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Workplace Networks and the Dynamics of Worker Organizing

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Abstract: A rich literature has established the importance of social networks for explaining participation in contentious politics but has typically treated networks as existing outside the awareness or influence of movement actors themselves. A separate literature has long recognized the importance of "organizing" for successful collective action but has not conceived of organizing in relation to network structure. Bridging these literatures, we develop the concept of "network-driven organizing" (NDO), where organizers allocate relational activity based on perceived social network structure. Using the case of labor organizers in a campaign at Walmart, we analyze more than 80,000 unstructured organizer field notes from almost 120 store-level campaigns between 2010 and 2015 and find that our measure of NDO is positively and robustly correlated with campaign success; going from 0 to 1 on the measure of NDO more than doubles the number of cards signed. We discuss the implications of our results in light of sociological theories of action and the practice of movement organizing.

Keywords: workplace organizing; networks; collective action; low-wage workplaces; social movements

Reproducibility Package: The data used in this article are proprietary data from the organization OUR Walmart. More information about this is provided in the Data section. All code used for data processing and analysis is available at https://osf.io/wejb5/. The researchers will make the processed and anonymized data available for replication purposes upon request and subject to review of a plan to keep the data secure and to delete after use.

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SCHOLARS of social movements have long appreciated that people's social ties to movement participants, and an absence of countervailing ties, are important determinants of their own participation (McAdam and Paulsen, 1993). Scholars have also appreciated how broader network structures—of individuals and organizations—help to determine movement outcomes (Diani, 1995; Diani and McAdam, 2003). However, with a few notable exceptions, attention to the role of social networks in social movements has neglected the agency of social movement actors in relationship to them. Networks do not just determine movement outcomes; movement actors see, and shape, networks.

This is not to say that the social movement literature has overlooked the agency of movement actors or the importance of "relational action" in movements. Scholars have long observed how organizers build new relationships, and draw on existing relationships in new ways, to induce people to work together toward some common cause. Movement actors may be exquisitely attuned to the group affiliations and identities of others and use different "forms of talk" to communicate across

differences to form relationships (Mische, 2009). What has been less explicitly theorized are the ways in which movement actors may consciously work to understand, and then intervene on, a broader pattern of relationships among a group of people—the whole social network in which they are embedded. In this article, we use the case of labor organizing at Walmart to study one form of such activity, what we call "network-driven organizing" (NDO).

In the United States, owing to both employer opposition and weak labor law, labor organizing entails overcoming formidable barriers to collective action. For instance, although almost 50 percent of non-union private sector workers say they would vote for a union if asked, private sector union density remains at approximately 6 percent, suggesting both that there may be unrealized demand for unions (Hertel-Fernandez et al., 2022), and that organizing at the workplace is experienced as a risky form of collective action. Workplace social capital and social networks among workers may be key to overcome such barriers (Naidu, 2022; Shepherd, 2024).

Both methodologically and substantively, the labor movement has advantages for the study of the process of organizing. Methodologically, workplace organizing is a useful field to study organizing because the boundaries of a case are fairly unambiguous (i.e., a particular workplace) and thus the population of actors and potential relations is discrete. This facilitates comparisons within cases—between participants and non-participants and between relations and the absence of relations—as well as comparisons across a large number of cases, each of which is more difficult to do in a less structured movement context.

Substantively, the establishment of a labor union within a workplace requires changing the nature of social relationships among workers. As outlined by Emerson (1962, p. 37), the power that comes from the "collectivization of labor" is usefully understood as changing relationships and networks, as previously individuated workers (who are individually more dependent on the employer than the employer is on them) become, through their ties with one another, a collective entity on whom the employer is more dependent (and thus less powerful). Many labor leaders will go so far as to say that the formal, legal recognition of a union within a workplace is less important than workers' capacity to "act like a union" (Lafer 2008; Moody 2009): to understand themselves as interconnected and interdependent.

Worker organizations are generally formed through a process of organizing at the level of the establishment, as staff organizers and worker leaders try to establish relationships among workers that can lead to collective action. Despite the fact that building and understanding social relationships is a background activity of everyday life, there are many different ways organizers and other leaders strategically pursue such action. Some strategies involve a focus on the movement-relevant characteristics of individuals—those "motivated" individuals who express the most initial interest in the cause—and build relationships around those individuals. Other strategies identify individuals who are "leaders," as defined by their ability to influence others as they articulate and frame workplace conditions in certain ways (those with social skill (Fligstein and McAdam, 2012)). Other strategies consider the local relational characteristics of individuals—who they are connected to and in what ways—and leverage those individuals and their relationships.

Still another path is to consider the structural position of certain actors in a broader workplace network, under the assumption that certain actors are better positioned to influence others and thus to facilitate the network diffusion of the ideas, frames, and behaviors required for collective action. Network theory suggests that attending to the structural network positions of participants and potential participants would be an effective way to organize, but we have little empirical evidence to support it. At the same time, the collective knowledge of organizers has produced volumes of thinking and learning about various relational strategies, but those strategies are largely unformalized and thus suggest very different uses of network and relational information for organizing. This leads us to know relatively little about the type of relational and network information organizers pay attention to and use in practice. And it leads us to a paucity of knowledge of the relative efficacy of different relational strategies for collective action.

In this article, we formalize and measure a particular form of relational social action using notes from labor organizers; we describe variation in the use of such a strategy across organizers and campaigns; and we empirically examine the relationship between that strategy and a collective action-related outcome. Synthesizing existing literature on networks, social movements, qualitative studies of labor organizing, and models of social learning, we develop a new measure of relational action, which we call "NDO": the correlation between an organizer's attention to a potential participant and that potential participant's centrality in a wider network of potential participants, as this network is perceived by the organizer.

We first provide a qualitative account of organizing within two stores with very different levels of NDO, to demonstrate what this difference looks like in practice. We then test this measure using more than 80,000 detailed organizing field notes collected by labor organizers from 120 store-level organizing drives at Walmart between 2010 and 2015. Our main outcome of interest is the number of membership cards signed within a store, a measure of collective action. Quantitatively, we show that when organizers target their effort and attention to the workers they perceive as central in the workplace relationship network (i.e., when they use NDO), there are significantly higher levels of collective action, as measured by membership cards signed.

We further probe causality by constructing an instrumental variable based on the organizing team assigned to a given store. The worker organization we study divided Walmart stores into different regions, and each region received a different team of organizers, with different organizing strategies and cultures. We construct a leave-one-out average of NDO of the team assigned to a given store and show that this variable is both strongly correlated with the level of NDO as well as with the number of cards signed. Under the assumption that the team assignment is independent (or independent conditional on observable variables) of other determinants of collective action at the store level, the instrumental variable estimates show a large effect of NDO on cards signed.

The estimated coefficient magnitudes are large and meaningful in our context: going from no correlation between network centrality and organizer effort to a perfect correlation of one results in between a 103 and 194 percent increase in cards signed, depending on the model specification, with instrumental variable estimates

increasing to as high as 300 percent. Given the low baseline rate of card signing, with only 13 cards signed at the median store and 23 cards on average, NDO is not on its own a magic bullet to sway an organizing drive. Nevertheless, it may be decisive in cases where a sizeable minority of workers are initially interested in organizing. We discuss the magnitudes of the effect and the implications for organizing below.

How Networks Structure Social Movements

People's social ties to others are important for explaining their participation in social movements and other forms of contentious politics (Klandermans, 1984; Snow et al., 1980; McAdam, 1986). Examining cases that range from the Nichiren Shoshu Buddhist movement (Snow et al., 1980) to Freedom Summer (McAdam, 1986), the Italian environmental movement (Diani, 1995) to Swedish Trade Unions (Hedström, 1994), scholars have demonstrated that people's social ties to others serve as a key mechanism through which people are recruited into movement participation. More than 35 years ago, Marwell and his colleagues (Marwell et al., 1988, p. 505) observed that it was already "practically a truism among social movement theorists that social networks are important for recruiting participants."

In the years since, scholars have explored a range of mechanisms in which networks encourage movement participation, from processes of interpersonal influence, whereby people mobilize (or demobilize) their neighbors (Kim and Bearman, 1997; McAdam and Paulsen, 1993; Polletta, 2014); to processes of information diffusion, whereby networks allow people to understand others' intentions for participation and thus to overcome collective action problems (Chwe, 1999; Granovetter, 1978; Kim and Bearman, 1997; Macy, 1991; Oliver et al., 1985); and to processes of collective identity formation (Gould, 1993, 1995; Tilly, 1979), whereby networks change how people understand themselves, and thus the collectivities on behalf of which they are willing to act.

Scholars have also extended their inquiry beyond individual social ties to explore the role that broader network structures play in both individual-level movement participation and community-level movement activity (Fernandez and McAdam, 1988; Hedström, 1994). An innovative body of work has made use of simulation models to explore how the formal structures of social networks moderate processes of social influence and information diffusion (Kim and Bearman, 1997; Oliver et al., 1985; Chwe, 1999; Macy, 1991; Gould, 1993).

For all of its promise, however, the literature on networks and social movements has been somewhat constrained by its structuralism. Social networks, and the ties of which they consist, are thought to influence people's behavior but remain largely outside the perception or influence of participants (and non-participants) themselves. This has meant that the creative, strategic, agentic work that movement actors do in relationship to the networks within which they are embedded has rarely received focused treatment (for an exception, see Mische 2003; 2009; 2016).

Outside the social movement literature, scholars have gone further in exploring the ways in which networks relate to strategic action. For instance, as Burt (2004, p. 354) famously observed, "People whose networks bridge the structural holes

between groups have an advantage in detecting and developing rewarding opportunities," as suggested by the strategic actions of brokers like Francis Lowell in the context of the Museum of Modern Art (DiMaggio, 1987), Cosimo de Medici in the context of Renaissance Italy (Padgett and Ansell, 1993), and the "good ideas" of managers in Burt's own electronics companies. In a slightly different vein, Krackhardt (1990) finds that an individual's power with a firm is positively associated with the extent to which they accurately perceive the "advice network" of their peers. But again, this literature has tended to emphasize the ways in which people's network positions generate possibilities for perception and action, rather than the ways in which people help to reshape the networks of which they are a part.

