Social Voting & Election Coordination in Rural Hondurans

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September 15, 2015

Abstract

Models of voter choice frequently assume voters behave as independent actors who make decisions in a social vacuum. Recent work has demonstrated that social connections play a formative role in the decision to turnout to vote, to take expressive political action, and in the formation of political identity. Yet, no work has examined how social connections influence voters' choices in an election. Here, I argue that political actors use *social information* to solve many types of coordination problems, including coordinating to vote for winning candidates. I present a novel data set where I measured the real-world social connections of more than 4,000 political actors and then randomly assigned 113 individuals to serve as a candidate for one of thirty political offices. I find that that better socially-connected candidates fare better in this election, and that voters use social information to coordinate their votes for winning candidates. These results suggest that social networks play a fundamental role in coordinating human actions that extend from our daily lives into explicitly political activities.

Contents

Do political actors use social information to coordinate their actions? If so, how? Across contexts as diverse as the US Congress, the *Ewe* tribe of fishers in Ghana, and city councils in Michigan, humans take political action in a context where the people selecting those for leadership have ongoing, direct contact with those being selected for the leadership role. In spite of the fact that such a large number of political actions are taken in this context, very little is known about the rich set of social information and social histories might shape outcomes.

Preview of Argument In this paper, I argue that *social information* plays an important role in shaping political outcomes. Social information deals with who knows whom, who dislikes whom, where the cleavages between group members exist, the sets of actors who frequently take the same action, and other queues easily collected and processed in routine, daily interactions. This social information is commonly shared by all members when the groups are relatively small and interact frequently. Indeed, in many decisions made by small groups of actors, social information is the sole piece common knowledge information. In the Norton Shores case, this social information allowed council members to update their beliefs about the actions of other members; as a result, the group quickly coordination on a candidate.

Preview of Results To more systematically test whether political actors use social information in their decisions, I construct a novel data-set that collects political, demographic, and social data from more than 4,000 residents of rural Honduras. With this data in hand, I partnered with a burgeoning social development and micro-finance non-profit in the region to randomly assign 113 of these 4,000 to stand for election. In all, the elections placed representatives in 32 year-long governance positions in with the non-profit.[1]

I find that better socially connected candidates did better in this election, even when controlling for observable quality indicators. Specifically, well connected actors receive

[1]The non-profit continues to work actively in the area.

fifty percent more votes than poorly connected actors, and actors who bridge clusters of actors in a community receive a nearly 25% boost in vote share over and above the effect of being well connected. In addition, this research design allows me to examine the social information mechanism voters use to choose candidates. The results are consistent with a theory that voters use social information to coordinate group-based actions.

1 The *Social Milieu*

An important strain of political science research identifies the role of the social environment to shape political outcomes. Berelson, Lazarsfeld and McPhee (1954) anchor the sociological political science tradition and squarely rest their account of political life in Elmira on the *social milieu* – the set of relationships and norms voters hold. "To a large extent, political discussion follows the composition of friendship groups," (Berelson, Lazarsfeld and McPhee, 1954, p.103). This work laid the foundation for later scholars to measure how civic-mindedness affects political participation (Verba and Nie, 1987), assess how discussion networks shape identity formation (Huckfeldt, Johnson and Sprague, 2004; Huckfeldt and Sprague, 1995), and examine how shared norms (Rosenstone and Hansen, 1993; Sinclair, 2012) and conditional cooperation (Rolfe, 2012) explain variation in individuals' levels of political activity.

Although political sciences' sociological tradition identifies a natural place for social context to influence citizens' behaviors, many past empirical works in the paradigm have not measured important parts of this social context or have relied on imprecise approximations or somewhat clunky aggregations. Two influential books published in the last year develop extensive theory about how social context shapes Americans' participation in electoral politics (Sinclair, 2012; Rolfe, 2012). Sinclair (2012) argues that a preference for conflict avoidance leads voters to form preferences that match those of political discussants. Rolfe (2012) develops a different theory that comports well with

Sinclair; she argues that voters take conditional action based on the actions of those political actors with whom they interact. This conditional behavior immediately calls to mind the work of Gerry Mackey and behavioral norms. However, because data on the social relationships their theories implicate does not exist, both scholars instad rely on imprecise geographic proxies reasoning that living in the same Congressional district increases the likelihood that two voters share social ties. As a result, in both Sinclair and Rolfe present results that are suggestive of a role for social context, though most of the hypothesized relationships were not borne out by the data at traditional levels (e.g. Sinclair, 2012, p. 68).

2 Theory and Hypotheses

Previous theories have argued that social relationships serve as an important conduit for information (Almond and Verba, 1965; Robinson, 1976; Huckfeldt, 1979; Huckfeldt and Sprague, 1987; Kenny, 1992; Rosenstone and Hansen, 1993; Walsh, 2004; McClurg, 2004, 2006; Klofstad, Sokhey and McClurg, 2013) and form the basis of norm based behavior (Wolfinger and Rosenstone, 1980; Spitzer et al., 2007; Sinclair, 2012; Goette, Huffman and Meier, 2006). Rolfe (2012) notes, "Citizens who are asked to vote are more likely to do so"; in 1920s, multi-ethnic Chicago, Gosnell (1927) found that women's social-groups affected women's probability of turning out to vote. In a nationally representative sample, Rosenstone and Hansen (1993) find higher turnout among members of social organizations, and Verba, Schlozman and Brady (1995) argue that "'congregational' churches" and other civic organizations train their congregants and members in the civic skills necessary to be effectively engaged in politics. McClurg (2004) finds that party contact of political discussant pairs can spill-over from one discussant to another, changing the substance of what these pairs discuss. These theories hold that information largely flows along social channels, and that understanding the contours of these channels might help

us to better understand political and behavioral outcomes (Mutz, 2002; Friedkin, 1998).

Much of this literature studies the flow of information between actors, and so focuses on the transmission and diffusion of information explicitly related to electoral politics (Huckfeldt and Sprague, 1987, 1995; Huckfeldt, Johnson and Sprague, 2004; Walsh, 2004). The most recent work in the area has focused on the related notions that social networks engender norm-based Sinclair (2012), conditional (Rolfe, 2012) responses to stimuli. and has contributed to our understanding of how political opinions and identities are formred in mass politics.

