>1</sup> Both Helween and Sharqi are populated largely by Sunni Arab Syrians from lower-middle-class, peripheral urban neighborhoods in western Syria. The Syrians who live in Helween came from different urban and peri-urban areas, and arrived to the camp in small groups of friends and families. On any given week, new residents arrive and others leave to live elsewhere in Lebanon. Residents are regularly out walking in the streets that weave among the tents, discussing recent aid distributions, trading information about the latest changes to work and residency laws, or explaining their family's need for assistance to visiting NGO staffers. In Sharqi, about a ten-minute drive down the road from Helween, many residents are related, have known each other for years, and come from the same neighborhood in the Damascus suburbs. Most camp residents have lived there for years, and few people move into or out of the camp.

In Helween, we observe residents from diverse backgrounds working together to mitigate community problems, whereas the densely knit community of friends and relatives in Sharqi demonstrates little such cooperative behavior. In 2015, the col-

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<sup>1</sup> The names of camps have been changed to ensure the confidentiality of research subjects.

lapse of Lebanon's national trash collection system threatened the quality of life in both camps. In the weeks that followed, the residents of Helween alternated between letting trash pile up between the tents and burning the trash in the streets. However, the residents continually sought solutions for the problem, trying to find local government officials and NGOs that could offer resources to help. Through these relationships, the residents found makeshift but effective solutions for waste management within a matter of weeks. In Sharqi long-standing piles of trash in the streets reveal that the camp never found a durable solution to the trash crisis. Despite the fact that nearly everyone knows and trusts each other, the camp cannot organize effective trash collection.

Refugee self-governance and local solutions are increasingly important to international humanitarian policy. The UN Refugee Agency has officially stated its goal to promote the 'self-settlement' of refugees, thereby putting more responsibility for governance on refugees themselves (UNHCR, 2015). Both the UN Development Program and the Norwegian Refugee Council run programs to develop Syrian communities' capacity for self-support. The policy shift toward refugee-community self-support, however, begs a theoretical question about when and how precarious communities can find local solutions to daunting collective problems. In this paper, I argue that existing work on public goods provision has not yet considered the critical role of net-

works in helping precarious and poor communities access information and resources that are often necessary to mitigate their problems.

Existing scholarship on refugee crises emphasizes the importance of refugees' networks in acquiring quotidian essentials like housing and a mobile phone (Steinberg, 2015) and obtaining the money and information needed to flee a war zone and settle in a safe country (Jacobsen and Landau, 2003). Refugees' networks shape high-risk collective action and the survival of insurgencies (Parkinson, 2013). Beyond refugee contexts, networks have been widely demonstrated to affect political behavior. In their role as conduits of information, networks affect public goods provision and cooperation (Miguel and Gugerty, 2005; Habyarimana et al., 2009; Larson, 2017*b*) as well as people's choices to protest or rebel (Hassanpour, 2017; Steinert-Threlkeld, 2017). I contribute to this literature about refugees and networks, offering novel theory and testing it with experimental data, to study how group structure affects refugee community cooperation around public goods and public-services problems, such as waste removal, water supply, and maintaining law and order.

I argue that in precarious mobile communities, like many refugee communities, higher group density comes with a trade-off: although group density facilitates cooperation by helping to overcome the free-rider problem, it limits access to a wide range of information and resources. Expanding on the dominant explanation in political

science that dense networks, such as ethnic groups, provide easy access to information and facilitate in-group punishment of free-riders, I draw on social network theory and sociology to argue that information flow through networks also facilitates cooperation by shaping whether people know about resources, know if and when the resources are available, and know how to access the resources.

In refugee communities the free-rider problem is neither the sole nor the primary obstacle to cooperation. The availability of and constraints on information and resources are critical determinants of cooperation in a precarious, mobile community like refugees, which may lack resources to solve public goods problems even in the presence of strong trust and reciprocity. Although scholarship on the effects of resource availability and constraints on the prospects for effective cooperation has a long tradition in sociology and political science (McCarthy and Zald, 1977; Morris, 1986; McCarthy and Wolfson, 1996; Weinstein, 2006; Staniland, 2012), it remains missing from literature on networks and cooperation. Whereas existing political science scholarship on networks and cooperation emphasizes the importance of internal information, which concerns the actions and resources of people in a group, I emphasize the role of external information about the actions and resources of people outside the group.

To test my theory that dense networks constrain access to external information

and resources, even while they help to overcome the free-rider problem, I conducted a randomized controlled network field experiment in 56 focus group discussions with Syrian refugees, across 14 cities, towns, and refugee camps in Lebanon and Jordan. I randomly assigned focus groups to comprise low-density or high-density groups, which was achieved by recruiting participants through either random sampling or referral recruiting from the UN Refugee Agency census. To study cooperation around public goods problems in the focus groups, I presented participants with audio vignettes about community problems that are common in refugee communities. I developed the content of the vignettes based on over a year of ethnographic research in Syrian communities in Lebanon, in conjunction with Syrian, Lebanese, and Jordanian NGO staff who work with Syrian refugees. The public goods issues presented to participants included public safety, freedom of movement, redistribution of humanitarian resources, protection of private property rights and the right to income, and interaction with public authorities/security forces. Outcomes include attitudinal and behavioral metrics of cooperation and deliberation from focus group transcripts, and survey data on participant characteristics.

Whereas I find that high-density groups demonstrate greater engagement with the the collective problems, low-density groups draw on a wider range of resources. These findings support the dominant explanation in political science and economics

that dense networks facilitate internal information flow, cooperation, and public goods provision (e.g., Putnam 2007, Habyarimana et al. 2009, Larson and Lewis 2016), and provide novel evidence that dense networks constrain the flow of external information and access to useful resources (e.g., Granovetter 1973, Granovetter 1983, Centola 2015), meaning that low network density can provide benefits for effective cooperation around public goods problems. Analyzing variation in the treatment effect across locations provides further evidence that resource access is a critical factor in explaining effective cooperation in refugee communities. Theories that explain networks and cooperation without reference to information flow, such as altruism (Alesina and La Ferrara, 2005), norms of strong reciprocity (Putnam, 2000), and preference homogeneity (Alesina, Baqir and Easterly, 1999; Goldin and Katz, 1999), do not find support in the data.

This research contributes to a growing literature in the social sciences that studies social networks in the field, and offers a new method for making valid inferences from network data that could be widely used by researchers in different settings. Causal inference with network data is often challenging, and this design allows researchers to nonparametrically identify and estimate the effects of group structure, even when the broader network structure is unknown. Most existing techniques for network intervention and inference require complete network mapping, which is difficult and

expensive even in small networks (e.g., Banerjee et al., 2013; Paluck, Shepherd and Aronow, 2016; Larson and Lewis, 2016). The method I develop and employ in this paper facilitates network interventions *without* mapping the network, even in large and complex networks.