Finally, network scholars and practitioners who deploy networks to administer interventions have tested various network-based strategies for maximizing the impact of interventions. One such body of work uses simulations or manipulations of online networks to understand how alterations in network structure (e.g., changing its density, clustering, or degree of homophily) shapes the spread of ideas and behaviors (Centola, 2010, 2018; Sassine and Rahmandad, 2024). Because this approach is, in most real-life cases, inaccessible, practitioners have drawn on theory about the role of influencers, social referents, and opinion leaders to examine how the selection and targeting of influential people—individuals with a particular structural position—within a network affects diffusion and action (e.g., Aral and Walker, 2012; Banerjee et al., 2019; Paluck et al., 2016; Valente and Pumpuang, 2007). Although the measures for identifying influential actors in a network vary across studies, as do assumptions about how these actors facilitate diffusion and mobilization, there is widespread consensus that identifying actors central in a network is often an effective strategy for producing diffusion and behavioral change in a social group (e.g., Airoldi and Christakis, 2024). Is this what organizers do?

What Do Organizers Do?

If the literature on networks and social movements has tended to overlook actors' agency in relationship to networks, a separate line of social movement scholarship has long recognized the importance of organizing and organizers to collective action outcomes. This literature has implicitly appreciated organizer's understanding of and engagement with social networks, yet has not conceived of this work in formal network terms.

Early efforts at theorizing the "organizer" recognized the importance of an organizer's use of social networks. In her account of the origins of the women's movement, for instance, Jo Freeman (1973) discussed the existence of "communication networks" as a necessary but insufficient condition for movement emergence. Although occasionally a crisis could "galvanize[] the network into spontaneous action" (Freeman, 1973, p. 794), she observed, rarely could a movement emerge or persist without the strategic action of organizers. However, while recognizing that the "role of the organizer in movement formation is... [a] neglected aspect of the theoretical literature" (Freeman, 1973, p. 807), Freeman did not go much further in specifying either the network or the work that organizers do in relationship to it.

The most explicit treatment of organizing may be Charles Payne's (2007) *I've Got the Light of Freedom: The Organizing Tradition and the Mississippi Freedom Struggle*, in which he describes the work of the Mississippi Student Non-Violent Coordinating Committee field staff in 1963: a group of 41 workers who were mostly young, "mostly Black, mostly southern, [and] mostly from working-class backgrounds" (Payne, 2007, p. 237). Payne describes in exacting detail the many ways that these young organizers went about the "slow, respectful work" (Payne, 2007, p. 243) of organizing. In his account, the organizer played many different roles at once: "Organizers had to be morale boosters, teachers, welfare agents, transportation coordinators, canvassers, public speakers, negotiators, lawyers, all while communicating with people ranging from illiterate sharecroppers to well-off professionals and while enduring harassment from the agents of the law and listening with one ear for the threats of violence" (Payne, 2007, p. 246). Tying together these multiple roles was the goal of identifying, recruiting, and developing potential movement leaders and supporters. On the one hand, the organizer worked to identify and develop "informal leaders" (Payne, 2007, pp. 248–249) in a community, those people who were not necessarily endowed with any institutional authority but who were well liked and well respected by others; on the other hand, the organizer reached out to everyone they could contact through canvassing, "going door-to-door, trying to draw people in" (Payne, 2007, p. 250). Payne summarizes the role of an organizer by quoting the Civil Rights leader Bob Moses, who responded to a question about how to organize a town by saying,

> "By bouncing a ball," he answered quietly.
> "What?"
> "You stand on a street and bounce a ball. Soon all the children come around. You keep on bouncing the ball. Before long, it runs under someone's porch and then you meet the adults" (Payne, 2007, p. 243).

The organizer in Payne's account works within existing ties and develops new ones, with the goal of recruiting new people to a movement and deepening the commitment of those already involved.

Building on such historical case studies, sociologists and political scientists have sought to distinguish "organizing" from other types of movement activity. Marshall Ganz (2006) provides a succinct definition of organizers as those who "identify, recruit, and develop leadership; build community around leadership; and build power out of community." As an important part of this process, he continues, organizers "develop new relationships out of old ones - sometimes by linking one person to another and sometimes by linking whole networks of people together."

Likewise, Hahrie Han (2014, p. 14), in her study of a range of NGOs, suggests that organizers "do not simply aggregate individuals but also create new relationships between them that generate new commitments and resources." In particular, Han continues, organizers do things like "make requests for action that bring people into contact with each other..." (Han, 2014, pp. 16), "focus on building relationships and community through interdependent (as opposed to individual) action" (Han, 2014, pp. 16), and develop people's leadership through "extensive training, coaching, and reflection" (Han, 2014, pp.17).

Although literature on organizing uses the metaphor of networks to describe the work that organizers do, the manner in which organizing uses networks is generally not defined very precisely, making it difficult to distinguish types of relational organizing practices and to assess those that succeed in different contexts. This is related to a more general struggle within the social sciences to theorize the practices by which actors successfully change institutional environments. Although a wide variety of interesting theoretical constructs—from "institutional entrepreneurship" (DiMaggio, 1988) to "robust action" (Padgett and Ansell, 1993) to "social skill" (Fligstein and McAdam, 2012)—have been proposed, such constructs tend to be defined in terms of the outcomes they produce (i.e. "Social skill can be defined as the ability to induce cooperation by appealing to and helping to create shared meanings and collective identities" (Fligstein and McAdam, 2012, p. 46)), which limits their usefulness in terms of explaining when such collective outcomes succeed and when they fail.

The network literature, reviewed above, offers some tentative hypotheses. In light of intervention-focused network studies, one might expect that organizers who are able to identify and engage those who are central within a network would be particularly successful at inducing cooperation within it. Of course, the fact that focusing on central actors seems promising within the scholarly literature on social networks does not mean that organizers (1) can use it, (2) do use it, or (3) are successful when they use it. The identification of individuals central in a network is empirically difficult, even more so in the absence of the resources and time for collecting data in a formal way (see Gomila et al., 2023; Airoldi and Christakis, 2024). Moreover, there are well-documented biases in how people understand the structure of networks and people's positions within those networks (Krackhardt, 1987; Casciaro, 1998), making relying on impressions of a social network potentially useless or even harmful.

In practice, it may be more feasible for organizers to pursue and build relationships with and among those who demonstrate the most initial interest in the cause, or to work on building relationships among pockets of individuals, without attention to the overall structure of the network and those individuals' position within it. Indeed, there is evidence that organizers do take this route. In his study of a unionization attempt at a small, entrepreneurial firm on the West Coast, Krackhardt (2003) observed that the most active participant in the organizing effort and the union organizers' main contact and spokesperson was not a central actor in the friendship network of the workplace but was instead someone considered by other potential members of the bargaining unit as a "loose cannon" and "not one of the guys" (Krackhardt, 2003, p. 99). Organizers did not directly approach the most central (and most accurate) person in the friendship network of the potential bargaining unit, and this person failed to take a leadership role in the organizing effort. In that case, the union relied on someone who was committed to the cause to generate support and votes among coworkers without attention to his position in the network overall.

On the other hand, organizer Jane McAlevey (2016) articulates a clear contrast to an interest-driven approach by explaining what a structural relational approach of organizing might look like. Focusing on the labor movement in particular, she discusses how successful organizers "analyze the workers' preexisting social

groups" (McAlevey, 2016, p. 34), using conversations with workers to learn which of their peers are considered as "organic leaders" in their workplaces. For McAlevey, leaders are not determined based on prior involvement in or enthusiasm toward the union but rather based on the influence they have with their coworkers. McAlevey quotes a labor organizer, Kristin Warner, who says, "[Organic leaders are] almost never the workers who most want to talk with us... They have a sense of their value and won't easily step forward, not unless and until there's a credible reason" (McAlevey, 2016, pp. 34).

In what follows, we draw on a novel data set and computational techniques to examine the efficacy of a structural relational approach of organizing. We precisely define and measure a specific relational practice, "NDO." In an appendix, we go further in motivating our measure using a De Groot model of social influence. We use qualitative data to illustrate alternative relational strategies that organizers use. And we examine the prevalence of the use of NDO and explore whether it is associated with success at generating collective action. In doing so, we go further than previous scholarship in building a formal account of models of relational action.

Data

We use several types of information from a voluntary association of employees working at Walmart—OUR Walmart (henceforth, "OUR"). We make use of a proprietary, anonymized database maintained by OUR, which includes information about the workers with whom staff organizers for OUR were in contact between 2010 and 2015. Because of the proprietary nature of the data, which includes sensitive information about campaign strategy as well as campaign notes through which people might be able to be identified, we are not able to make it publicly available.

During this period, staff organizers (a mix of former Walmart employees, former labor organizers, and activists with non-profit experience) sought to build support among Walmart employees for actions to improve their workplaces and Walmart policies as a whole. Organizers used a range of strategies to make contact with workers initially: brief and surreptitious interactions in the workplace, leafleting at nearby bus stations, house visits to those for whom they had contact information, and making use of existing ties. Over time, organizers would work to deepen relationships with workers and connect them with the work of the organization. During the period in which these data were collected, OUR and its members advocated for Walmart workers by attending the company's annual shareholders' meeting, by generating media stories about work conditions, and by waging smaller-scale campaigns at specific stores. It did not seek union recognition.

The organization's work was thus somewhat diffuse, with a variety of campaigns operating at different scales and timelines. Nevertheless, OUR leadership emphasized to its staff organizers that increasing worker membership was key to building the organization's power. More than any other outcome, then, organizers were evaluated based on the extent to which they were able to recruit new worker

members into the organization. (The organization, now called United for Respect, no longer has a similar membership structure.)

OUR Walmart Member Information and Card Signing

The database includes information about all members of OUR and the stores for which they work or worked. The database also includes the date on which a worker was entered into OUR's database and, for those employees who became OUR members, the date on which the member signed an OUR membership card. We use card signing as a meaningful outcome indicating successful organizing, as it was associated with a commitment to pay $5 in monthly dues. The organizer's objective was to gain signed cards, with the idea that the larger the share of workers who had signed cards, the more successful a variety of collective actions would be, ranging from specific store-level changes to policy, to specific national-level policy demands like "Respect the Bump" (pregnancy benefits), to actions like Black Friday strikes, in which workers walked off the job on the busiest shopping day of the year.

We use the number of signed membership cards as our primary indicator of store-level collective action, and we aggregate the total number of signed cards to the store level (logged). As this measure is dependent on a variety of campaign-level characteristics beyond our NDO measure, we take care to either normalize by or control for mechanical determinants of card signing such as the length of the campaign. Campaign length, measured as the number of weeks between the first and last organizer notes linked to the store, ranges from 63 weeks to 251 weeks.