Sinclair and Rolfe (independently) argue that voters' decisions to turnout to vote or participate in local-level political activism are shaped by individual predispositions of voters and how those predispositions change when voters interact with one another. Sinclair argues that broad political outcomes can be well described by a conflict-avoidance mechanism whereby voters choose positions that are in line with the positions of their social connections. In this model, because one selects social alters that are likely to share tastes, and beliefs, and, indeed genetic material (Christakis and Fowler, 2014), taking the position of social alters both does a good job of taking a position near one's own ideal point, but also minimizes the conflict between social alters who take different positions.

Rolfe arrives at a similar conclusion, but argues that political action is the result of conditional-cooperation filtering through a socially-connected world. This view takes a tit-for-tat, game theoretic, view of political action, and argues that there are a small number of actors in society that will take costly political action independent of the actions of others, but that others' actions are conditional on being forced into action by political active members of society. While Rolfe identifies conflict avoidance as one of several mechanisms driving this social effect, she is not interested in specifically engaging the mechanism. Rather, Rolfe's modeling focuses on the effects of broader social-structure rather than interpersonal influences.

2.1 Theory

I build upon information transmission and norm-based theories and propose a complementary mid-range theory: the social network itself conveys information to those who are embedded within it. I refer to this notion that the social networks contain information as a theory of "social information." First, well connected actors likely have attained such status by their actions in past exchanges (Csányi and Szendroi, 2004; Acemoglu and Jackson, 2011). Knowing this, the actions of these highly connected actors might serve as a useful heuristic for other political actors to satisfice and reach a decision (Simon, 1955). Second, and in parallel, friends and family members are more likely to satisfy representativeness heuristic criteria. As a result, the actions of closely related political actors might serve as a complementary decision criteria. Actors may also make intentional use of social information to make coordination and distribution decisions, especially when payoffs are conditioned by beliefs about the actions of other actors. Third, actors may simply hold a preference for taking actions similar to those with whom the share social bonds. Although it is an important question, the core contribution of this proposed dissertation is not to adjudicate between theories about why or how social networks actionable information, but rather to suggest that this information is at play in ways that shape important political outcomes even in the absence of communication.

Even if actors do not have an explicit knowledge of the aggregate network structure, they do have heuristics to intuit their social system's important structural elements. For instance, children in a classroom know which other children are popular; politicians in closed door discussions about military action know who is well connected in the Democratic organizational committees (DCCC); citizens discussing conservative politics at local meeting places (e.g. Washtenaw Dairy, Walsh (2004)) or out at the local surf break know who's opinions are likely to stick within the group. In this way, popularity and network centrality measure the same phenomena; both concepts identify social information that makes an opinion or action likely to be observed. These actors also understand

social cleavages: children understand that some are jocks while others are nerds; politicians understand who are hawks and doves; surfers know who are long-standing locals and who is not. These distinctions outline community structures identified by algorithm in social network graphs. Finally, these actors can even integrate the connectedness and community structure concepts. Children can identify the most popular jock and the nerdiest nerd; the most influential hawk; the best connected local.

In each case, these actors are a part of a social system that shapes the likelihood an action is observed. A class of political outcomes, most notably coordination tasks, are shaped by the beliefs of actors. That is, while actors may have preferences for a particular outcome, equilibrium reasoning requires they make some assessment of the preferences, cognitive structures, etc. of other actors in the game, and it is these beliefs about the actions of the alter that in fact shape eventual outcomes. For a child deciding which clothes to wear, if she holds a preference for a blue shirt but also preferences to coordinate her shirt color with others, then her beliefs about the shirt color of others shapes her eventual choice. Similarly, a citizen discussing conservative politics might have a preference for antagonistic tax policy, but also a preference to not be the first mover in her social group to identify with the Tea Party because she dislikes dis-coordination.

2.2 Voters' incentives

Candidates have a clear incentive to try and coordinate the behavior of the people who are voting. If they can lead voters to hold similar views and valences on the issues, candidates can reduct the variance between the opinion of the median voter in their win-set and the opinions of all the actors in that set. Even more, and of primary importance, need to coordinate the actions of voters to vote them into office.

It is perhaps less clear why the voters would like to be coordinated by a candidate. This type of coordination might mean changing attitudes and beliefs that are loosely organized (Campbell et al., 1960; Converse, 2006) or drawn from a distribution of atti-

tudes (Achen, 2011; Zaller and Feldman, 1992). In this paper, by design there is neither communication between candidates and voters, nor communication between voters. As a result, I assume that voters' beliefs are unchanged when presented with a slate of candidates. Consequently, the design leaves voters with only two primary considerations. First, the voters would like to select a candidate who will do a better job. Second, for both psychic and intrinsic considerations, voters would like to be among the group of voters who supported the winning candidate.

2.3 Hypotheses

A theory of social information leads to the following set of hypotheses:

1. Outcomes:
   (a) *Candidate Capability Hypothesis:* More capable candidates will win more votes than less qualified candidates;
   (b) *Candidate Connectedness Hypothesis:* More connected candidates will win more votes than less well connected candidates.
2. Mechanisms:
   (a) *Social Proximity Mechanism:* Voters select candidates who are socially proximate;
   (b) *Social Connectedness Mechanism:* Voters select candidates who are socially connected.

2.3.1 Capability Hypothesis

Voters who care about outcomes are more likely to vote for well qualified candidates than poorly qualified candidates; so, under candidate capacity considerations well-qualified candidates will win more votes than less qualified candidates. This effect operates independent of any social information, though quality information and social information can operate in concert with each other. Indeed, many of the traits that might be associated with a quality politician are also associated with a quality friends – empathy, motivation, capacity.