This paper offers theory and evidence about the effects of group structure on cooperation and to research on public-goods provision in groups. I highlight the trade-off of network density for cooperation in precarious communities and the important distinction between internal and external information and their functions in facilitating cooperation. Dense networks facilitate cooperation by helping groups overcome the free-rider problem, but they limit access to information and resources that exist outside of the group. Whereas high-density groups demonstrate higher engagement with collective problems, low-density groups can draw on a wider range of resources. In precarious communities that lack the resources to mitigate their problems, dense networks will not be sufficient for cooperation. Even in the presence of strong trust and reciprocity, a precarious, mobile community may lack resources to solve problems.

## 2 The Syrian Refugee Crisis

In Lebanon and Jordan, most Syrian refugees live in urban and peri-urban settings. In Jordan 20% of Syrians live in formal UN camps. The UN has not established official refugee camps in Lebanon, but 15% of Syrians live in informal camps.<sup>2</sup> Worldwide, refugees living outside camps is the norm; less than one third of the world's 22.5 million refugees live in camps.

In the early years of the refugee crisis it was fairly simple for Syrians to enter and reside in Lebanon or Jordan. However, legal restrictions on entry, residency, and work increased as the conflict continued, severely limiting Syrians' ability to enter the countries, and forcing the majority of those already residing there into legal and financial precarity. Lebanon and Jordan deny Syrians a general right to work and constrain their movement. For most refugees, any interaction with state authority, such as police or government bureaucracy, can carry significant risk. In Lebanon and Jordan, Syrians fear passing through checkpoints due to the risk of abuse, arrest, or deportation. Traveling even short distances might involve passing through checkpoints, which means that Syrians cannot move freely within the host

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<sup>2</sup> People conversant in NGO/UN legalese may be familiar with the term '*informal settlement*' (*IS*) used to describe refugee camps in Lebanon. The term is meant to emphasize the fact that the camps are not run by the UN Refugee Agency. I maintain that the difference is more bureaucratic than useful, and I deliberately use the term 'camp' rather than IS

countries. Those who cannot legally move cannot safely work, go to hospitals to receive healthcare, travel to urban centers to renew their documents, or visit family to maintain and enjoy their most basic and cherished relationships.

Although Syrians cannot change the fundamental causes of their problems, they use response strategies to meet their daily needs and ease their difficulties (a process of ‘making do’ referred to as *zabat al-hal*). The inchoate dynamic nature of refugees communities magnifies the importance of information about social, economic, and bureaucratic processes that stable communities can take for granted. People continually search for information about safe travel routes, reliable employers, the current state of work-permit laws, and the services currently available from NGOs and international organizations. Even with useful information, people’s responses may only be day-to-day responses rather than permanent solutions, leaving people frustrated that they could not do more. The responses may be an ongoing negotiation between Syrians, or between Syrians and host-country individuals and organizations, or between Syrians and humanitarian organizations. The responses that people employ may be different each time they encounter a new problem, and may be a process of trial-and-error where people try a response to their problems, find that the response was ineffective and try a different response the next time they encounter the same problem.

Community problems are exacerbated in precarious mobile communities, which may lack resources to solve problems through effective cooperation even in the presence of strong trust and reciprocity. The diverse forms of precarity facing Syrians strain communities and press refugees to adopt *negative coping strategies* — actions where the survival of the agent is secured at the cost of other community members (Bayat, 2013, 55). Negative coping strategies create a vicious circle that could be mitigated through cooperation, but the consequences of the strategies make trust and cooperation harder.

I define *cooperation* as engaging with others in mutually beneficial activity (Bowles and Gintis, 2011). I draw on Bowles and Gintis (2002, 420) in defining a *refugee community*, the unit of analysis for the study, as “a group of [refugees] who interact directly, frequently, and in multi-faceted ways,” and I conceive of *interaction* as relations between individuals or groups implying that parties are potential contributors and beneficiaries from each other’s cooperation. Bowles and Gintis (2002)’s definition of community emphasizes the interactional and non-geographic nature of community, which is more general and useful for understanding how social ties define communities among people who do not necessarily live as close neighbors. Nonetheless, for populations with limited mobility, such as refugees facing legal vulnerability, a community must be geographically clustered for members to mutually contribute to

and benefit from public goods. Therefore, in my conception of the interactions that define community, the interactions should take place within a fairly small geographic area, such as a town or an urban neighborhood. Accordingly, the primary sampling unit for focus groups was defined geographically as the village in rural areas, the town in peri-urban areas, and the neighborhood in cities.

### 3 Networks, Resources, and Cooperation

A large body of work in political science and economics suggests that network density leads to more cooperation around public goods problems (e.g., Fearon and Laitin 1996, Putnam 2007, Habyarimana et al. 2009). Much of this work specifically studies the effects of ethnicity, which we can conceive of as a social network where proximity is defined according to ascriptive similarity. Other scholarship suggests that density correlates with bonds of normative obligation and shared preferences, which facilitate cooperation (Putnam, 2000; Alesina, Baqir and Easterly, 1999; Alesina and La Ferrara, 2005). Social network theory, however, suggests that higher network density may inhibit the flow of information and resources important for cooperation around public goods problems, meaning that lower density networks may provide unique benefits for communities with limited resources trying to improve their well-being (e.g., Granovetter 1973, Centola 2015).

### 3.1 Information Flow

The dominant explanation in political science for the correlation between group density and public goods provision states that high-density networks facilitate information flow and effective in-group sanctioning (Fearon and Laitin, 1996; Putnam, 2000; Miguel and Gugerty, 2005). The flow of information increases the likelihood that free-riding is detected, that information spreads about the free-riding, and that the person in question can be located and punished. Because social ties transmit information, the higher a network's density, *ceteris paribus*, the more opportunities people will have to share and receive information.

Miguel and Gugerty (2005) find evidence in western Kenya that higher ethnic homogeneity in villages resulted in a better provision in local public goods and services, a result which they argue is due to homogeneous communities facing lower cost in overcoming collective action problems associated with applying social sanctions. Tsai (2007) shows that local officials in China are more likely to provide goods and services when they are part of the same social groups, such as churches, as common citizens, rendering social sanctions more feasible. In Kampala, Uganda, Habyarimana et al. (2009) test a number of mechanisms to explain the robust positive correlation between ethnic concentration and public goods provision, and find evidence that people tend to interact more frequently with coethnics, believe they can better read

information about coethnics, and may be better able to locate a specific coethnic if necessary.

Turning from political science to network science, I argue that information flow will also serve to support cooperation through non-punitive mechanisms. Whereas network density facilitates the flow of *internal information* within a group, which helps people monitor the behavior other group members, it constrains the flow of *external information*. Bridging ties between distant parts of a network link diverse individuals, spreading information that recipients could not otherwise access (Granovetter, 1973, 1983), and supporting effective responses to public goods problems. Dense groups can be so clustered as to prevent meaningful contact outside that group, thereby stymying the flow of resources and information. Worse still is the risk that highly homogeneous groups can generate balkanized communities with little intergroup contact (Blau and Schwartz, 1984; Centola, 2015).