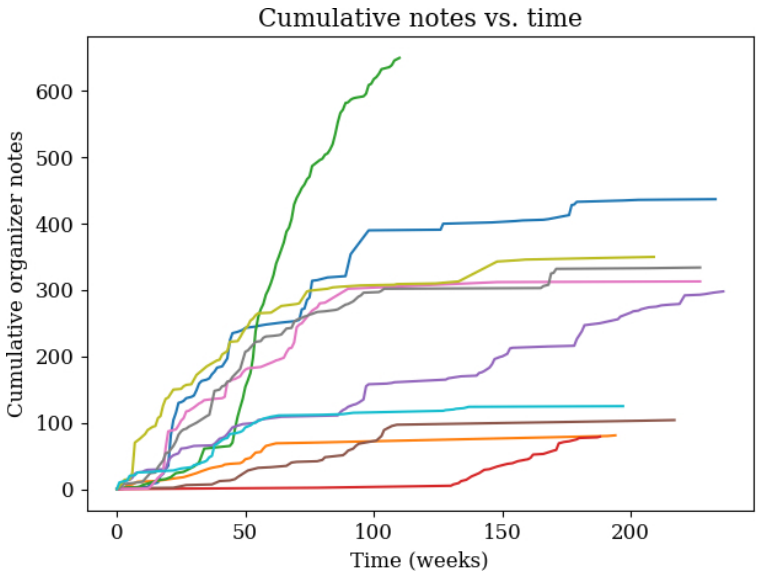
OUR Walmart Field Organizer Notes

In addition to member information, the database includes a total of 81,020 "notes" written by organizers in accordance with procedures established by OUR. Each note was logged by an organizer after they had a conversation with a worker, along with the date of the conversation and the unique identifier of the worker. We use these notes for two main purposes: first, we measure organizer attention to a worker as the number of notes indicating a conversation with that worker; second, we identify other workers' names in the text of these notes as indicators of relationships between workers that have been discovered or cultivated by the organizers (see the defining and coding network edges section).

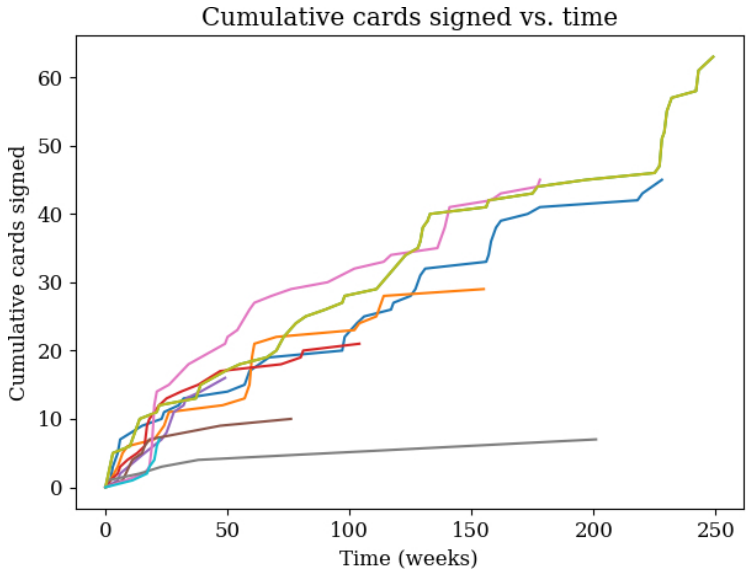
Organizing activity, as reflected through card signing and organizer notes, varies dramatically from store to store, and we show time-series graphs of this activity in a random set of stores in Figure 1. We show the distribution of cards signed across stores (as well as the log) in Figure 2, and we provide some examples of the raw note data in the Appendix.

Defining and Coding Network Edges

We construct the organizer's conception of the store-level network based on the occurrence of other store employees' names within organizer notes about a worker. Based on the notes associated with each worker, we consider the worker to have



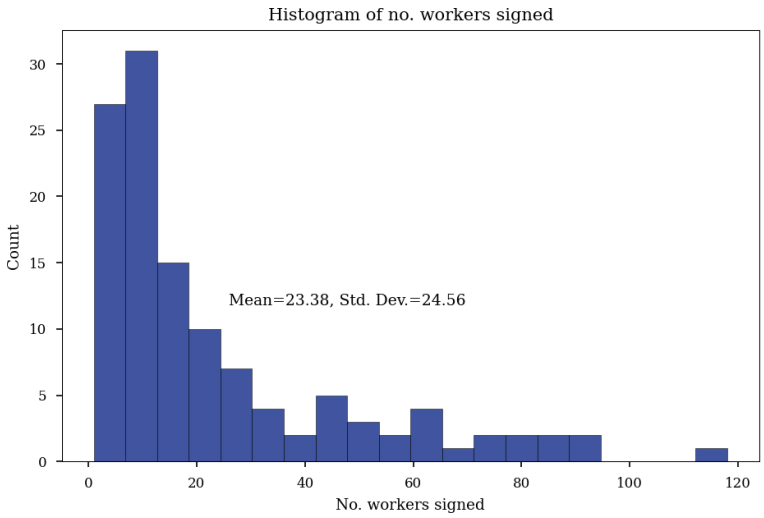
Cumulative organizer notes over time for ten randomly selected stores in sample.



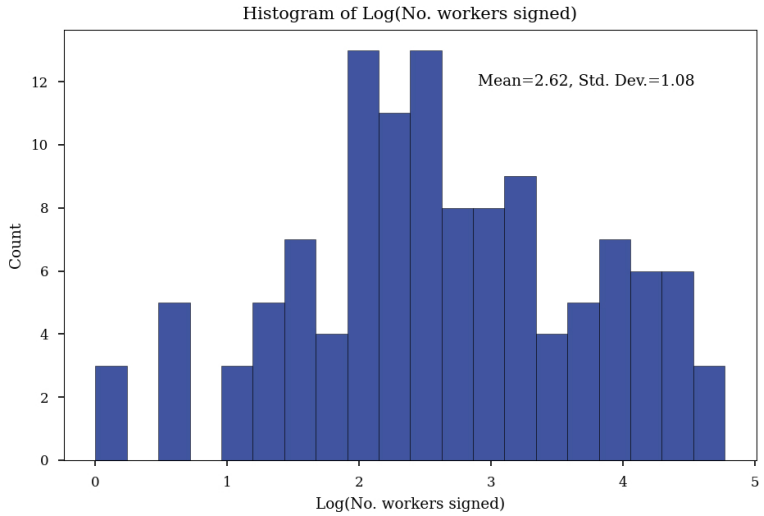
Cumulative membership cards signed over time for ten randomly selected stores in sample.

Figure 1: Organizing activity over time.

a relationship with a second worker (denoted by a 1 in the store-level adjacency matrix) if the second worker's name "matches" a name mentioned in the text of the note. A "match" is defined by a worker in the same store's first name appearing in the text. If more than one worker shares the first name, coders attempted to disambiguate the matches using the next word in the note's text. We determine whether this next word is the last name or the initial of either match by checking if either match's last name starts with the next word.



Histogram of number of cards signed.



Histogram of number of cards signed (log-transformed).

Distributions of outcome variable and number of cards signed. Variable log transformed in the main regression to reduce skewness.

Figure 2: Signed cards measure.

This method of network construction reflects an organizer's attention to relationships between employees within a store. Relationships that organizers recorded among employees could take two forms: those that pre-existed the organizer's attention and efforts (e.g., friendship or family relationships that the organizer recorded) and those that the organizer facilitated among employees (e.g., asking two employees to come to a meeting together). We combine both of these types of relationships into an adjacency matrix representing any type of relationship between employees. We emphasize that the network does not represent the "true"

underlying relationships between employees but instead represents the way the organizer conceives of the set of relationships among employees. Within each store adjacency matrix, we calculate the centrality of each individual using two centrality measures: degree centrality and eigenvector centrality. The centrality measure of an employee reflects the number of coworkers that the organizers perceived to be socially connected to that employee through any type of relationship (degree centrality) or the calculation of the relative influence of an individual employee based on the eigenvector score of his or her network connections (eigenvector centrality).

Network-Driven Organizing

Our key independent variable is our measure of NDO. The measure is based on field organizers (1) recording relationships among employees in a store and (2) recording that they spent more organizing time (assessed by the number of times an an organizer had a conversation with an employee) with those central employees, which we refer to below as organizer attention. To ensure that these two factors vary independently of each other, our measure is calculated as the number of organizer notes for any individual employee minus notes that record the relationships used to measure their centrality.

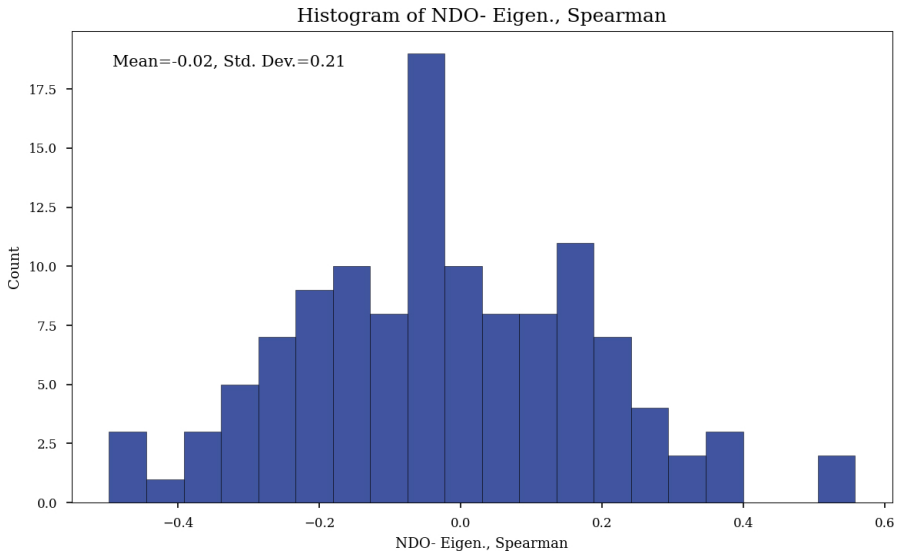
Given a network adjacency matrix in store j A^j, we define the NDO measure as the within-store rank correlation between centrality (either degree or Eigenvector centrality) and organizer effort (number of notes that do not contain information about relationships with other employees, i.e., non-edge notes):