There are a number of reasons why one candidate may be more qualified than another. One candidate may be more capable of taking on the cognitive load associated with leadership and complex decision making. In this case, increased education which signals a capacity for increased load, will be associated with increased vote share. Additionally, one candidate may be better qualified because he is more familiar with unique constituent issues. In this case, living in the community longer and being older should be associated with increased vote share. Finally, one candidate may be more empathetic and willing to address the problems of constituents and find compromise where possible. In this case, it possible that personal, social lives are a useful signal of the ability of a candidate to take on responsibility. Then, being married may signal positive responsibility while being divorced may signal a lack of responsibility.

2.4 Candidate Connectedness Hypothesis

In addition to capability considerations, candidates with social networks that have desirable traits may perform better in an election than candidates who do not have those same desirable traits. In particular, candidates might receive votes from their local-neighborhood of social contacts – described in the next subsection as the social proximity mechanism – or might receive votes from a more distributed set of electors – described in the next subsection as the connectedness mechanism.

2.4.1 Social Proximity Mechanism

The main competing theories are the social proximity theories of Sinclair and Rolfe. Instead of using social networks to coordinate behavior, actors may just use their social networks to find the candidate with whom they are the closest friends. Choosing the most socially proximate candidate satisfies Sinclair's conflict avoidance mechanism and Rolfe's conditional cooperation model of behavior. Figure 1 presents one realization of voting patterns under the social distance theory. Under this theory, rather than evaluat-

ing how well-connected is a candidate, instead, voters make a simpler calculation about which of the candidates is the most proximate and cast a vote for that candidate. Voters make this assessment with some inaccuracy, there is some drift between the conceptualization of the social network and its operationalization of, and voter are probabilistic actors. These factors lead to some mis-matched voting, where a voter votes for a candidate who is not measured as the most socially proximate, but the social distance pattern is still clearly observable.

2.4.2 Connectedness Mechanism

To elect a candidate, voters must coordinate to vote in a similar way. One way to coordinate is to use how well connected are candidates to form mutually consistent beliefs about whom other voters will choose. Socially connected actors are in active in their communities and are in frequent contact with other residents. They tend to participate in community, church and work organizations, and in these groups they strengthen relationships with other community members. The strength of these relationships, and the frequent interaction with other members of the community as a result of these relationship make actions of well-connected actors increasingly visible within the community.

Acemoglu and Jackson (2011) demonstrate that under conditions of imperfectly observable actions – an assumption that appropriately matches social systems – the actions of "prominent" actors can shape future behaviors because all future actors are more likely to have received the signal from the prominent actor than other actors. While Acemoglu and Jackson stipulate that prominent actors' signals are perfectly received by alter, I relax the perfect observability requirement, and assume only that better connected individuals actions are increasingly likely to be observed in the number of social connections she holds.

This theory of social information does not imply persuasion, obedience, or any other type of social influence as a mechanism. Rather, the social prominence hypothesis is

a statement of common beliefs. Each political actor holds beliefs about the probable actions of other actors; and, conditional on the randomly assigned candidate set, the actor updates her beliefs about the actions of others.

3 Research Design

3.1 Key Network Concepts

One of the assets of approaching a political science problem from a social networks framework is that researchers and readers have a strong intuitive understanding of social network concepts from their daily lives. Rather than learning about concepts like sampling variability, variance and heteroskedasticity that one typically does not encounter outside of formal training, to understand the argument and evidence in this paper, those who do not have previous experience with the method need only learn two relatively straightforward concepts: connectedness and social distance.

In this paper, I conceptualize social connectedness as *how central* an individual is to her social network. Well-connected, or central, actors are actors that are thought to be important to the network. In a high school, these actors might be the students who are elected to be the prom queen and king; in a business, central actors might be the woman who knows how to quickly address technical problems or the man who knows how to navigate a bureaucracy; in a political science sub-discipline this might be the scholar who everyone wants to talk with at the discipline's annual conference. Freeman defines three core concepts of social connectedness: degree, closeness, and betweenness. In this chapter, I utilize only degree and betweenness, and so I only discuss the operationalization of these two measures.[2]

[2]Like both degree and betweenness centrality, closeness centrality also measure the distance between a focal actor and other actors in the network. However, unlike degree and betweenness, closeness is ill-defined in networks that are not *fully-connected* – when there is an actor or group of actors that does not hold any social relationships with the rest of the social network.