To test implications of network theory for information flow, I want to vary group structure, rather than tie type. Granovetter's theory of 'the strength of weak ties' is not a *ceteris paribus* causal theory. The implicit counterfactual comparison in Granovetter's prediction — that acquaintances ('weak ties') are less likely to be socially involved with one another than are close friends ('strong ties') (Granovetter, 1983, p.203) — is not between ties exogenously determined to be strong versus weak;

instead the unstated notional comparison is between a tie, given that it is a strong tie, and the same tie, given that it is a weak tie. Granovetter's theory does not suggest that an intervention turning a weak tie into a strong tie would decrease the expectation that the tie bridges social distance. Instead, given that a tie is strong, the connected nodes are likely to be socially proximate and share a larger proportion of their connections.

Granovetter (1973, 1983)'s argument that bridging ties are particularly useful for spreading information is not really about the type of ties but rather about connections across social distance. As Watts (1999, p.14) argues, the network characteristics of two connected nodes, and the consequent dynamics of their interactions, are not determined by the type of tie, but rather by structure of the network around them. I follow Watts (1999) in conceiving of network distance according to the difference between two units in their characteristics and some assessment of similarity or metric of interaction, rather than the metric known as *path length*, which is the number of network edges we need to trace to arrive from node *A* to node *B*. By definition, the similarity of nodes is increasing in social proximity, and vice versa. Given that two nodes are connected, the probability of the connection being strong (versus weak) is increasing in social proximity (that is, similarity). Because the tie must be strong or weak, the probability of the connection being weak is decreasing in social

proximity. Observationally, the strength of ties, the density of ties, and the similarity of information and resource access will all be increasing in the socially proximity of a group.

Based on theory from political science that high-density networks facilitate cooperation by disincentivizing free-riding, and theory from network science that low-density networks facilitate access to a wide range of information and resources, we can draw testable predictions to form the first two hypotheses:

**H1: From political science and economics**

Treatment (being recruited to form a dense group) increases internal information flow, which disincentivizes free-riding and incentivizes cooperation. An observable implication of this in the context of a focus group discussion is that treatment will increase engagement around collective problems.

**H2: From social-network theory**

Treatment (being recruited to form a dense group) decreases external information flow, and therefore decreases the diversity of resources groups draw on in responses to collective problems. An observable implication of this in the context of a focus group discussion is that treatment groups will be less likely to draw on diverse

resources in response to public goods problems.

### 3.2 Resource Access

A wealth of scholarship has studied the impact of resources on political outcomes ranging from local advocacy and activism to national movements (Morris, 1986; McCarthy and Wolfson, 1996) to high-risk collective action like participation in wars and insurgencies (Kalyvas, 2001; Weinstein, 2006; Staniland, 2012). Resource mobilization theory asserts that almost any group of people striving for social change needs to marshal external resources and aggregate the resources for collective purposes subject to the structural constraints they face. I argue that cooperation in refugee communities critically depends on resource availability, access, and constraints. We can think of *resources* as goods that have utility for achieving social change (Opp, 2009). A person or group ‘controls’ the resource if they can use it toward achieving their goals for social change (Jenkins, 1983). In refugee communities, resources can include public services, material goods, information, human capital, and political connections. With more access to resources that help mitigate community problems, the rewards of cooperation will be higher, while the costs remain constant, thereby incentivizing cooperation.

Access to and control of resources shape groups’ capacity to mobilize for and

influence campaigns of social change. Groups with serious objective deprivations will need to rely more heavily on external resources to realize their preferences for social change (McCarthy and Zald, 1977, 1225-6). Informal and migrant communities with constrained resources may only be able to find satisfactory solutions under a narrow set of real-world conditions, which may overpower or counteract the potential advantages of dense social ties. That is, the relationship between social ties and cooperation will be contextually contingent on whether useful resources exist, and high-density groups will rely less on external resources for dealing with public goods problems. These predictions motivate the following hypothesis about the availability of external resources and likelihood of cooperation:

**H3: Heterogeneous Treatment Effects in Resource Availability**

When external resources are available, control (low-density) groups will have a cooperative advantage because of their ability to draw on outside resources. Conversely, when external resources are unavailable, treatment (high-density) groups will have a cooperative advantage since the low-density groups cannot draw on outside resources.

## 4 The Social-Network Field Experiment

I conducted 56 focus group discussions with Syrians in Lebanon and Jordan to study how refugee communities cooperate in the face of collective problems. I randomly assigned focus groups to be recruited through either a random sample or a referral sample. These two strategies created groups that have either high or low network density between participants, with respect to pre-existing ties. Random assignment was blocked by country, site, and gender. This produced one treatment group and one control group per gender per site, across 14 research sites in Lebanon and Jordan. Variation in the recruitment strategy used to construct focus groups allows us to study the impact of dense group structure on participant discussion of public goods problems in the focus groups. I designed and fielded the study as part of a broader World Bank research project on the effects of the Syrian refugee crisis on Syrians and host communities. Two experienced focus group moderators conducted the focus groups. I discuss details about the moderators, research assistants, transcriptionists, and other project staff in the online appendix.

Table 1 describes the two experimental recruitment strategies. For each gender and site, we can conceive of the design as sampling two nodes from an undirected graph representing a social network. One node is randomly assigned to sit in a low-density group of randomly sampled nodes from the graph; the second node is assigned

Table 1: Description of Experimental Conditions

Control: Low density	Treatment: High density
Ten individuals randomly selected from the UNHCR census, representative of the eligible population, representing a baseline (or null) distribution against which to compare referral-recruited (high-density) groups.	One ‘seed’ randomly selected from the UNHCR census, and 9 close acquaintances drawn from a systematic two-wave, three-contact referral sample.

to serve as a seed for a referral sample of its network neighborhood, forming a high-density group. We can directly compare the treated focus groups to the control focus groups to estimate the consequences of being in a high-density social group rather than a low-density group.

The research design has two key features: (i) random seed selection and (ii) random assignment of seeds to treatment. I sampled from UNHCR registration data, a census of all registered Syrian refugees in Lebanon and Jordan. The units that are randomly sampled from the UNHCR census are representative in expectation of the population meeting the study’s inclusion criteria. Because the control-group is

representative in expectation of the population, we can interpret the experimental results in two non-mutually exclusive ways. The tests show how high-density groups differ from the overall population, and also compare high-density social groups and low-density social groups. Another desirable feature of random selection and assignment is that the characteristics of observed network neighborhoods are representative in expectation of the population’s network neighborhoods. Therefore the experiment allows us to compare groups that are representative of the real-world networks (control) to groups that are representative of real-world groups (treatment).