$$NDO_j = Corr(Rank(Cent_i^j), Rank(Notes_i^j)),$$

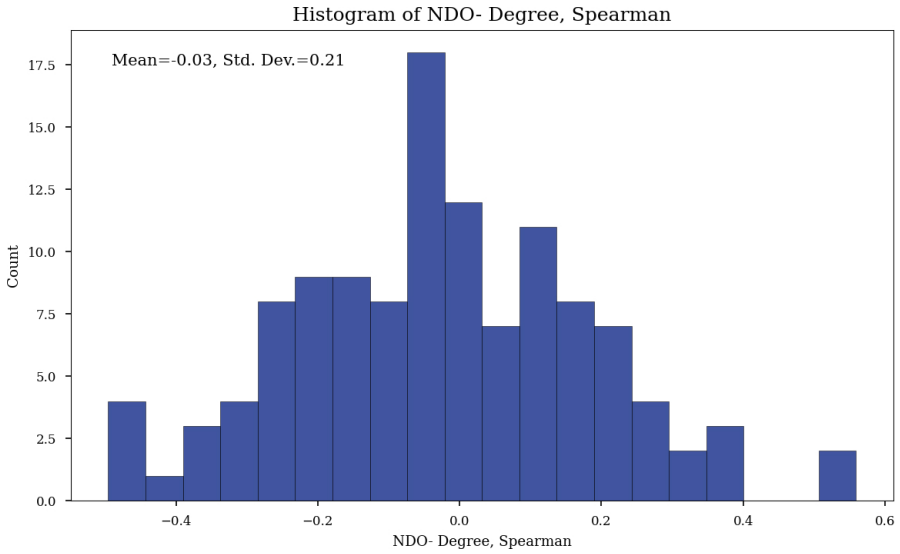
where $Cent_i^j$ is the degree or Eigenvector centrality of employee i at store j, $Notes_i^j$ is the number of non-edge organizer notes mentioning employee i, and $Corr()$ is the within-store correlation between employee centrality and the number of non-edge notes that include that employee taken over the $I(j)$ workers in the data set for the duration of the campaign at store j. We test the measure using both degree centrality, which represents the most simple mental model an organizer might have of an employee's potential influence over their network neighbors by representing the total number of relationships they have, and Eigenvector centrality, which captures a more complex representation of employee influence that an organizer might hold, which takes into account the relative influence of those an employee might themselves influence.

The main measure is the within-store (and, necessarily, within-campaign) correlation between organizer attention *Notes* and employee centrality *Cent*. This measure can also be interpreted as the cosine distance between normalized organizer effort and normalized centrality, which Galeotti et al. (2021) show characterizes the optimal intervention in network games with strategic complements.

We use rank correlations between organizer effort and worker centrality in our main specifications to minimize the influence of outliers and any non-normality in the underlying distributions. The distributions of the NDO measures are shown in Figure 3, and both versions have means slightly below 0 and vary from -0.5 to 0.56. We show qualitatively similar results using Pearson correlations in the Appendix.



NDO using eigenvector centrality.

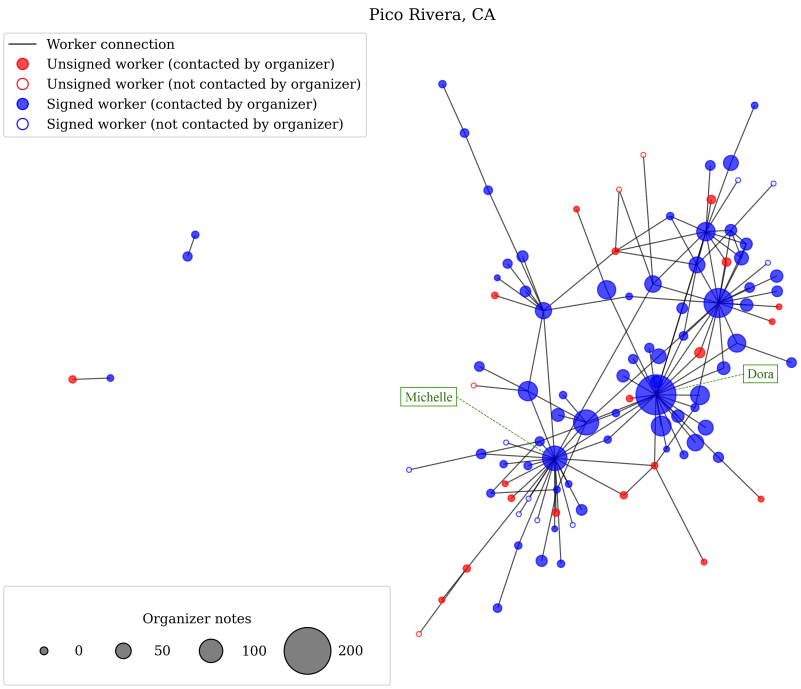


NDO using degree centrality.

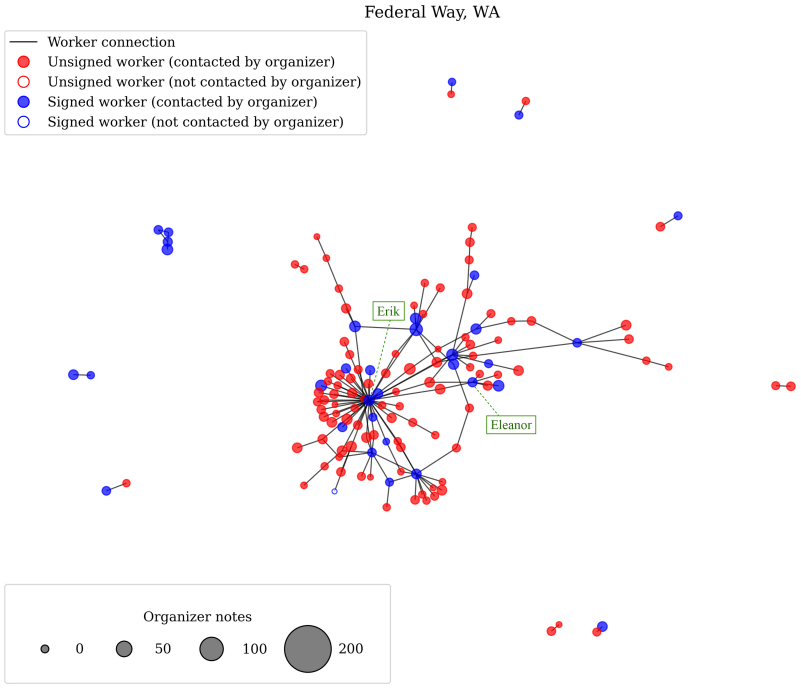
Distributions of networked organizing scores using the two selected centrality measures.

Figure 3: Network-driven organizing (NDO) measure.

We illustrate the data underlying this measure in Figure 4, which shows the networks corresponding to two stores on which we base our qualitative analysis: the Pico Rivera (one of the highest levels of NDO) and Federal Way (around the mean level of NDO) stores, with the size of the nodes (employees) scaled by the amount of organizer attention they received. Quantitatively, the NDO level of Pico Rivera is 0.56, whereas it is close to 0 at Federal Way.



Workplace network from Pico Rivera, CA.



Workplace network from Federal Way, WA.

Figure 4: Pico Rivera and Federal Way workplace networks.

Table 1: Store-level summary statistics.

Variable	Mean	Median	Std. Dev.	Min	Max
No. organizer conversations	268.80	181.00	253.59	9.00	1416.00
No. workers discovered	136.14	91.50	133.62	11.00	946.00
No. workers contacted	102.14	66.50	116.34	7.00	793.00
Campaign length	178.91	201.43	57.39	22.14	251.14
Mean network degree	0.31	0.22	0.31	0.00	1.55
No. network edges	18.12	9.00	26.29	1.00	141.00
Variance in network centrality	0.01	0.01	0.01	0.00	0.07
Average network clustering coefficient	0.01	0.00	0.03	0.00	0.13
Percent black in ZIP	0.16	0.07	0.22	0.01	0.98
Percent Latino in ZIP	0.26	0.18	0.24	0.01	0.93
Mean-adjusted gross income in ZIP	41.94	38.08	19.07	21.58	141.08
Union density in ZIP	0.14	0.14	0.07	0.01	0.40
Percent male	0.40	0.41	0.10	0.00	0.64
Network-driven organizing (Eigen., Spearman)	−0.02	−0.03	0.21	−0.50	0.56
Network-driven organizing (Degree, Spearman)	−0.03	−0.03	0.21	−0.50	0.56
Network-driven organizing (Eigen., Pearson)	0.05	0.05	0.36	−0.68	0.86
Network-driven organizing (Degree, Pearson)	0.07	0.10	0.41	−0.83	0.92
No. workers signed	23.38	13.00	24.56	1.00	118.00

N = 120. Summary statistics for all variables utilized in regressions.

Summary information for the data is provided in Table 1.

Organizer Teams

Each paid organizer belonged to one of 12 teams, which were formed based on the geographic region within which they were organizing (Southern California, Dallas, Chicago, Central Florida, etc.) Each team was supervised by a lead organizer who was responsible for directing the work of the organizers, and provided informal and formal organizing trainings for the rest of the organizing staff. Because OUR's goals were somewhat indeterminate, in that organizers were not trying to form unions, teams had quite a lot of scope for experimentation, meaning that the team cultures and approaches varied substantially. Central Florida's team, for example, was led by a former Walmart associate without prior union organizing experience. She developed an innovative online-to-offline approach in organizing in which the team would identify potential supporters through online group conversations before meeting them in person. In contrast, the Southern California team was led by someone with years of experience as a union organizer, and so brought a more traditional union organizing approach to her team's work. In Chicago, the mostly black organizers discussed their work as being a modern-day Civil Rights movement; in Dallas, organizers with religious experience discussed it as a David versus Goliath struggle. As we will see below, these teams' different approaches were differently associated with the NDO approach we test in this article.

Qualitative Evidence from Two Walmart Campaigns

Before turning to our quantitative results, we use two case studies, one of a successful campaign that yielded many signed cards and one of a campaign that did not, to help illustrate what NDO looks like in practice.

Any store will have an existing, heterogeneous set of relationships among employees. Some of these relationships will be kin or friendship relationships, and others will be relationships based on shared experiences, as when workers share a shift or have children who attend the same school. The network we observe in these stores is one where the organizer is both learning about these existing ties and creating organizing-relevant ties by inviting coworkers to attend meetings together, suggesting that they talk with each other, and meeting with them together. To the extent that organizers continue to follow up with people who have more contacts, of either kind, they are pursuing a network-driven strategy such that high centrality people receive more energy and effort.

Organizing with Attention to the Network

The organizing campaign at a store in Pico Rivera, a town in southeast Los Angeles County, began like it did in many other stores, with organizers from OUR Walmart trying to speak to as many workers as they could. This could be a somewhat long and painful process. For example, the very first worker that organizers recorded in their notes, in November 2010, was Juan (all names used below are pseudonyms). Although he thought that organizing with OUR Walmart was a "good idea," as he told the organizers, Juan wanted to wait until after the holidays to "see what happens." Organizers contacted Juan again in December, when he said he did not "want to be the first person in the store" to sign up; in mid-January, when he was "still undecided"; and again in March 2011, when an organizer visited him at his home and spent at least 90 minutes in conversation, at which point he said that he "still wants to wait and see if his situation changes." This was the last time that Juan appeared in the organizing notes, suggesting either that Juan left his job or that the organizers gave up on trying to bring him around. In our data set, Juan was referenced in nine organizer notes by the end of the campaign, and he had a network centrality score of 0, the lowest possible, indicating either a lack of workplace relationships or a lack of organizer awareness of those relationships.