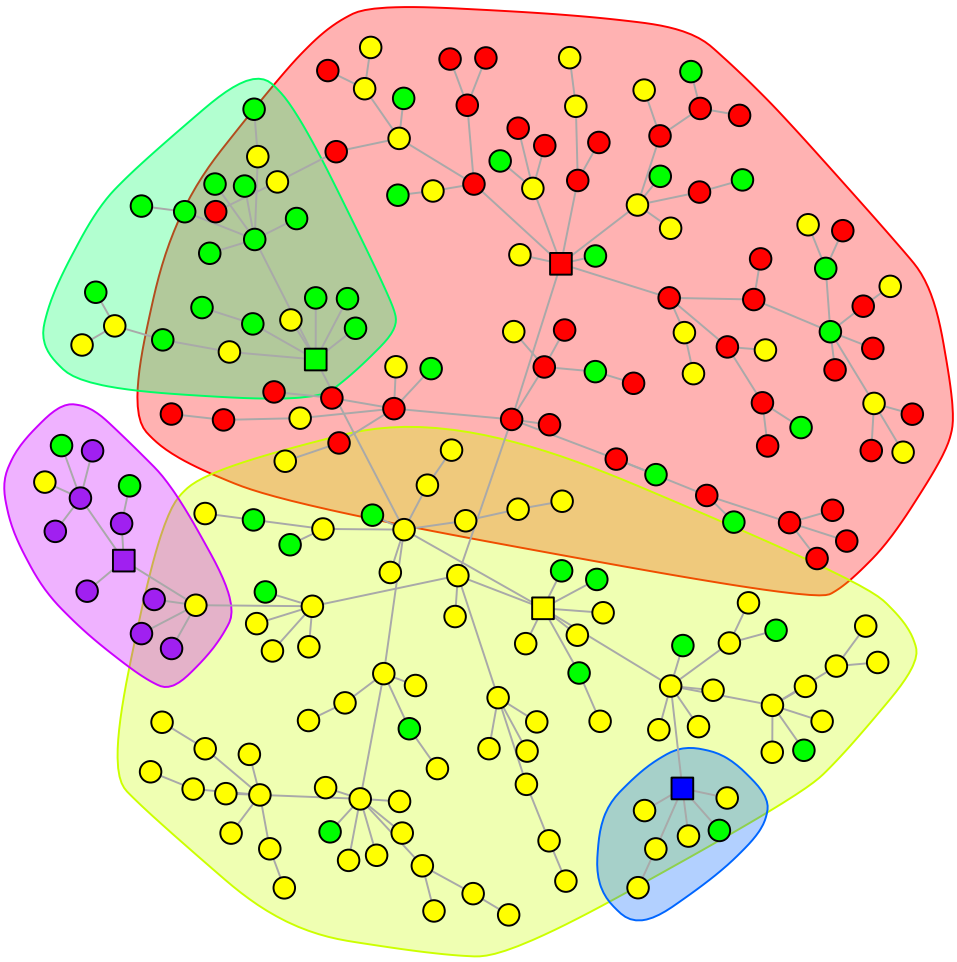

Figure 1: Possible voting pattern under social distance theory of voting. Square nodes represent randomly selected candidates, each assigned a unique color. Circular nodes represent voters, and grey edges between nodes represent social ties. Overlaid polygons are the *closest candidate* catchment areas, and the colors correspond to the candidates' assigned colors. Colors of circular nodes are votes for a candidate, and are a function of social distance and stochastic noise.

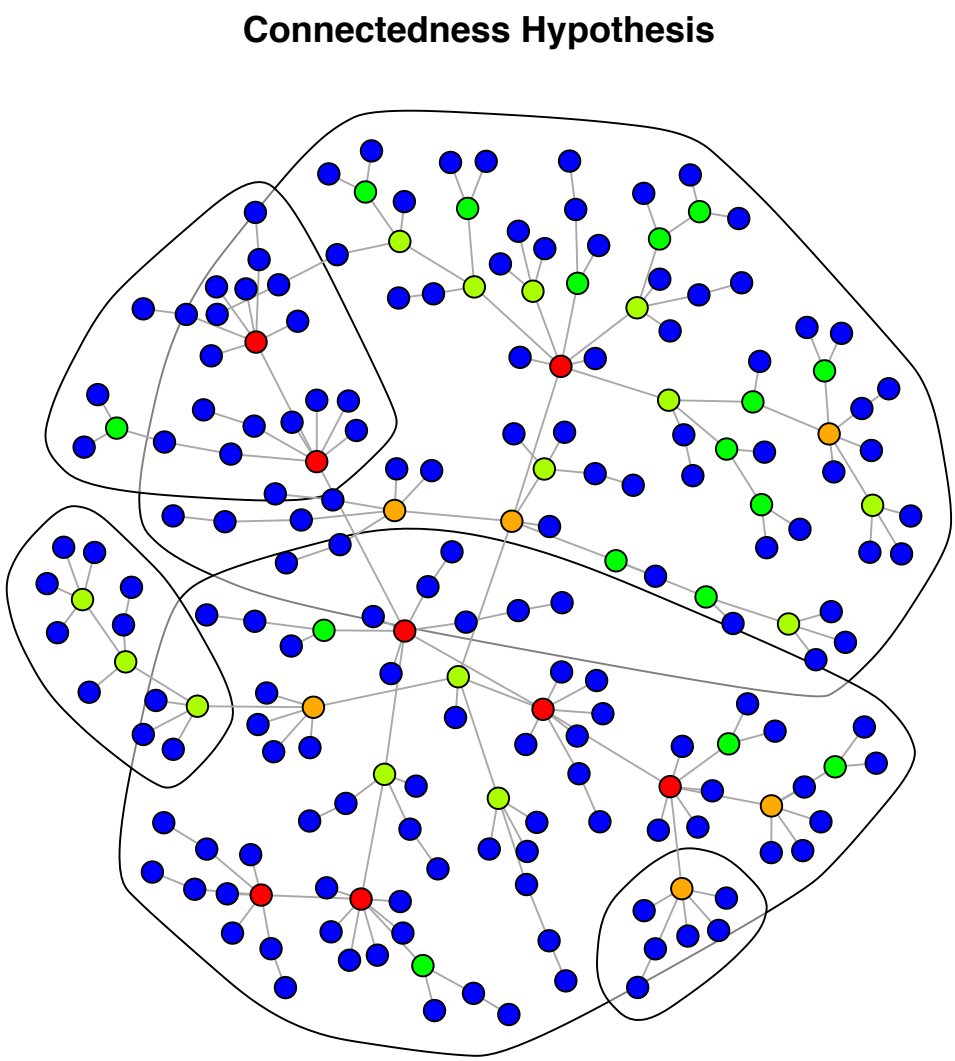

Figure 2: Possible voting pattern under social information theory of voting. Nodes represent individuals in the community and grey edges between nodes represent social ties. Overlaid loops are the same *closest candidate* catchment areas as Figure 1. Colors represent the probability of winning an election if voters vote based how well connected is a candidate, and range from red–orange–yellow–green–blue from most likely to win to least likely to win.

Degree Centrality Degree centrality is a count of the social connections an actor holds. If someone has three friends, we would say that this person's friendship social network has a degree of three; if someone has a single sister, that person's sibling network has a degree of one. That is, degree is the number of relationships, frequently called edges, incident on a particular actor. One further distinction in degree centrality lay in the direction of a tie. Frequently, social relationships are measured as beginning with one person directed toward another. I might call someone a friend, in which case we would say that this social relationship originates with me, and is directed toward my friend. My friend, in turn, might also say that I am her friend, a tie beginning with her and directed toward me. In this case, one would say there exist two relationships – one in each direction, between us. In this paper I make one further distinction about degree centrality based on the direction of a tie. I use indegree – a count of the edges incident on an actor – or the number of others that nominate an actor as a particular social relationship. Canonically, (Wasserman and Faust, 1994, p. 164) define indegree (D_I) for a particular actor (e_i) as,

$$D_I(e_i) = \sum_{j=1}^{g} x_{ji}, \tag{1}$$

where $x_{ji} = 1$ if there is a social connection from node j to node i and zero otherwise. Indegree has several desirable properties as a measurement of social connectedness, but two worth particular mention for this task. First, indegree increases in the number of social connections an actor has, but does not increase in the number of outgoing ties. For networks that are built from personal interviews, this limits mis-measurement that would result from personality traits that might be correlated with social network indicators, particularly gregariousness and intelligence. Second, indegree is a locally consistent centrality measurement; if there are nodes or edges missing from the social network measurement, as might exist in sampled graphs, indegree still predictably ranks actors without any order reversals (Yoon et al., 2007; Illenberger and Flötteröd, 2012). I use degree centrality to operationalize hypothesis two that better socially connected

actors will perform better in the election.