Refugees could only be recruited if they were willing and able to refer their network neighborhood, operationalized as the three people with whom they had interacted most frequently over the past two weeks. This inclusion criterion screened out people who do not have a recruitable network neighborhood, and establishes that focus group potential outcomes are fixed and defined counter-factually, in the sense that each unit has a network neighborhood that we would have observed if it had been assigned to treatment. Therefore, the inclusion criterion ensures that all participants could have been assigned to either treatment condition, and both treatment and control potential outcomes are defined for every unit in the study<sup>3</sup>

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<sup>3</sup> Additional inclusion criteria were applied. In both arms, participants needed to be between the ages of 20 and 50, live in the study site, be the same gender as the referrer, not be members of another participant’s nuclear family or household.

The fact that *all research participants could have referred three people* is critical for ruling out reverse causation — for example, that people who are more likely to talk to each other and more likely to be cooperative are more likely to have social ties and therefore be selected as a high-density focus group seed.<sup>4</sup>

## 4.1 Public Goods Vignettes

In the focus groups, participants discussed public goods problems that are common in refugee communities, which were presented in audio vignettes. In the audio vignettes, two Syrian men discuss problems that Syrian refugee communities commonly face. I developed the content of the vignettes based on more than a year of ethnographic research in Syrian communities in Lebanon, and in conjunction with Syrian, Lebanese, and Jordanian NGO staffers who work with Syrian refugees.

I presented participants with problems related to resource redistribution, public safety, access to labor and income, protection of private property rights, and legal vulnerability vis-a-vis security authorities. The full text of the vignettes is available in the online appendix and on my website, where the reader will find links to videos

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<sup>4</sup> The fact a potential recruit could have referred others only ensures that they are referrable if we assume an undirected social network. That is, we assume that the three people a seed would refer if asked, would in turn refer the seed if any of them had been asked first. The assumption is non-trivial but was necessary to maintain the feasibility of the study.

that include the Arabic-language audio of the vignettes with English-language subtitles. After playing each vignette the discussion was opened up for the participants. Although the community problems have possible collective responses, the vignettes did not impose collective responses upon participants. Indeed, we see variation in discussion of the vignettes from disinterest to heated debate, and from atomistic statements to communal responses. Moderators did little to shape participants' responses to the audio vignettes. Outcomes include behavioral metrics of deliberation and cooperation in the focus groups and attitudinal and demographic metrics from participant survey data. I played the audio vignettes about 90 minutes into focus groups that lasted two hours on average, and the presentation and discussion of all four vignettes lasted about 15 minutes on average. The order of the public goods vignettes in each focus group was randomized to eliminate order effects.

To attain evidentiary validity, vignettes should resonate with participants, which may not happen if the vignettes are designed based on researchers' *a priori* assumptions. Therefore, I sought to achieve three goals in designing the audio vignettes' content. First, I aimed to maximize the realism and salience of scenarios. Second, the audio vignettes described problems that were sufficiently general they would resonate with Syrians living in urban, peri-urban, and camp settings in both Lebanon and Jordan. Third, the content of the recordings needed to be sufficiently specific

to prompt meaningful discussion. As shown in the online appendix, the content of focus group discussions makes clear that the vignettes resonated with participants.

To help preserve excludability, moderators were not told about the intention of the construction of high-density and a low-density groups, and were not told about the hypotheses under investigation.<sup>5</sup> I trained moderators to do very little to guide discussion after the vignette audio files were played. At most, if participants asked what they were supposed to do, the moderators were trained to say something minimal like, “What are you going to do?” or “Can you do anything in this situation?” but explain no more and never express expectations that people work together.

## 4.2 Empirical Strategy

There are  $n$  focus groups, indexed  $i = 1, 2, \dots, n$ , and 4 vignettes in each focus group, indexed  $j = 1, 2, 3, 4$ . I define the focus group outcome as  $Y_i^j$ , for discussion of vignette  $j$  in focus group  $i$ . I consider a binary treatment, denoted  $Z_i = 1$  if focus group  $i$  is assigned to treatment. I define a covariate of focus group  $i$  as  $G_i$ , the population mean for covariate  $G$  as  $\mu_G$ , and a covariate of the seed of group  $i$  as  $S_i$ .

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<sup>5</sup> Moderators did know that the groups were either people who mostly knew each other, or mostly did not know each other, which was necessary for practical reasons of getting participants into the right room.

I assume SUTVA at the level of the focus group, such that:

$$Y_i^j = Y_i^j(Z_i) \quad (1)$$

$$G_i = G_i(Z_i) \quad (2)$$

Equations 1 and 2 state that the observed values of  $Y_i^j$  and  $G_i$  are only a function of the treatment assigned to focus group  $i$ .

Random assignment implies the following independence relationships:

$$Y_i^j(z) \perp\!\!\!\perp Z_i, \text{ for } z \in \{0, 1\} \quad (3)$$

$$G_i(z) \perp\!\!\!\perp Z_i, \text{ for } z \in \{0, 1\} \quad (4)$$

Equations 3 and 4 imply Equations 5 and 6, below. I will use the plug-in principle to estimate the inferential targets, the left-hand side of Equations 5 and 6, with sample analogues of the right-hand side of Equations 5 and 6.

$$E[Y_i^j(z)] = E[Y_i^j | Z_i = z], \text{ for } z \in \{0, 1\} \quad (5)$$

$$E[G_i(z)] = E[G_i | Z_i = z], \text{ for } z \in \{0, 1\} \quad (6)$$

Although potential outcomes are independent of treatment assignment, referral recruited participants have different probabilities of recruitment than randomly sampled participants. In traditional experiments, the research design implies both Equation 6 and the observable similarity of the pre-treatment covariate  $G$  across

treatment arms, that is,  $E[G_i|Z_i = 1] = E[G_i|Z_i = 0]$ . My research design implies Equation 6 but does not imply that the observed covariate looks similar across treatment arms. That is, in this research design  $E[G_i|Z_i = 1]$  does not necessarily equal  $E[G_i|Z_i = 0]$ .

$S_i$  is a fixed covariate for group  $i$  and not a function of treatment, which implies that  $E[S_i|Z_i = 1] = E[S_i|Z_i = 0]$ . Furthermore, the characteristics of all randomly sampled units are equivalent in expectation. Therefore, when  $G$  and  $S$  denote the same covariate,  $E[G_i(0)] = E[S_i|Z_i = 1] = E[S_i|Z_i = 0] = E[(G_i(0), (S_i|Z_i = 1))]$ . In the special case where  $G_i$  is the group mean of a covariate, which I denote  $\bar{G}_i$ , the expectation for the control group will be the population mean for the covariate. That is,

$$E[\bar{G}_i|Z_i = 0] = \mu_G \tag{7}$$

### 4.3 Estimation

I present difference-in-means estimates for focus group behavior, covariates, and beliefs. To study the treatment effect on focus group responses to audio vignettes, I present difference-in-means estimates at the focus-group-vignette level with robust standard errors clustered at the focus-group level, and randomization-inference  $p$  values calculated based on randomization at the focus-group level blocked by country,

site, and gender.<sup>6</sup> To test for differences between the treatment and control groups' covariates, I use participant survey data and calculate difference-in-means estimates at the focus-group level, with robust standard errors, and randomization-inference  $p$  values from randomization blocked by country, site, and gender. To estimate heterogeneous effects by country, I run a straightforward heterogeneous treatment effects analysis using OLS regression of the outcome regressed on treatment, a country indicator, and the interaction of the two, with cluster-robust standard errors.