Around the same time that the organizers met Juan, though, they also met Dora Avila; according to Dora, one of the OUR organizers was dating her former ex-brother-in-law—the sort of weak tie (Granovetter, 1973) that organizers are often looking out for—and met up to talk about OUR Walmart over a coffee at Starbucks. After the meeting, the organizer wrote that Dora had been working at Walmart for five years and had a well-defined set of grievances: Walmart would cut people's hours and change their shifts arbitrarily; the managers would show favoritism to some workers over others, often in a way that reeked of sexism; and the company made her pay $160 a month out of pocket for health care. In Dora's account, she immediately saw the appeal of OUR: "I was like, 'Oh, sign me up.' [The organizer] was like, 'For reals?' So I was like, 'Yes. I got it, I understood it. Sign me up."' Dora remembers thinking to herself, "My number one thing was how do I get everybody

else to sign up?" She was the fourth worker to sign up for the organization in the Pico Rivera store but would quickly become one of the most essential.

Having identified Dora as a potential leader, organizers began to meet with her consistently to give her support and guidance as she reached out to her coworkers. Ten days after an organizer met with Dora for the first time, Dora brought a second worker (Lourdes) to a meeting with another organizer at a nearby shopping center. Lourdes signed up for the organization at that meeting (13 organizer notes and 67th percentile of network centrality), representing the first time that a sign-up occurred through the efforts of a worker leader at the store.

Dora soon proved that she could recruit her coworkers to the organization in a way that organizers could not. This was not only because she knew who they were and how to reach them but also because she was respected by her coworkers and thus more easily able to influence them in ways that organizers could not. For instance, on December 7, an organizer had approached Lorena, who worked in the bakery department (25 organizer notes and 67th percentile of network centrality). In that meeting, Lorena had not been sure about the organization: on the one hand, she wanted "more help," and "more respect" from Walmart; on the other hand, she was "very scared" that she was "going to lose her job." A month later, though, on January 12, Dora was able to convince Lorena to come to an organizing meeting. At this meeting, she "got her to sign."

Dora had many connections to her co-workers and potential OUR supporters at Pico Rivera, as documented by her efforts that appear in the organizer notes. Dora also has the highest network centrality as documented by the organizers at the store. Organizers from OUR Walmart seemed to understand her social position and nurtured her action, providing Dora with support, advice, and encouragement as she took on and completed assignments to reach out to those with whom she was connected. For example, in February, Dora set up an organizing meeting with five of her coworkers. In March, Dora led a meeting at the local Shakey's Pizza, where three more of her coworkers signed up for the organization. In the meantime, organizers were regularly in touch with Dora, strategizing with her about recruitment, putting her in touch with journalists who were beginning to cover the campaign, and inviting her to meetings and trainings. As Dora organized her coworkers, OUR organizers increasingly invested time in supporting her. Excluding notes recording connections that Dora had made with others, organizers recorded 138 conversations or meetings with Dora individually over the course of the 2.5 year campaign.

We see a similar pattern in the way that OUR Walmart identified and developed another key leader at the Pico Rivera Store, Michelle Rogers. As documented by Reich and Bearman (Reich and Bearman, 2018, pp. 167–168), Michelle reports that she initially heard about OUR Walmart from "Crazy Dora Avila." As Michelle recalls, "She was always asking me, 'Hey, mama, how's things going?' And I would tell her, 'Not good,' you know... And she would say, 'You know, when we get a chance, let's talk."' The two met at a Del Taco, a nearby fast-food joint, where Dora introduced Michelle to some of the OUR Walmart organizers. Michelle went home and looked up the organization online. She concluded that "if I was going to have to be here for a few more years," she would have to "either make changes or just take the beatings." She signed up for the organization in February 2011. Michelle

herself was well-connected in the store, in the 99th percentile of network centrality based on organizer notes.

In those early months, Michelle attended a few meetings but did not do much more than pay the organization's monthly dues. However, in July, an organizer sat her down to encourage her to be more active in the organization. Specifically, the organizer asked that Michelle take on two "assignments" to speak with coworkers she knew about OUR Walmart. It took a number of months, and concerted attention from an organizer, but Michelle eventually committed to the organizing. When it became clear that Michelle was connected to others and able and willing to reach out to them, organizers invested more in her. Between late 2010 and February 2012, organizers reported only six conversations with Michelle. Between February 2012 and mid-2014, organizers reported 46.

Through the identification and development of leaders like Dora and Michelle, which involved attention to their network relationships, OUR Walmart organizers at Pico Rivera were able to build an active committee of workers open to taking collective action. Notably, an NDO strategy cannot be successful without at least some interest and openness from people with more social connections. We next turn to a case where the organizers did not make use of an NDO strategy to illustrate the alternative, before moving to our quantitative evidence, to test the relationship between NDO and campaign success across many stores.

Before we do so, however, we want to underscore how difficult it is to organize at Walmart, even when workers are invested in doing so: Walmart seemed to recognize the threat posed by workers at the Pico Rivera store. In April 2015, the company announced that there was a plumbing problem at Pico Rivera, and that it would have to shut down and layoff its workforce. When it reopened six months later, those most active in OUR Walmart were not rehired.

Organizing without Attention to the Network

The campaign at the Federal Way Walmart, outside of Tacoma, Washington, shared several features with the Pico Rivera campaign. Based on organizer effort (indicated by the total number of notes logged by organizers), the campaigns were practically equivalent: organizers at Federal Way logged 1,350 notes over the course of the campaign, only about seven percent less than the 1,448 notes logged at Pico Rivera. At Federal Way, organizers were in contact with more workers than they were at Pico Rivera: organizers logged notes about 326 workers at Federal Way (94 percent of all store contacts), compared to just 170 workers at Pico Rivera (55 percent of store contacts). At Federal Way, though, organizers did not seem to make use of networks among workers in the same way as they did at Pico Rivera: although they did use organizing conversations to map the shop's social network, they used this social network to reach uncontacted workers themselves, rather than to prioritize their relationship with central workers, who may have had a greater capacity to influence their coworkers. Ultimately, organizers at Federal Way managed to sign up 83 workers for the organization, or 25 percent of their contacts. At Pico Rivera, organizers managed to sign up 118 workers for the organization, or 38 percent of store contacts, a success rate of nearly 60 percent higher. One reason for this

difference in success rate seems to be the different strategies deployed by organizers in the two stores.

Early in the campaign at Federal Way, organizers seemed to identify several workers who they understood to be central in the workplace network; people who provided organizers with the names of other potential supporters. And yet, organizers did not seem to follow up with these workers, or support them in their efforts to reach out to others. For instance, in June 2011, a worker named Daniel (nine notes and 97th percentile of network centrality) convinced a coworker named Eleanor Bernard (six notes and 82nd percentile of network centrality) to sign up. Organizers had approached Eleanor earlier that year, in April, but she had demurred on participating in the organization because "she might be quitting soon and [Walmart wasn't] important to her." However, Daniel had persuaded her, illustrating that co-worker persuasion was present at Federal Way, even though organizers were not focusing their efforts on organizing through central network actors.

After Eleanor signed up, she seemed to have the potential to be Federal Way's Dora Avila. She made efforts to introduce coworkers to organizers, and based on organizers tracking relationships, she was in the 99th percentile of network centrality in the store. In June 2011, as organizers waited outside her store, Eleanor convinced three coworkers to meet with them outside on their breaks. Just as some workers at Pico Rivera refused to talk to organizers but were willing to talk to Dora, several of Eleanor's coworkers refused to talk to anyone but Eleanor. In early August 2011, she gathered a group of workers outside her store to sign a declaration of principles regarding how they wanted to be treated at work. After that, however, Eleanor disappeared from the organizer notes. Organizers apparently stopped having conversations with her; but they also did not note that she had cooled on the organization. The next note about Eleanor occurred in March 2012, seven months after the declaration of principles, when her membership dues lapsed because her credit card was declined. She is recorded as having attended one final meeting a week later and then she disappears from the notes again. The final note about her (out of a total of six notes), in January 2013, records that she had been inactive for six months and was now opposed to the organization.

This seemed like something of a pattern at the Federal Way store. In early 2011, organizers stopped by the house of Erik Fraser, who expressed interest in the organization. Between July and October of that year, he provided organizers with information about 56 of his coworkers, reflecting his 100th percentile of network centrality based on the organizers' notes. And yet organizers did not meet regularly with Erik, or support him in reaching out to his coworkers. Although Erik is logged as having walked out on strike during a national action in November 2012, there are few recorded meetings or conversations with him (a total of eight notes). By September 2013, he had left his job at Walmart. Similarly, Marla Alexander was very active in October and November 2011, identifying potential leaders and coming to meetings. Based on organizer records, she was in the 99th percentile of network centrality. Then, somewhat abruptly, Marla disappears from the log after 10 organizer notes.

In all three cases—Eleanor, Erik, and Marla—organizers identified workers who were interested in OUR Walmart and who seemed to have a large number of relationships with their coworkers. However, organizers did not record efforts to cultivate these potential leaders through meetings or through encouraging them to talk with their coworkers. Although the organizers expended a lot of effort and made contact with a large number of workers, they did not seem to use NDO at Federal Way.

Again, we turn to the network graphs to summarize the differences between the two campaigns. In Figure 4, the organizer-recorded network of Pico Rivera workers is on the top and the Federal Way network is on the bottom. The Pico Rivera graph, besides showing a high number of workers who signed an OUR card, clearly shows more organizer notes for the more central workers. In contrast, the Federal Way graph shows no differential investment by organizers in the most central workers. Our hypothesis is that this difference in organizer relational strategy contributes to the low rate of card signing in that store.

Regression Specifications

Motivated by these two case studies, we now present regressions examining the full sample of Walmart campaigns. We examine whether campaigns marked by more NDO (a higher correlation between organizer attention and employee centrality) are more successful, as measured by OUR membership cards signed.