Betweenness Centrality Betweenness centrality measures how much a particular actor is a necessary link between two others. Intuitively, "interactions between two nonadjacent actors might depend on other actors... especially [those] who lie on paths between the two," (Wasserman and Faust, 1994, p. 188). In a university, graduate students would hold high-scoring betweenness position between faculty members and undergraduates because ideally all communication about grade appeals filters through the graduate students. On the Hill, Congressional schedulers hold positions of high betweenness centrality because information about a Member of Congress' face-to-face meetings between staffers, other Members of Congress and outside interests must all be coordinated by the scheduler.

Described formally, the betweenness centrality (B) of a particular actor (e_i) is,

$$B(e_i) = \sum \frac{\sigma_{uv}(e_i)}{\sigma_{uv}}, \tag{2}$$

where $B(e_i)$ is the betweenness of node e, $\sigma_{uv}(e_i)$ is the number of shortest paths (using social network connections) between nodes u and v that cross node e_i, and σ_{uv} is the total number of shortest paths between u and v. A shortest path between two nodes is the path that traverses known social connections without "wandering off." The theoretical maximum betweenness of any node is $(g-1)(g-2)/2$, where g is the total number of nodes in the network. Then, graphs can be scaled by this theoretical maximum, projecting betweenness onto a [0,1] range by dividing the betweenness score of each node by the theoretical maximum, noted $B'(e)$ is,

$$B'(e) = \frac{B(e)}{(g-1)(g-2)/2}. \tag{3}$$

The rescaling permits the comparison of betweenness centrality in networks of different

sizes. I use betweenness centrality to operationalize hypothesis three that actors who bridge factions will perform better in the election.

3.2 Measuring Social Networks

I measured the strong-tie, affective social networks of all residents living within a 1.5 hour drive of the city of La Uniòn, Honduras. La Uniòn was selected for two factors. First, the outlying towns, called *aldeas*, are spread along coffee growing access roads which provide relatively easy access by truck, but are separated by enough distance that towns were easily separable and distinct networks could be measured.[3] Second, because the region is an active coffee-growing region, there was the opportunity to parter with a burgeoning microfinance organization in the region.[4]

To measure the social connections and personal political characteristics, we undertook a three-stage measurement strategy. First, following Marchelli (2007), we enumerated every possible residence in every town—including partially completed homes, sheds and granny-flats in the rear of residences, and gardener compounds on school lots. In borderline cases, we interviewed neighbors to ascertain if any town residences lived in a particular structure. Second, we returned to each residence and enumerated all residents; at this time we collected all residents' ages, and gender, and importantly photographs.[5] Third, after combining this census information for a town, the survey team returned to each residence and surveyed all residents using a custom-designed, computer assisted interview program.

Survey enumerators measured respondents' social networks using the following

[3]In other work, I use the separability of these networks to run a Randomized Controlled Trial with random assignment to treatment at the village-level.

[4]This organization, *Unión Microfinanza* still operates full-time in the region today, and many of the candidates elected in the election undertaken in the article are still affiliated with the organization. At the time, the organization was interested in learning about families social connections in the area; the organization has continued to use this information in daily-practice.

[5]We collected pictures of all residents because many residents had very similar names. Including a photograph of every resident allowed us to accurately measure social connections with reduced threat of mis-measurement due to a common name.

three questions: (1) Who are your siblings who you are friends with? (2) Who are your friends? (3) Are you married or living as married with anyone? If so, whom? For the present analysis, as in previous work, all nominations were made symmetric (e.g. Leider et al., 2009).

These networks create a network of the strong-tie relationships political actors hold in their everyday lives. Previous work suggest that strong-tie networks are the most influential on the daily activities of populations in developing contexts (Apicella et al., 2012) as well as in the Western/developed world (Jones et al., 2013). Our networks are highly similar to other societies' social networks along a number of metrics – connectedness, clustering, scale invariance – suggesting that the networks were reliably measured (Apicella et al., 2012). Figure 3 plots the distribution of indegree, and a characteristic social network drawn from one sample area.

3.3 Experiment

To test how social characteristics effect vote choice, I randomly selected 115 candidates to be elected to 30 positions as an officer to a microfinance organization. These officers were to be initial contacts between the microfinance organization and they people who lived in each city. As such, these candidates had real influence over who the firm would eventually work with, and therefore real influence over the distribution of resources. Practically, the elections took place at town meetings on the weekend, and were well attended. In the rest of this section, I describe how candidates were selected and provide attributes of those candidates that were drawn from the population; I provide the text of the election and further describe the incentives at play; and I describe how votes were recorded.