#### 4.4 Randomization Check

I check randomization by testing for the observable similarity of randomly sampled participants across treatment arms, which includes all control-group participants and treatment-group seeds, and excludes treatment-group referral recruits. I use the plug-in principle to test Equation 8 with my sample.

$$E[G_i(0)] = E[S_i | Z_i = 1] \tag{8}$$

As we would expect under random assignment, data from a participant questionnaire shows that measured pre-treatment covariates of randomly sampled units are balanced across the two experimental conditions. I run a test of joint balance

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<sup>6</sup> Although errors are likely correlated within regions as well as within focus groups, standard errors are clustered by focus group because it was the level of random assignment.

(aka, joint orthogonality), testing the joint hypothesis:  $\beta_1 = \beta_2 = \dots = \beta_k = 0$ , by running an F-test on a linear regression of treatment assignment on measured covariates, subsetting to randomly sampled observations, which includes the referral seeds and excludes referral-sampled observations. The test of joint orthogonality fails to reject the null hypothesis of equality (randomization-inference  $p$  value: 0.485). The variables for the randomization check are drawn from the post-focus group questionnaire, meaning they were measured post-treatment. The content of the questions, however, is plausibly fixed pre-treatment, including age, tribal identity, number of households members, and year of arrival in the host country.

## 4.5 Manipulation Check

As a basic test of design, I test whether treatment increased focus group density, defined as  $\delta_i$  in Equation 9 as the share of realized ties to possible ties in focus group  $i$ .  $d_i$  denotes the total number of realized ties between the  $n_i$  participants in focus group  $i$ .  $n_i(n_i - 1)$  denotes the total number of possible ties in the focus group.

$$\delta_i = \frac{d_i}{n_i(n_i - 1)} \quad (9)$$

I present three metrics of participant connections. First, I measured simple ties, operationalized as other people in the focus group whom the respondent knew by name before the day of the focus group. Second, I asked respondents how many other

participants they regularly exchange visits with, a metric I refer to as strong ties. Third, I calculate a metric of weak ties by subtracting the strong-ties metric from the simple-ties metric for each respondent, which captures the number of participants whom the respondent knows by name but does not regularly exchange visits with.

Figure 1 shows that the density of high-density groups was much higher than that of low-density groups. Based on participant self-reports the low-density groups had 11.6% average density of pre-existing simple ties, compared with 63.6% for the high-density groups. Looking at panel 2, we see that the low-density groups had 5.3% average density of pre-existing strong ties, compared with 38.4% for the high-density groups. Looking at panel 3, we see that the low-density groups had 6.3% average density of pre-existing weak ties, compared with 24.6% for the high-density groups.

Although Figure 1 clearly demonstrates both the statistical and substantive significance of treatment effect, I also present regression results in the online appendix.

## 5 Data

Data includes both behavioral metrics of deliberation and cooperation in the focus groups and an attitudinal metric of self-reported beliefs about the effectiveness of group cooperation. For the attitudinal metric, I ask participants after the focus group whether they believe that they would be able to work with the other people

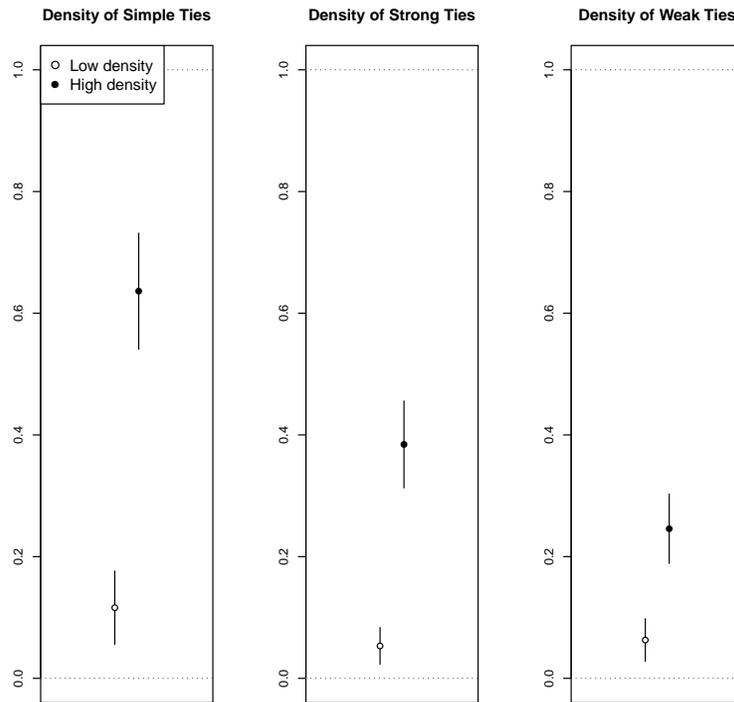


Figure 1: Density of Within-Focus-Group Social Ties,  $n=56$

in the room to resolve problems like those discussed in the vignettes. (Question wording, translated from Arabic: “Do you think that you would be able to find a response to the problems in your community like the problems we discussed in the focus group with the other participants in the focus group?”) Behavioral metrics capture how focus group participants responded to the vignettes. I coded responses to the vignettes based on the transcripts. I was blind to treatment status while developing the vignette coding guide and while coding vignettes. I only merged

treatment status with other covariates after I completed coding. Coding was not automated or predictive; I read and hand-coded all focus group transcripts using the qualitative data analysis software Dedoose, which then output the results in a spreadsheet for statistical analysis. Details of the coding guide and coding process are available in the online appendix.

I conducted 56 focus groups ( $n = 56$ ), comprising 489 individuals, and 223 vignettes (rather than 224, due to a focus group moderator error in presenting the vignettes). The average focus group had 8.7 participants, ranging in size from 6 to 10 participants. Attendance rates were balanced across treatment and control arms. Focus groups were either all-male or all-female, with no mixed-gender focus groups. The study was conducted in Levantine Arabic. I speak the dialect fluently and all recruiters and focus group moderators were native speakers. All data collection was conducted in Levantine Arabic and all documents read to or distributed to participants were in formal Arabic. I explained the content of the documents to many participants in Levantine Arabic to ensure comprehension. I monitored all aspects of the study including recruitment, data collection, and focus group transcription. I discuss more details of study conduct and quality checks in the online appendix.