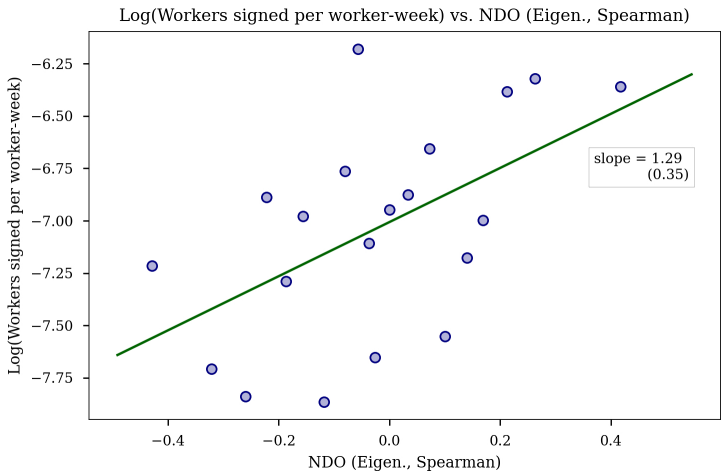
We begin by presenting simple bivariate scatterplots that show our main result. Recall that our primary outcome of interest is log number of cards signed in a workplace within a campaign. For illustration, we normalize the number of cards by two measures of campaign intensity: worker week and total organizer conversations. In the upper panel of Figure 5, we show the log number of cards per worker week, as a measure of share of workers who sign cards per week, plotted against our NDO measure. In the lower panel, we normalize the number of signed cards by organizer effort, as measured by the total number of conversations, as an alternative measure. In both panels, we see a statistically significant relationship between the measure of NDO and the number of cards signed per worker week or per organizer conversation.

Although Figure 5 demonstrates the basic pattern, we turn to ordinary least squares (OLS) regressions to show robustness to various sets of possible confounds. We estimate regressions of the form:

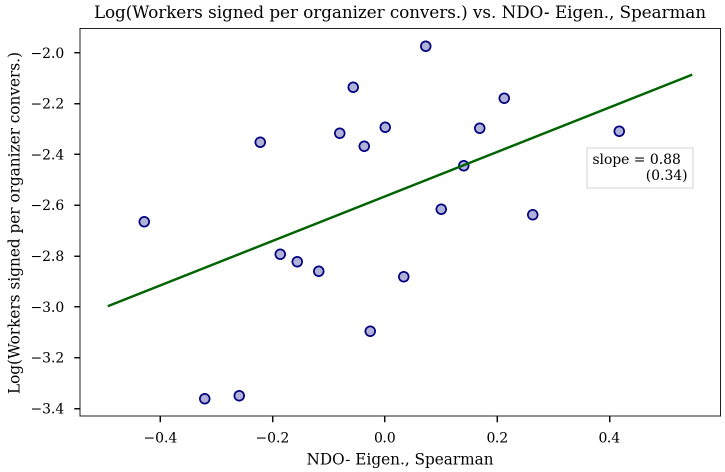
$$log(Cards_j) = \beta NDO_j + X_j'\gamma + \epsilon_j. \quad (1)$$

The coefficient β is our estimand of interest and can be interpreted as the effect of going from an NDO coefficient of 0 (effort uncorrelated with centrality) to an NDO coefficient of 1 (effort perfectly correlated with centrality) on log cards signed.

Standard errors are heteroskedasticity adjusted. Although we have a large number of potential control variables and confounders, which we discuss in the next section, our limited sample size imposes a ceiling on the number of degrees of freedom in the regression. Along with controlling for our covariates in a conventional



Logged number of cards signed per worker-week vs. Eigenvector network-driven organizing measure.



Logged number of cards signed per organizer note vs. Eigenvector network-driven organizing measure.

Figure 5: Cards signed and network-driven organizing (NDO), no controls.

OLS regression, we also control for a parsimonious set of controls in our baseline specification, selected via a double-LASSO (Least Absolute Shrinkage and Selection Operator) procedure (Belloni et al., 2014).

Control Variables

One set of controls (worker and organizer controls) is factors related to organizer effort and store size: the total number of organizer notes (representing the amount of effort the organizer expended during the campaign, logged), the total number of employees at each store as represented in the organizer notes (logged), and the total number of employees the organizer contacted (logged). A second set of controls (campaign length controls) is indicators for quintiles of campaign length.

A third set of controls (other network statistics) relates to features of employee networks as represented by the organizer notes about the relationships between employees. Here, we consider the mean and variance of centrality (for either degree and eigenvector centrality, depending on the model) for the store-specific network, as well as the mean degree, the number of relationships (edges) in the network, and the average clustering coefficient of the network. By controlling for these characteristics of the network, we attempt to isolate the unique relationship between NDO and card signing apart from how the organizer understood and represented the characteristics of the store network.

A fourth set of controls (demographic and union controls) includes the gender composition of the store (percent male) and zip code-level characteristics of the area around the store, including the percentage of black, Latino/a, and white residents, the mean annual gross income, and union density (measured using the average rate of unionization for jobs in the zip code from 2009 to 2016, from Gallup). We use these controls to account for the possibility that card-signing rates are related to features of social organization or solidarity for which this demographic information can serve as a proxy. The measure of zip-level union density accounts for underlying variation in local labor power and openness to organizing that might affect card signing in the stores.

Finally, we follow procedures established by Belloni et al. (Belloni et al., 2014) for LASSO selection of controls among the above variables. Although the exact variables selected will differ across specifications, in general the LASSO-selected controls are the mean degree of a store network, variance in store network centrality, number of edges in the store network, length of the campaign, logged number of organizer notes, logged number of workers in the store, logged number of workers contacted by the organizer, store percentage male, and zip-code level characteristics of the percentage black, percentage Latino/a, union density, and average adjusted gross income.

Main Results

Our quantitative analysis examines the relationship between our measure of NDO and card signing at the store level for 120 stores. Results from estimating equation 1 using various sets of controls to rule out alternative explanations for the relationship are shown in Table 2. Columns 1-4 are models using eigenvector centrality and columns 5-8 are models using degree centrality. Recent work indicates that when networks are sparse and subject to measurement error, degree centrality may have better finite sample properties than eigenvector centrality (Cai, 2022). The results are very similar in terms of both patterns and magnitudes regardless of centrality measure.

In columns 1 and 5, we include only the logged number of organizer notes for a store and the logged mean degree (average number of coworker relationships recorded by the organizer within a store) as controls. These are the two variables whose correlation defines the NDO measure (though without the notes that record coworker relationships); the coefficients on all three variables are positive and significant. Notably, the coefficient on the NDO variable, regardless of the method

Table 2: OLS regression of card signing on network-driven organizing.

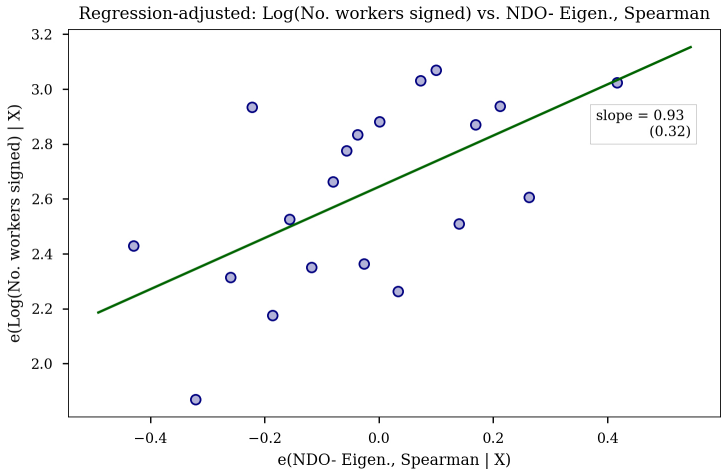
	1	2	3	4	5	6	7	8
NDO	**1.07**	**0.93**	**1.07**	**0.72**	**1.05**	**0.95**	**1.08**	**0.74**
	(0.34)	(0.32)	(0.32)	(0.34)	(0.33)	(0.32)	(0.32)	(0.35)
Log(no. organizer convers.)	**0.82**	**0.42**	**0.42**	0.39	**0.83**	**0.40**	**0.42**	0.38
	(0.08)	(0.19)	(0.19)	(0.22)	(0.08)	(0.18)	(0.19)	(0.22)
Log(mean degree)	**0.29**	79.39	11.81	104.34	**0.29**	74.93	9.74	102.29
	(0.05)	(87.10)	(68.65)	(103.40)	(0.05)	(87.17)	(68.56)	(103.17)
LASSO selected	N	N	Y	N	N	N	Y	N
Centrality metric	Eigen.	Eigen.	Eigen.	Eigen.	Degree	Degree	Degree	Degree
No. worker controls	N	Y	Y	Y	N	Y	Y	Y
Campaign length controls	N	Y	Y	Y	N	Y	Y	Y
Other network statistics	N	Y	Y	Y	N	Y	Y	Y
Demographic-union controls	N	Y	Y	Y	N	Y	Y	Y
Team fixed effects	N	N	N	Y	N	N	N	Y
Adjusted R_{sq}	0.56	0.65	0.65	0.69	0.56	0.65	0.65	0.69
N_{obs}	120	120	120	120	120	120	120	120

Results of regression of network-driven organizing metrics on number of cards signed, with various controls. No. workers includes logged number of workers ever contacted and logged number of workers referenced in field notes. Campaign length controls are indicators for quintiles of campaign length. Other network statistics include the log of the variance of worker centrality, logged number of edges, and average clustering coefficient. Standard errors are robust, and coefficients significant at 95 percent are in bold text.

of calculating centrality, is positive and significant, indicating that the targeting of effort to high-centrality workers is independently related to the number of cards signed in a store.

We display the relationship between store-level NDO and logged cards signed, conditional on controls, in a binned scatterplot in Figure 6. We see no clear evidence for a non-linear relationship between the variables. Columns 2 and 6 include a much larger set of controls selected to rule out other explanatory factors: (1) the log of workers contacted or mentioned by the organizers, a measure of both organizer effort and the size of the potential pool of workers who can sign a card; (2) the length of the campaign, as longer campaigns should yield more cards signed over time; (3) additional network statistics including the log of the variance of worker centrality, log number of recorded coworker relationships (network edges), and the average clustering coefficient of the coworker network (assessing closed triads in the network, a common measure of clustering) to ensure that the effects are not an artifact of workplace network structure; and (4) store-level gender composition, the racial composition and average income of the zip code in which the store is located, and the union density of the zip code in which the store is located.

In this control-saturated model, the adjusted R-squared increases by 0.11, and the coefficient on the NDO variable falls by 0.14, within the confidence interval. As there are a large number of covariates relative to the number of observations, we use L1 penalization to more judiciously choose control variables. In columns 3 and 7, we use double-LASSO (Belloni et al., 2014) to select important sets of covariates. The double-LASSO first uses L1 penalization to select control variables



Scatter plot of network-driven organizing versus logged number of cards signed, conditional on all controls in Table 1.