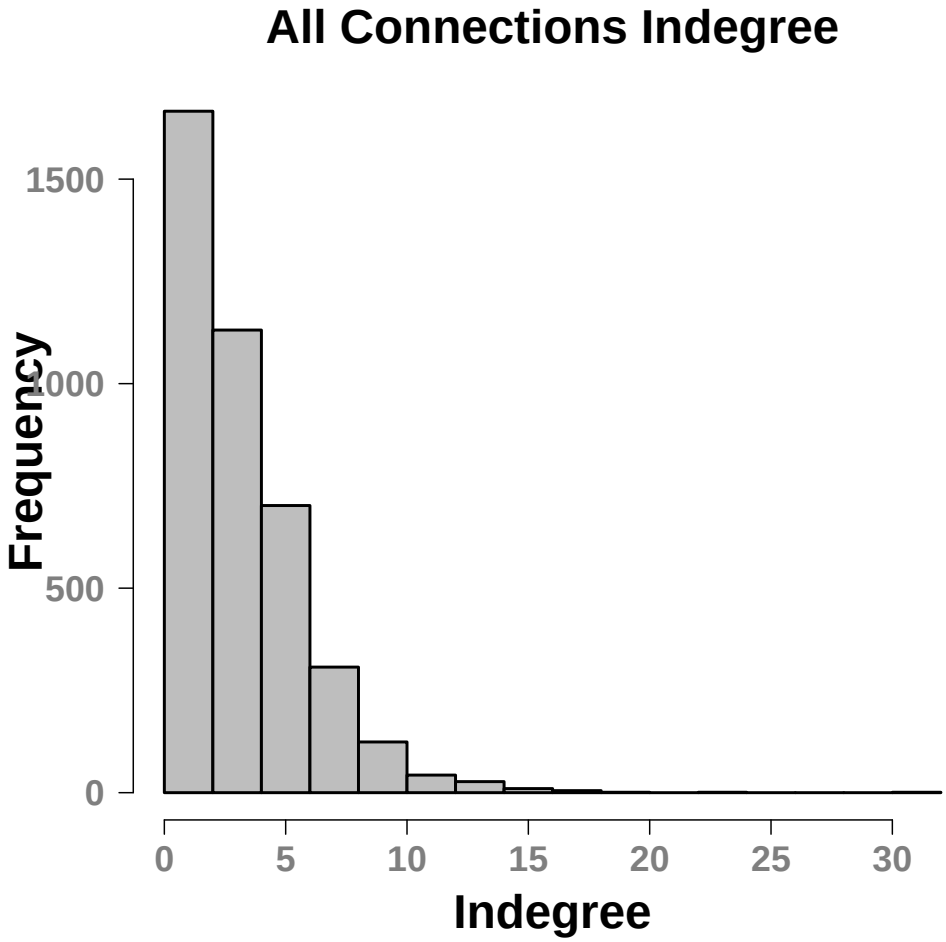

Figure 3: Indegree of all individuals. Indegree is the sum of all social connections that originate with someone else and point toward an individual. Conceptually, this is the number of people who refer to a given person as a friend. This distribution demonstrates the characteristically heavily skewed distribution.

3.3.1 Selecting Candidates

In each town we selected, at random, between 3 and 6 individuals to serve as "candidates" for an election to be held at a town meeting in the following days. The number of candidates randomly selected was strictly a function of town size. In towns that were smaller than 50 residents, we selected 3 candidates; in towns between 50 and 500 we selected 4 or 5 candidates, and in towns larger than 500 we selected 6 candidates. We did not inform candidates that they would be placed on the ballot, and so there was no

opportunity for candidates to campaign, pledge, or promise benefits to constituents. By disallowing candidate statements and campaigning, we held constant campaign effectiveness and campaign effort; in doing so we are able to isolate the independent effect of social connections without the contaminating effect of selection into campaign effort, which through positive/pro-active selection would likely be positively correlated with candidate skill and/or probability of election. An hour before the election, we informed the candidates of the election that we were holding, the costs and benefits of being elected to the post, and also the reality that any candidate could drop out at any time. Because the costs to serving in this position quite small – a single organization meeting and follow-up to take place in the candidates' home villages – none of the randomly drawn candidates opted to withdraw their names from consideration.

We held all elections as a part of a town-meeting held on the weekends when the greatest number of town residents were likely to be available to meet. Meetings were scheduled in one of three times: Saturday mid-morning, Saturday mid-afternoon, and Sunday mid-afternoon. Mean turnout at these meetings was just over fifty percent of town residents; most villages fell between twenty-five percent turnout and seventy-five percent turnout. Figure 4 displays the distribution of turnout across the villages.

3.3.2 Candidate Attributes

One important characteristic distinguishes candidates from non candidates – candidates for election are uniformly male. After extensive interviews with local leadership in the county seat, the church, leadership at the village level, and male and female residents of the areas it became clear that local tradition required that nominations for a position of this sort required a male candidate. Female residents in the region are well integrated into the society – they own shops, restaurants, and business at commensurate rates as to male residents; they hold positions of leadership in schools and churches at commensurate rates; females hold wealth stores that are likely indistinguishable from the wealth