I ran the focus groups in Lebanon in May and June 2016, and in Jordan in June and July 2016.<sup>7</sup> Due to delays with obtaining permits for research in Za'atari camp,

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<sup>7</sup> Recruiters read all people contacted a consent script approved by the Yale Human Subjects

I ran the focus groups there in September 2016. I conducted pilot focus groups in Lebanon in May 2016 to improve the public goods vignettes, discussion guide, and framing of the study. I present additional information in the online appendix about site selection, blocking, assignment of moderators to focus groups, recruitment procedures, and focus group participant descriptives.

## 5.1 Participant Protection in Humanitarian Crises

Recruiting and conducting research with participants from a vulnerable population is difficult and requires great care to minimize potential for harm. To decrease the transparency of recruitment identifiers I utilized the fact that a majority of Syrian adults have a nickname. During recruitment and focus group conduct the research team referred to participants by their nickname whenever possible. The widespread local nickname system is based on the name of someone's eldest son or eldest daughter (if they have no son). For example, Em Ali (meaning Ali's mom) is the nickname for a woman whose eldest son is named Ali. Abu Muhammed (meaning Muhammed's dad) is the nickname for a man whose eldest son is named Muhammed. Sometimes a man without children uses a similar nickname, but replaces the name of a child with the name of his father, implying that when he has a son, he will name the son

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Committee under protocol HSC #1603017430. Focus group moderators read another consent script to participants before focus groups were conducted.

after his father, although it is also widespread among young men and men to use their father's name even if they do not plan to name their child after the father. Women who do not have children less frequently adopt such nicknames, although some adopted them during the early days of the uprising to protect their identities.

Files including recruitment information and transcripts are password-protected and encrypted. People's responses are further protected by the fact that their statements and real names never appear in the same document. In the audio files of the focus group discussions, moderators referred to people by their nickname (which was written on a placard in front of each person at the beginning of the focus group to help the moderator with the nicknames), and the transcripts identify participants by their nickname.

## **6 Results: How Does Group Structure Affect Community Cooperation?**

To explore how group structure shapes patterns of cooperation around public goods problems in refugee communities, I employ several statistical analyses to test my hypotheses. First, I present the experimental results for the treatment effects on behavioral metrics of cooperation and resource access drawn from transcripts of vi-

gnette discussions to test Hypotheses 1 and 2, about network density and the flow of information. To test Hypothesis 3 about whether the treatment effects are conditional on resource availability, I examine attitudinal metrics of respondent optimism about effective cooperation across network variation and across countries. I present non-experimental heterogeneous treatment effects analysis by country to test for differences in contextual resource access. In the next section, I present experimental tests of alternative explanations for the correlation between between network density and cooperation that do not rely on information flow.

## 6.1 Information Flow

The flow of information through networks may facilitate punishment of free-riders in high-density networks and facilitate the spread of external information and resources in low-density networks. These propositions lead to two hypotheses. First, (H1) treatment (being recruited to form a dense group) increases internal information flow, which disincentivizes free-riding and incentivizes cooperation. An observable implication of this in the context of a focus group discussion is that treatment will increase engagement around discussion of public goods problem. Second, (H2) treatment (being recruited to form a dense group) decreases external information flow. An observable implication of this in the context of a focus group discussion is that

treatment groups will be less likely to draw on diverse resources in response to public goods problems.

To test the first hypothesis, I proxy for a group's engagement in response to collective problems by examining the treatment effect on the amount of interpersonal discussion about the public goods problems. For each public goods vignette, I examine the number of comments where participants were actively discussing the issue on the table with other participants. Dialogue is coded comments about the problem on the table and either responded to a previous comment or prompted a direct response from another participant.

To test Hypothesis 2, I measure a group's access to diverse resources by looking at whether a focus group states that Syrians could turn to an outside party in response to the problem being discussed. Outcomes include a speaker saying that, in response to the public goods problem on the table, Syrians (a specific Syrian including the speaker, or Syrians in general) could turn to some resource outside the focus group members. I test for results across all resources that were discussed in any focus group. The resources discussed included Syrian leaders, brokers between the Syrian and the host community, traditional dispute resolution involving sheikhs (*sulha*), the host community, NGOs, and the national government.

In Table 2 the unit of analysis is the focus-group vignette. The outcome for the

Table 2: Community-Problem Responses

	Dialogue	Leaders	Brokers	Sulha	Host	NGOs	Gov
Control mean	2.46	0.1	0.17	0.14	0.2	0.05	0.39
$\hat{\beta}$	1.33	-0.06	-0.09	-0.08	-0.08	-0.04	-0.04
	(0.62)	(0.03)	(0.04)	(0.03)	(0.04)	(0.02)	(0.06)
RI $p$ -value	<0.01	0.03	0.03	0.02	0.06	0.01	0.49

Notes:  $n = 223$ .  $\hat{\beta}$  denotes difference-in-means estimate. HC2 robust standard errors, clustered at the focus-group level, are reported in parentheses. Randomization inference performed with 10,000 simulated randomized treatment assignment vectors, clustered at the focus-group level and blocked by country, site, and gender. Results are robust to adjustment.

Dialogue column is a continuous measure of the number of interactive comments between two participants discussing the community problem. The mean number of comments in one focus-group vignette discussion was approximately 11. We can see a large increase in how much high-density group participants engaged with each other in response to the community problems. The control mean shows that in low-density groups 2.46 comments were dialogue per vignette discussion, whereas the high-density groups made 3.79 dialogue comments on average. This constitutes a 54 percent increase, and a 12 percentage point increase in the share of comments that were dialogue, from roughly 22% of comments being dialogue in control to roughly 34% of comments in treatment.

The other outcomes in Table 2 are binary variables, and each indicates whether at least one respondent stated that Syrians can turn to each actor in response to the community problem. We see that across a range of actors, high-density groups are consistently *less* likely to say that they could draw on these resources. The difference in means is statistically significant for all variables except the national government and the point estimates are all negative.

Next, I test for a treatment effect on explicit statements about *not* being able to rely on outside resources, which allows us to refine the interpretation of the treatment effect. The results presented in Table 2 in the previous section are based on statements like “We can turn to the police in response to the problem.” The treatment effect on negative statements, like “We *cannot* turn to the police in response to the problem,” is a separate empirical question. I coded transcripts for both positive and negative comments about whether each type of outside resource would or would not be helpful. If we observe that low-density groups make both more positive and more negative comments about outside resources, it would suggest that low-density groups discuss outside resources more, and possibly are more aware of their existence, but the conclusion would be unclear as to whether low-density groups are better able to access external resources. However, if low-density (control) groups are better able to access resources, we would expect to see a negative treatment effect on positive

statements, as we saw above in Table 2, and we would expect to see a null or positive treatment effect on negative comments.