Figure 6: Cards signed and network-driven organizing (NDO), regression adjusted.

that significantly predict logged cards signed and then uses a separate L1-penalized regression to select variables that predict the NDO measure. Any variable selected in either of these regressions is included in a final regression, with standard errors adjusted as in Belloni et al. (2014).

The resulting adjusted R-squared remains identical to the model with full controls, at 0.65, but the coefficient on the NDO measure is now virtually identical to the estimate from the simple specification in columns 1 and 5. This exercise suggests that once a sparse set of covariates that predict the outcome or the key independent variable are included, there is little parameter instability and the explanatory power of NDO remains high. The stability of β across specifications with controls, while not dispositive, suggests an effect of NDO on card signing. As an additional check on our basic empirical finding, we conduct a series of non-parametric permutation tests (see Appendix). In general, these tests suggest the robustness of the observed relationship between NDO and card signing.

We might wonder whether other organizing strategies work as well as network-based targeting of organizer effort. To explore this, we construct a measure of "mobilizing" as opposed to organizing. A mobilizing strategy is one where the organizer allocates more effort toward those workers who are most enthusiastic about the organization. We operationalize this approach using the Spearman correlation between the number of organizer conversations and how early in the campaign the worker was first contacted, under the assumption that those individuals most open to the organization will be willing to talk earlier in the campaign. As in the Federal Way example above, the mobilizing strategy directs organizing effort toward the earliest workers contacted, rather than toward those most central in the network.

In Table 3, we illustrate the addition of this measure of “mobilizing” to the regressions.[1] The coefficient on NDO remains positive and significant, although somewhat smaller. The mobilizing score, while positive, is somewhat more imprecise,

Table 3: OLS regression of card signing on network-driven organizing, including endogenous mobilizing score.

	1	2	3	4	5	6	7	8
NDO	**0.76**	**0.90**	**0.90**	**0.71**	**0.74**	**0.91**	**0.91**	**0.73**
	(0.34)	(0.32)	(0.32)	(0.34)	(0.33)	(0.32)	(0.32)	(0.35)
Mobilizing (Spearman)	**0.88**	0.65	0.65	0.14	**0.87**	0.65	0.65	0.14
	(0.35)	(0.46)	(0.46)	(0.40)	(0.35)	(0.46)	(0.46)	(0.40)
Log(no. organizer convers.)	**0.85**	0.37	0.37	0.38	**0.85**	0.36	0.36	0.37
	(0.08)	(0.19)	(0.19)	(0.22)	(0.08)	(0.19)	(0.19)	(0.23)
Log(mean degree)	**0.32**	55.26	55.26	98.99	**0.32**	51.02	51.02	97.07
	(0.05)	(96.38)	(96.38)	(109.17)	(0.05)	(96.46)	(96.46)	(108.92)
LASSO selected	N	N	Y	N	N	N	Y	N
Centrality metric	Eigen.	Eigen.	Eigen.	Eigen.	Degree	Degree	Degree	Degree
No. worker controls	N	Y	Y	Y	N	Y	Y	Y
Campaign length controls	N	Y	Y	Y	N	Y	Y	Y
Other network statistics	N	Y	Y	Y	N	Y	Y	Y
Demographic-union controls	N	N	Y	N	N	N	Y	N
Team fixed effects	N	N	N	Y	N	N	N	Y
Adjusted R_{sq}	0.58	0.65	0.65	0.69	0.58	0.65	0.65	0.69
N_{obs}	120	120	120	120	120	120	120	120

OLS regression showing the effects on card signing of various control groups. Spearman mobilizing score is calculated as the correlation between the order in which workers are first contacted and the number of organizing conversations they are allocated. Coefficients significant at 95 percent are in bold text.

and significance varies depending on the included controls. The quantitative magnitudes suggest that mobilization may also be an effective strategy, though not as robust as NDO.

To summarize, regardless of whether centrality is measured using eigenvector or degree, and net of the LASSO-selected controls (representing organizer effort, store worker network characteristics, local area demographics, or local union density), the NDO measure is positively associated with the number of cards signed in that store over the course of the campaign. When the organizer has more interactions with high centrality workers, the campaign is more successful. For every one unit increase in the NDO term (using eigenvector centrality), at least 24 more cards are signed in the course of an average campaign.

Although the OLS estimates are robust, one covariate in particular reduces the magnitude and significance of the coefficient on our NDO measure: an indicator for the team assigned to organize that store (columns 4 and 8). One reason for this is the variation in NDO within a team is more limited due to shared organizing practices. In the next section, we will use solely the variation *across* organizing teams as an instrumental variable.

Instrumental Variable Estimates

We construct and leverage the average organizing strategy of the organizing teams as an instrumental variable. We construct an average NDO team score for each

store, leaving out the NDO measure for the focal store. We define it formally as

$$NDO_j^{Team} = \frac{1}{|Team(j)| - 1} \sum_{k \in \{Team(j)/j\}} NDO_k, \tag{2}$$

where $Team(j)$ is the team assigned to store j. Thus, the team measure is the average of the NDO measure of all the other stores being organized by organizers on the same team.

Although team assignment is independent of other determinants of organizing success, team organizing strategy is significantly associated with each individual organizer's use of networks in allocating their organizing effort.

In the appendix, we provide bivariate regressions with each of our control variables as outcomes, regressed on the instrument, to examine the exogeneity of the team average NDO score. Only the percentage black and mean income in the store zip code are correlated with the NDO_j^{Team} variable, out of 15 regressions. Nevertheless, we control for all of these variables, as well as LASSO-selected variables, in the analyses below.

The upper panel of Figure 7 shows the basic bivariate binned scatterplot corresponding to the first-stage of the instrument. Although there are only 10 teams, there is considerable variation in the underlying measure, partly driven by the heterogeneity in team size, and the leave-one-out average is significantly correlated with the left-out store's NDO measure. Because teams were assigned to regions, as we discuss above, it is likely that teams are exogenous to other determinants of organizing success other than their strategic orientation.

The middle and bottom panels of Figure 7 show the reduced form scatterplots of the measure of cards signed (transformed) against the leave-one-out team average of NDO. Both show strong and significant associations.

Specification and results

To examine robustness of the instrumental variable analysis to a variety of controls, we estimate a series of two-stage least squares regressions. We obtain instrumental variable estimates starting with the first-stage given by

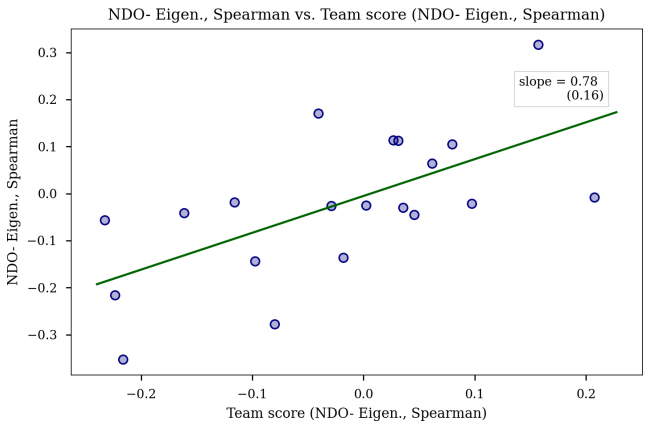
$$NDO_j = \alpha NDO_j^{Team} + X_j'\gamma + \epsilon_j \tag{3}$$

and reduced form equation given by

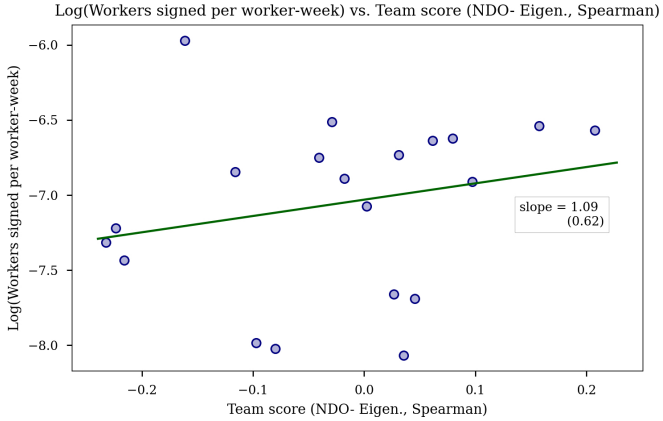
$$log(Cards_j) = \eta NDO_j^{Team} + X_j'\gamma + \epsilon_j. \tag{4}$$

The instrumental variable estimate of β will be given by $\widehat{\beta^{IV}} = \frac{\hat{\eta}}{\hat{\alpha}}$. The X_j will be the same sets of covariates from equation 1. We report robust standard errors in parentheses, and team-level clustered standard errors below in square brackets.

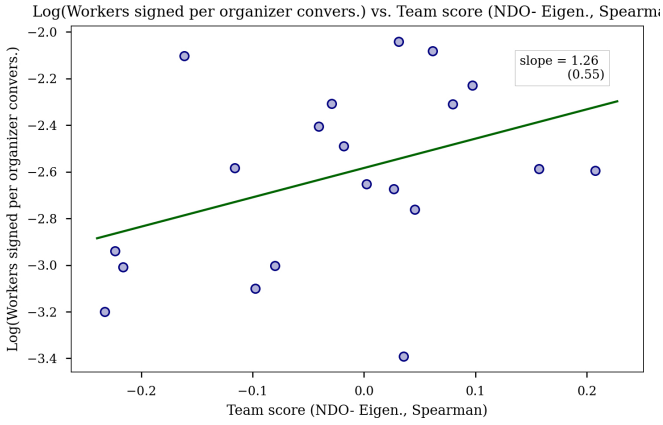
Table 4 shows the instrumental variable estimates of β from specifications parallel to those in 2. We show standard errors and F-statistics from both clustered (at the team level) and heteroskedasticity-adjusted specifications. The F-statistic from the first stage is reported at the bottom of the table and shows that the instrument



First stage: Eigenvector network-driven organizing measure vs. leave-one-out eigenvector network-driven organizing team score.



Reduced form: Logged number of cards signed per worker-week vs. leave-one-out eigenvector network-driven organizing team score.



Reduced form: Logged number of cards signed per organizer note vs. leave-one-out eigenvector network-driven organizing team score.

Figure 7: Leave-one-out network-driven organizing (NDO) team score instrument, no controls.

Table 4: Instrumental variable regression results.