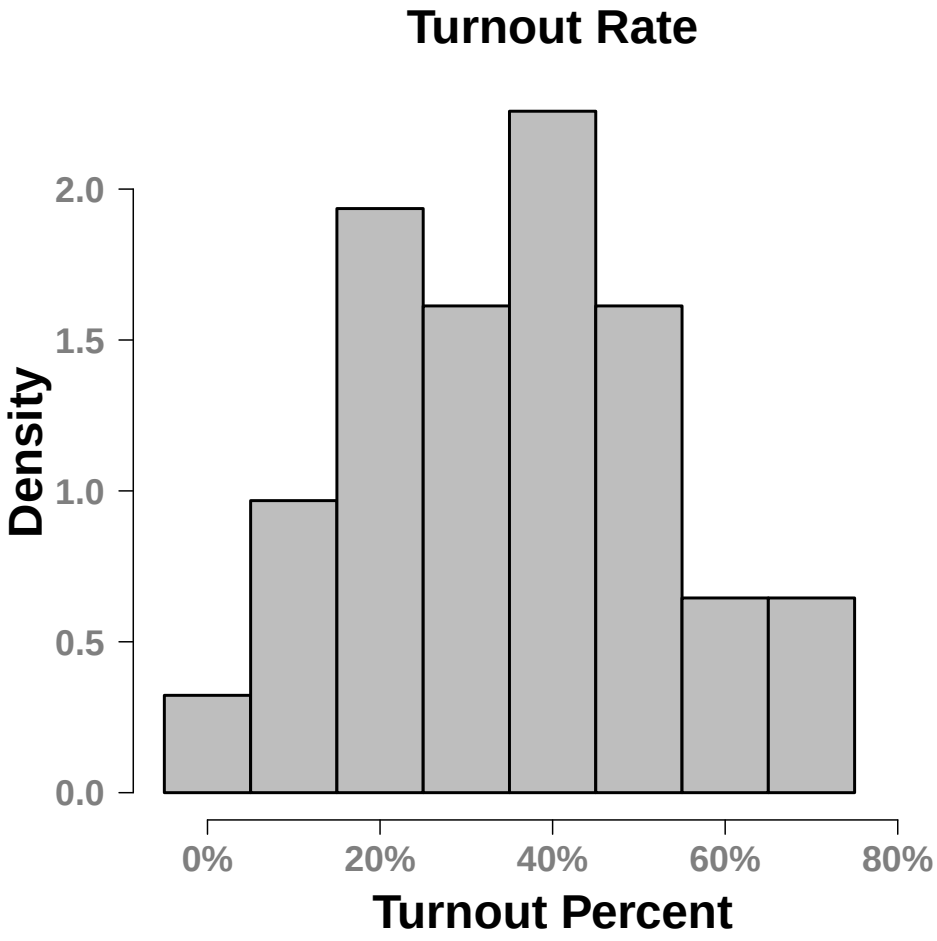

Figure 4: Turnout to the village meeting per town.

stores of men. However, for this position local custom dictated that in forms of negotiation formally related to dealing with a bank-like entity, that the position be filled by a male candidate.

On characteristics that are not gender, candidates look very similar to non-candidates. characteristics of candidates and non-candidates. Both groups have similar educational histories, are married at similar rates, are employed in similar jobs, and have lived in town for similar amounts of time.

Table 1: Candidate Characteristics

Statistic	N	Mean	St. Dev.	Min	Max
Age	111	43.946	14.265	18	94
Years Education	82	4.000	2.244	1	12
Monthly Income	60	1,770.500	1,482.270	280	8,000
Eigenvector Centrality (All)	113	0.102	0.097	0.000	0.388
Indegree (Friends)	113	3.372	3.709	0	26
Outdegree (Friends)	113	2.354	1.231	0	7
Indegree (All)	113	5.788	4.345	0	31
Outdegree (All)	113	4.885	2.219	0	12
Betweenness (All)	113	922.021	1,156.320	0.000	6,501.134
Scaled Betweenness (All)	113	0.018	0.022	0.000	0.133

Table 2: Non Candidate Characteristics

Statistic	N	Mean	St. Dev.	Min	Max
Age	1,701	36.240	16.703	5	145
Years Education	1,331	4.184	2.319	0.000	12.000
Monthly Income	1,014	1,581.764	1,063.349	0	10,000
Eigenvector Centrality (All)	1,706	0.058	0.071	0.000	0.444
Indegree (Friends)	1,706	1.808	2.305	0	19
Outdegree (Friends)	1,706	2.019	1.452	0	14
Indegree (All)	1,706	3.842	2.946	0	23
Outdegree (All)	1,706	4.267	2.400	0	17
Betweenness (All)	1,706	863.884	1,325.787	0.000	11,628.640
Scaled Betweenness (All)	1,706	0.008	0.012	0.000	0.157

3.3.3 Election Text

Subjects were presented with the following instructions when they were asked to make a candidate selection:

> *A microfinance organization will soon be starting to work in this area. Microfinance organizations are groups that make low-interest loans to members of the community so that these members can make investments in capital to start or improve a business. Because we do not know everyone in town, we want to select a representative from the town that can help us with introductions and setting up this firm. We have selected a small number of candidates who live in this town to represent you in these first meetings. We were not able to talk with everyone before selecting candidates, so the person that you would MOST LIKE to be a representative might not be a candidate. If this is the case, then please select the candidate who you think would BEST REPRESENT you.*

In this way, the election field experiment fairly recreates a number of dynamics at play in municipal, regional and national elections. First, electoral candidates were selected through an external selection mechanism. In the United States this selection mechanism depends on the state but typically involves the coordination of party elites. In consolidating democracies, this mechanism is frequently local and national party machines. Second, electoral candidates have clear influence over the distribution of resources. In "real" elections, these resources are manifest in terms of appropriations, pork-projects or other constituent services. In this election, electors were informed that the microfinance organization planned to utilize the local elected official as a point of contact for the distribution of capital-improving resources. Third, in "real" elections with a secret ballot, there electors have scant ability to credibly claim they voted for one candidate over another. This inability to clearly demonstrate a vote is present in elections in consolidating democracies as well as consolidated democracies. Fourth, in "real" elections where the issue space is relatively dense – when candidates are not able to run, and win, on a single issue – there are not typically clear policy mandates conferred through the electoral process. In this very local election, the same truth held; a vote for one candidate

over another transmitted precious little programmatic information from the electorate to the finally selected candidate.

3.3.4 Voting Measurement

After presenting the justification for why we were holding an election to the residents of the village, we provided residents with a short "ballot" that included the names and photographs of the men randomly selected as electoral candidates. Each resident then individually recorded their vote choice in a computer system; residents who were unfamiliar with computers were assisted by survey enumerators. Electors were informed that they need not vote if they had no preference over the candidates.

3.4 Setting - Honduras

Honduras is a relatively poor nation by Latin American standards, and La Union is comparatively poor within Honduras. The majority of residents of the La Union region are in the lowest quintile of the Honduran Income distribution; residents of La Union have less access to potable water, fewer latrines, lower television penetration, and fewer residents who continue to secondary education than the general Honduran population.

La Union, the regional seat, is home to roughly five-thousand residents. The primary industries are coffee manufacturing and distribution; other industries include local merchants, religiously affiliated positions, teaching and municipal positions. Nearly all residents maintain subsistance farms in the outlying areas.