In keeping with the second interpretation, we find little evidence of a treatment effect on negative statements about the helpfulness of outside resources. The regression results are presented in Table 3. First, no one made statements that Syrian leaders, brokers, or traditional dispute resolution would *not* be helpful, so we see in columns 1-3 that the control-group mean and the treatment effect estimates are both 0. The one metric where we observe a statistically significant treatment effect in Table 3 is an increase in the number of vignette discussions where someone discussed *not* being able to turn to the national government, from 0 of 111 control-group discussions to 5 of 112 treatment-group discussions. It is worth noting that if even one control-group discussion had mentioned not being able to turn to the national government, this result would go away. Nonetheless, the results obtain across all variables except respondents' views about being able to turn to the national government.

In summary, the social-network experiment provides supportive evidence for Hypotheses 1 and 2. The experimental results based on the focus group transcripts show robust differences in how high-density groups respond to public goods problems relative to a low-density groups. First, high-density groups were more likely to engage in dialogue with each other, responding directly to one another's comments,

Table 3: Not Able to Rely on Resources

	Not Leaders	Not Brokers	Not Sulha	Not Host	Not NGOs	Not Gov
Control mean	0	0	0	0.23	0.03	0
$\hat{\beta}$	0	0	0	-0.04	0.02	0.04
	(0)	(0)	(0)	(0.05)	(0.02)	(0.02)
RI $p$ -value	1	1	1	0.41	0.5	0.03

Notes:  $n = 223$ .  $\hat{\beta}$  denotes difference-in-means estimate. HC2 robust standard errors, clustered at the focus-group level, are reported in parentheses. Randomization inference performed with 10,000 simulated randomized treatment assignment vectors, clustered at the focus-group level and blocked by country, site, and gender. Results are robust to adjustment for observed covariates.

as opposed to making stand-alone statements. Second, high-density groups were less likely to discuss the helpfulness of outside resources — including NGOs, leaders, brokers, and host community — in response to public goods problems. They were less likely to say that they would turn to leaders, brokers, dispute resolution mediated by community elders (*sulha*), NGOs, the national government, and the host community. The estimated treatment effects on all proxies for access to information and resources are statistically distinguishable from zero, except for turning to the national government.

These results suggest that people in high-density groups are more able to rely on

informal connections and discursive exchange between community members but are also less able to draw on diverse resources. The experimental finding that treatment (being recruited to form a high-density group) increases engagement in response to collective problems supports Hypothesis 1 and aligns with the large body of existing evidence that high-density groups have an informational advantage in monitoring and punishing free-riders. We also find supportive evidence for Hypothesis 2 that treatment (being recruited to form a high-density group) decreases information about and access to diverse resources that support cooperation. As shown in the online appendix, results are robust to adjustment for observed covariates.

## 6.2 Availability of Resources

Turning to Hypothesis 3, I test whether the treatment effect is conditional on the existence of external resources. As we saw in the previous section the high-density groups are less likely to draw on external resources in response to community problems, which should diminish the effect of resource availability on cooperation. Conversely, among the low-density groups, we should observe greater variation in public goods depending on the availability of external resources.

To test the effects of variation in the availability of outside resources, I leverage the fact that levels of public goods provision are higher in Jordan than Lebanon and

constraints on access are lower. Descriptive statistics substantiating this assertion about resource access and constraints in the two countries are presented in the online appendix. Because the legal and social conditions in Syrian communities and government public goods provision differ between Lebanon and Jordan, it is plausible that the consequences of social networks on refugees' responses to public goods problems are heterogeneous across the two countries. To study these effects, I turn to the post-focus group questionnaire, where participants were asked if they think they could work with the other focus group participants to respond to problems in their community like the issues presented in the vignettes.

When interpreting the heterogeneous treatment effects by country it is important to remember that I did not randomize which country Syrian refugees live in or the level of government public goods provision or legal regimes in the countries. Some confounding variable may be driving the observed results. My interpretation of the heterogeneous treatment effects analysis depends on the assertion that the availability of public goods to Syrians is driving variation between the countries, which is a strong assumption, and future work should experimentally manipulate resource access, while ensuring the intervention is ethical given the vulnerability and deprivation of communities.

The heterogeneous treatment-effect estimates presented in Figure 2 show vari-

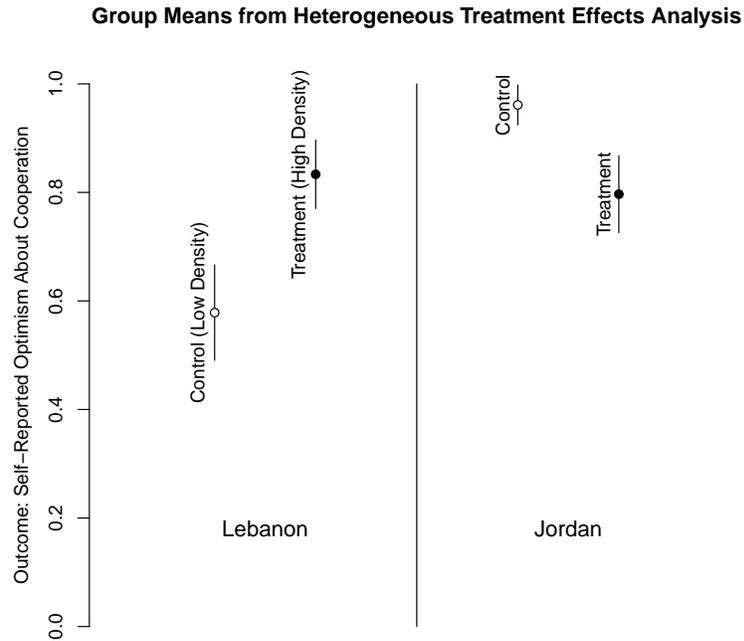


Figure 2: Heterogeneous Treatment Effects By Country

Notes:  $n = 56$ . Confidence intervals are calculated with HC2 robust standard errors, clustered at the focus-group level. Results are robust to adjustment for observed covariates.

ation in the treatment effect between the two countries with respect to Syrians' self-reported optimism about the effectiveness of group responses to problems. The treatment effect is positive in Jordan, which I argue is a context with more outside resources for Syrians to access. Conversely, the treatment effect is negative in Lebanon,

which I argue is a context with fewer outside resources for Syrians to access. While the rates of optimism about cooperation in the treatment groups are statistically indistinguishable across the two countries, the control group in Jordan is significantly more optimistic than the control group in Lebanon. In Jordan, where more public goods are available for Syrians to access, we see that the control group, which must rely on these external resources is more optimistic than the control group in Lebanon. This aligns with the theoretical prediction that low-density groups, which rely on external resources, are dependent on the availability of and constraints on external resources.