	1	2	3	4	5	6
NDO	**1.82**	3.04	3.00	**1.62**	2.45	**2.42**
	(0.71)	(1.79)	(1.62)	(0.63)	(1.29)	(1.18)
	[1.01]	[0.80]	[0.79]	[0.92]	[0.52]	[0.51]
Log(no. organizer convers.)	**0.84**	0.06	0.09	**0.84**	0.15	0.19
	(0.08)	(0.39)	(0.37)	(0.08)	(0.31)	(0.29)
	[0.07]	[0.32]	[0.32]	[0.07]	[0.29]	[0.28]
Log(mean degree)	**0.30**	−29.29	−26.48	**0.30**	−13.13	−17.45
	(0.06)	(134.49)	(107.79)	(0.05)	(119.13)	(99.16)
	[0.06]	[125.43]	[127.63]	[0.06]	[102.03]	[109.03]
LASSO selected	N	N	Y	N	N	Y
Centrality metric	Eigen.	Eigen.	Eigen.	Degree	Degree	Degree
No. worker controls	N	Y	Y	N	Y	Y
Campaign length controls	N	Y	Y	N	Y	Y
Other network statistics	N	Y	Y	N	Y	Y
Demographic-union controls	N	Y	Y	N	Y	Y
First-stage F-Stat (robust)	25.69	3.70	4.19	32.40	5.97	6.72
First-stage F-Stat (clustered)	75.70	7.53	9.00	118.55	12.13	14.69
Adjusted R_{sq}	0.55	0.55	0.56	0.56	0.60	0.61
N_{obs}	118	118	118	118	118	118

Results of regressions using the leave-on-out networked organizing team score as an instrument, showing the effects of network-driven organizing on the log of cards signed, with various controls. The leave-one-out network-driven organizing team score is calculated as the mean of a store's associated regional stores' (based on teams of organizers) scores, excluding the score of that store. No. workers includes logged number of workers ever contacted and logged number of workers referenced in field notes. Campaign length controls are indicators for quintiles of campaign length. Other network statistics include the log of the variance of worker centrality, log number of edges, and average clustering coefficient. Robust standard errors appear in round brackets; standard errors clustered at the team level are reported in square brackets. Coefficients significant at 95 percent are in bold text.

is strong without controls but loses strength when controls are added (with corresponding loss of precision in the second-stage estimates, particularly when standard errors are not clustered).

The results in Table 4 again suggest large, albeit imprecise, effects of the NDO measure on cards signed; the estimates are more than double the size of the OLS effects. The first stage statistics are low when all the controls are added. In columns 3 and 6, we again use a variant of the double-LASSO procedure, adjusted for the instrumental variable. We use LASSO regressions for NDO_j, NDO_j^{Team}, and $log(Cards_j)$ as outcome variables. Any control variable selected in any of these three regressions is then included in the two-stage least squares regression as a control. The coefficients remain large, but the precision and strength of the first stage estimates are improved relative to the specifications in columns 2 and 5.

The instrumental variable coefficients are significantly larger than the OLS coefficients. This could be due to measurement error in the NDO measure, but it

could also be due to a failure of the exclusion restriction in the instrument. Teams may differ in many respects other than the degree of NDO, and the assignment of teams to stores may not be uncorrelated with other determinants of campaign success. Furthermore, the stores where the organizer practices NDO in a manner similar to that of their team may be stores where workers are more responsive to NDO; organizers who do not comply with the standards of their team may have some different information about what would work in their particular store. The imprecision, low F-statistic, and wide coefficient range on the instrumental variable analysis suggest taking these estimates as more qualitative indicators of the direction of the effect rather than quantitatively robust (unlike the OLS estimates). Although we think these instrumental variable estimates of NDO point toward a causal interpretation, we cannot rule out all possible confounding factors.

Interpretation of the Magnitude of Results

Our estimates are large, particularly in the instrumental variable specifications. Even taking the 95 percent lower confidence bar of the OLS coefficient in Table 2, model 3, the estimates imply that an increase in the correlation between organizer effort and worker centrality from 0 to 1 increases cards signed by about 55 percent.

Are these magnitudes too large to be plausible? Recall that the sample median cards signed is 13, less than 10 percent of the average Walmart store employment, and likely less if we account for turnover. Thus, these large percentage increases in card signing should be interpreted in light of the low base rate of signing. Even the largest significant instrumental variable coefficient would imply that cards signed would go from 13 to 60, roughly half the size of a single store.

Union elections are tight and small margins matter. Although our context is not a standard union drive, National Labor Relations Board (NLRB) union recognition elections provide an illuminating comparison. Using Bloomberg's NLRB election data, the average vote margin for a union win in the retail sector between 2017 and 2024 was 14 votes.

We can compare NDO to other organizing tactics deployed in NLRB elections. Bronfenbrenner (2009) shows that having a representative (rank-and-file) organizing committee increases the probability of a union win by 22 percentage points. A representative organizing committee essentially "re-wires" the workplace network so that union supporters—not necessarily those who are most central in the workplace network—are connected to each other while also dispersed throughout the bargaining unit. Having a representative organizing committee is a core "best practice" for winning union drives.[2]

The NLRB data show that in large bargaining units with more than 100 workers, wins have a 73 vote margin on average. As a very rough linear approximation, this would suggest a representative organizing committee increases votes by ($0.22 \times 73 =$) 16 in a large unit. Our estimates of the effect of NDO on cards signed suggest that it is a tactic quantitatively comparable to other best practices in union organizing. Although OUR Walmart was not trying to win NLRB recognition, the process of an organizer trying to secure costly collective action is common to both NLRB election drives and OUR Walmart's card signing efforts. Targeting central

workplace agents is well-known folk wisdom in organizing, and our estimates validate this prior.

Conclusion

In contrast to scholarship that asks how social networks condition participation in collective action, here we focus on the way that organizers draw on their understandings of social relationships to shape their organizing practices. In other words, we see organizers as agentic networkers. We suggest that social movement scholars pay more attention to the creative and strategic relational, network-attuned work that movement actors do.

Building on previous qualitative scholarship on the theory and practice of labor organizing, this article offers quantitative evidence that labor organizers are more successful when they focus attention on people who are central within a (perceived) workplace network. This finding provides novel empirical evidence to social scientists about the value of the action of individuals perceived as central in a network for facilitating risky collective action. We also find that, despite the insights from theory regarding the value of targeting central actors, there is substantial variation in applying that insight as an organizing strategy. For organizers and practitioners, this article provides more precise guidance about how to leverage relational organizing and a way of formalizing the training of organizers and the evaluation of organizing. That the data we draw on represent the centrality *as perceived by the organizers* reaffirms the importance of perceived networks for power and action in organizations and confirms empirical variation in individuals' ability to accurately perceive networks (Krackhardt, 1987; Casciaro, 1998). That the results do not substantially vary based on whether we calculate perceived centrality with degree or Eigenvector centrality suggests that the specificity of organizers' perceptions of centrality need not be too nuanced. The relevance of perceived centrality provides a more actionable strategy for training organizers than would assuming centrality based on some "real" social network structure.

The interpretation we provide for the qualitative evidence and the quantitative findings—that the use of an organizing strategy based on cultivating and spending more time with those workers that organizers understand to be central in their workplace network is more effective than alternative organizing strategies—also allows for the possibility that other store and individual differences that we do not observe may also be important. For example, based solely on the organizing notes, it is difficult to establish definitively whether the differences between Pico Rivera and Federal Way are differences in organizer strategy or differences in organizing context. While it appears, for example, that organizers at Pico Rivera made much more of an effort to develop Dora Avila as a leader than organizers at Federal Way did to develop Eleanor Bernard as a leader, we cannot rule out the counterfactual that Dora was simply more open to being organized than Eleanor—more supportive of the organization, more willing to devote time and effort, more committed to voice over exit. Alternatively, we might ask, did organizers do something differently with Michelle at Pico Rivera than organizers did with Erik at Federal Way, or was Michelle simply a different kind of person than Erik? Given our data, we cannot

definitively separate out this explanation from one based on NDO; it seems likely that both social processes are operating to produce variation in card signing.

Based on this case, we also observe that pursuing an NDO strategy is not simple. The highest level of NDO we observe in these data is a correlation of 0.56, suggesting that it may be quite difficult to target effort according to worker centrality. Our results speak to longstanding comparative questions about the low level of union density in the United States (Eidlin, 2018), and the difficulty in organizing new unions. The magnitudes of the coefficients suggest that NDO can significantly increase the number of cards signed, but the absence of any lasting organization in these stores (i.e., none of these stores continue to have significant OUR membership or other representation by a worker organization) also indicates the structural constraints faced by organizers.

In our sample, the mean number of cards signed was 23 (about 17 percent of the mean workers discovered by an organizer) and no store received more than 38 percent of cards signed (using the baseline number of workers known to the organizer, likely smaller than the actual number of employees). To put these numbers in context, organizing folk wisdom holds that a shop should not file for NLRB elections without more than 65 percent of a unit having signed cards because employer opposition mounted during the election period can effectively cut down support by 15 percent, on average. While using networks in the organizing process can drastically improve organizing outcomes, even the most perfect network-based targeting is unlikely to move enough workers to reach a majority, let alone the 65 percent threshold. Although the strategic use of workplace networks is important, then, it is unlikely to drive organizing success on its own, highlighting the structural disadvantage organizers face in the high-turnover, low-wage environment of U.S. retail. The extent to which these findings extend to the recent period of low unemployment following the pandemic remains an open question.

We are able to analyze the relationship between organizer practice and organizing outcomes because of the uniquely rich relational data collected by organizers over the course of the OUR Walmart organizing campaign. This type of data are increasingly collected by labor organizations in a manner even more systematic and precise than the way OUR collected their data. Although OUR was not a traditional labor organization nor aiming for a traditional NLRB election, the results in this article are relevant to a variety of organizations aiming to leverage social networks for solving collective action problems. In this sense, our article contributes to a pragmatist approach to social science that attempts to understand the social world through the lens of solving real-world problems (Prasad, 2021). Spending more time with those workers perceived as central in a workplace yields better organizing outcomes, reflecting that organizers can both leverage and build relationships in a workplace. Our metric of NDO could be one that workplace-based organizations use to measure and improve their own practice. Other research might compare workplace networks from the perspective of workers to those perceived by organizers. Future partnerships could embed experimental variation in organizer strategy to examine external validity and robustness of the results from this article.

Notes

1 The measure is formally $Corr(Rank(Conversations_i), Rank(\text{Weeks from first contact with i})$

2 In more recent data collected by Bronfenbenner and collaborators, still unpublished, the same tactic, unadjusted, is associated with a 12 percentage point increase in win probabilities, an 8 percentage point additional vote share (mean 49 percent) in favor of the union, and about 40 more votes. Looking at NLRB petition signatures, rank-and-file committees are associated with roughly 12 percentage points (mean 60 percent) more of the bargaining unit signing the petition (roughly 50 more signatures).

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