An anecdote from the conduct of the study highlights the importance of information and resources for refugees to confront their problem. Participants in the focus groups were given my contact information (my WhatsApp number for free texts and calls) as part of the informed consent form. In the year after the study was conducted, I received messages from and corresponded with dozens of participants. Far and away, the most common general category of messages was requests for information, such as filing a claim for a service from the UN or an INGO, registering someone with UNHCR, or gaining access to medical services. The important point is that all the information is publicly available and has been promoted through UN and INGO information dissemination campaigns. Nonetheless, only once these par-

ticipants were provided with a bridging tie to someone who had the information — in this case, me — were they able to get information that the UN and INGOs have been actively trying to deliver to them. Furthermore, the majority of these participants subsequently benefited from the information and services they had inquired about, ruling out the possibility that they had not received the information because they were not eligible for the services.

## 7 **Alternative Explanations**

A number of explanations for the observed correlation between group density and cooperation do not rely on information flow. First, people in high-density groups may cooperate more because they care about each other's welfare, prefer working with each other, or share a sense of normative obligation (Putnam, 2000; Alesina and La Ferrara, 2005; Wood, 2003). People interacting with a group of close acquaintances may be more likely attend to the needs of others, thereby promoting cooperative behavior. Participants in high-density groups, sitting with people whom they know and relate with, may more easily think of problems and responses as collective issues, or they may more readily feel the trust that is necessary for people to contribute to public goods (Kahan, 2003).

Second, numerous mechanisms proposed by existing scholarship rely on in-group

similarity relative to out-group members to explain the correlation between group density and cooperation; for instance, coethnics may have similar preferences or may work well together. Scholars including Alesina, Baqir and Easterly (1999), Goldin and Katz (1999), and Alesina and La Ferrara (2005) suggest that a “diversity of tastes” comes with ascriptive diversity. Given that recent work testing the mechanism of shared preferences has cast doubt on its importance (Habyarimana et al., 2009; Larson and Lewis, 2016), further empirical testing is particularly important.

Lastly, even among similarly dense networks, the network location of key actors may have critical effects on outcomes. Recent work in political science argues that different node location will produce different outcomes even when holding density constant, and that peripheral network locations may be more important for initiating and mobilizing high-risk collective action than central members (Larson and Lewis, 2016; Steinert-Threlkeld, 2017; Hassanpour, 2017; Larson, 2017*a*).

## **7.1 Testing for Alternative Explanations**

To test whether psychological mechanisms are at play in the observed differences between the high- and low-density groups, I proxy for psychological mechanisms using two metrics. First, if people have more sociotropic preferences in high-density groups, participants in the high-density experimental groups will express concern

or recognition of the issue as one that affects the well-being of other people in the community, not just themselves. Therefore, I coded whether a speaker expressed concern or recognition of the problem as one that affects the well-being people other than their own and that of their family, either self-inclusive (e.g., “this affects us”) or self-exclusive (e.g., “this affects many other people in the community, although not me”).

In a second coding, I applied a higher standard of sociotropic preferences. I coded whether statements discussed the impact of the problem in the vignette on people other than the speaker or their family members. Last, I coded whether comments explicitly acknowledged that people should work together to mitigate the community problem.

As the experimental results in the online appendix show, I find no detectable treatment effect on whether groups discussed the need for collective action, and no detectable effect on whether groups viewed the problems from a more collective perspective. The lack of evidence of psychological mechanisms aligns with existing studies, including Habyarimana et al. (2009), who find that people do not exhibit greater concern for their in-group peers’ welfare or prefer working with in-group members.

Another alternative explanation is that high-density groups may include partic-

ipants who have different network locations in their real-world community. Recent work in political science argues that node location affects cooperation even when holding density constant, and that peripheral network locations may be more important for initiating and mobilizing high-risk collective action than central members (Larson and Lewis, 2016; Steinert-Threlkeld, 2017; Hassanpour, 2017; Larson, 2017 *a*).

In the online appendix, I present results for tests of whether high-density groups are more central in real-world networks than low-density groups. We do find that high-density groups know more people in the community, meaning that they are more central to the network, but as we saw in section 6.1 that they still talk less about external resources. The most straightforward prediction about the relationship between network centrality and the diversity of resources would be an observed positive relationship. The results in section 6.1 about deliberation and access to diverse resources, however, move in the opposite direction, with the treatment group turning to outside resources less in discussing their community problems. Although treatment does have an effect on network centrality, I do not interpret the result as evidence that the treatment effect is driven by participants' locations in the broader community instead of the flow of information between recruited participants.

## 8 Conclusion

In spite of Sharqi camp's dense networks of trust and strong reciprocity, the community's large proportion of overlapping network connections constrained the flow of diverse external information that could have given the residents access to relationships, public services, or NGO resources to help resolve their community problems. Helween, on the other hand, has many subgroups in the camp, and is overall a less dense community. Despite Sharqi's higher levels of trust and reciprocity, the greater social distance between Helween's residents made them more likely to have nonredundant information about and access to resources useful for mitigating their public goods problems. Residents of Helween, with a diverse range of ties linking them to people outside the camp, were able to leverage relationships with NGOs, the UN, and local officials and elites to establish a system of trash-collection after the national system collapsed.

The dominant explanation in political science for the correlation between group density and public goods provision is that high-density groups facilitate the flow of information about members' actions and thereby support in-group sanctioning of free-riding. I have argued that the flow of information through networks also facilitates cooperation by shaping which external information and resources people are aware of and know how to access.

The experimental results confirm that while high-density groups of refugees engage more with each other in response to public goods problems, low-density groups draw on a wider range of resources. The data does not support alternative explanations for the correlation between network density and cooperation that do not rely on information flow.

This study does not explore the determinants and effects of tie formation, including the ways networks develop over time and people's strategic selection into networks to improve their well-being. People make strategic choices about whom to form links with, within the constraints of personal knowledge and ability. We might assume that if a potential link were going to be particularly valuable, it would be rational to form such a link even at a high cost, as long as the decision-maker expects the benefits to exceed the costs. But this logic belies the reality that refugees often do not have the material or social resources to pay a short-term cost even with the promise of long-term benefit, with constrained material and social capital and little access to credit.

The experimental results in this paper speak directly to policy makers' choices about who to bring into refugee community-driven and community-capacity-building programs. The underlying assumption of community programming is that beneficiary communities often have internal collaborative capacities to help themselves that

aid agencies fail to recognize. My findings show that this approach will often not be the right answer. If refugee groups do not have the internal resources necessary to mitigate their problems, NGO community-driven programming that attempts to leverage a group's ability to solve problems internally may be promoting precisely the wrong capacities. Rather than a group solving its own problems internally, it may be optimal for a group to go to outsiders for help. In refugee communities, program design may be more effective if NGOs support refugees in asking who they can go to for help, rather than asking how they solve a problem themselves. In communities where trust or reciprocity is the binding constraint for effective cooperation, building social ties and systems of accountability within the community can help. In communities where resource access is the problem, linking refugees to local authorities, service providers and surrounding neighborhoods, in ways that are sensitive to the dynamic vulnerabilities the refugees face vis-a-vis these actors, may be an effective way to facilitate access to resources necessary to meaningfully mitigate problems.

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