The outlying areas are the primary setting for the present study. In the mountains surrounding the central-seat are some fifty smaller villages. Most villages are situated along the maintained thoroughfares, and the residents focus primarily on the production of seasonal agricultural goods (coffee, maize, beans). Villages range in size from one extended family-unit (twenty individuals) to large distributional hubs (six-hundred fifty individuals). Notably, most of these villages are geographically separated from one

		Lempira	Honduras
Quintile of National Income Dist	Lowest	63.9	20.0
	Second Lowest	25.1	20.0
Water Source	In Home	8.4	15.1
	Outside of Home	56.4	32.4
	Ditch/Canal	22.2	10.2
Sanitation Service	Latrine with Water	38.7	19.2
	No Service	46.3	16.0
Consumer Durables	TV	15.1	62.2
	Telephone (landline)	3.4	23.5
	Telephone (mobile)	9.3	36.1
	Refrigerator	8.3	44.0
Household Structure	Female Head	19.6	26.0
	Number of Members	5.5	4.8
Schooling			
Less Than Primary	Female	78.4	54.3
	Male	79.1	58.5
Primary	Female	85.6	84.6
	Male	86.2	84.7
Secondary	Female	17.4	42.0
	Male	15.3	34.5

Table 3: Summary Stats of La Uniòn, Lempira, Honduras

another; while it is not unusual for residents of one village to know a resident in another village, the primary friendship, work, and family relationships are all held within (rather than between) the residents of a single village.

4 Results

I analyze this experiment at two levels. First I analyze how social connections shape outcomes at the candidate-centered level. Here, I use models that estimate the relationship between candidate characteristics and voteshare. Then, to draw inference about the mechanism at work in this election, I estimate models at the voter-candidate dyad level. Across the two sets of analysis, I find strong evidence in support of socially coordinated behavior. At the candidate-centered level, candidates who have higher indegree receive significantly, and substantially more votes than candidates with lower indegree, even

controlling for candidate skill characteristics. Moreover, controlling for indegree, candidates who bridge groups in the social network also garner more votes, controlling for all other characteristics. I also find evidence that voters prefer candidates who are closer relationships. When I analyze the data at the voter-candidate dyad level, I find more limited evidence in support of the theory. While I find that voters cast votes for better connected candidates, somewhat puzzlingly I find that at the voter-candidate level there is a negative relationship between candidate betweenness and probability of a voter casting a vote for that candidate. I conclude this section by providing my thoughts on what might be driving this correlation.

4.1 Candidate Level Results

The elections produced considerable variation in results. In some elections, a single candidate ran away with a super-majority of the votes, leaving the other three, four, or five candidates with less than ten percent of the vote-share between. In other elections, the distribution of votes was plurally distributed and the candidates split the vote total evenly. Figure 5 displays the empirical distribution of votes that candidates received. A relatively large number of candidates received zero votes. This is most likely caused by the random selection of candidates from the town population. While every candidate that was drawn lived and worked in each town, and was in principle qualified to hold the position they were standing for election for, it is evident that a large number of the candidates were viewed by the town as low-quality candidates. In contrast, there were several candidates who swept the election returns and garnered a majority, or super-majority of the votes cast. Five candidates received greater than 80% of the votes cast in the election, signaling either that these candidates were exceptionally well-qualified for the position or that the other candidates drawn to run were exceptionally poorly qualified to run.

At the candidate level, two results emerge that are consistent with the capabilities and

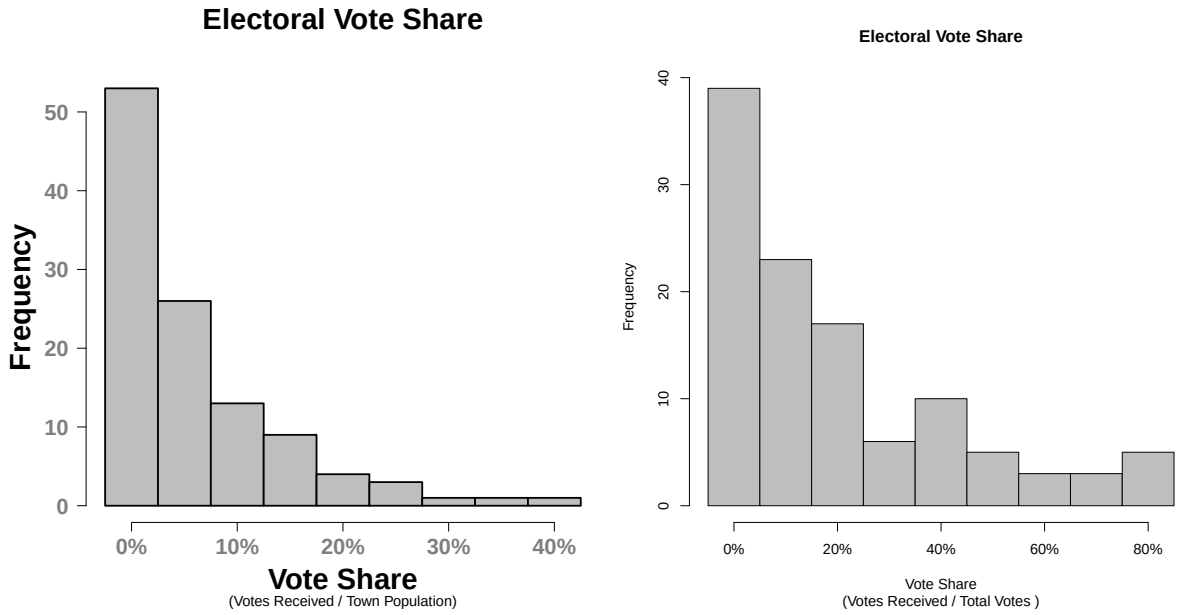

Figure 5: Vote Share Distribution. *Left Panel:* Electors' empirical voteshare distribution, calculated as a function of the total population of the town. *Right Panel:* Electors' empirical voteshare distribution, calculated as a function of the total number of votes cast in the election.

connectedness hypotheses of subsection 2.3. First, consistent with the *capability hypothesis*, candidates who were better educated, and reported having taken political action in the past (voting) were significantly more likely to receive votes. Second, consistent with the *connectedness hypothesis* candidates who have more social contacts were significantly more likely to receive votes.

4.1.1 Capability Hypothesis

As is reported in Table 5, candidates with greater education and who had previously taken political action were significantly more likely to receive votes. These education and political cues are readily available, easily accessible heuristics that voters in the elections could use to identify the capability of the candidates. In addition, candidates who reported being in a married won significantly more votes. One possibility that these candidates won more votes is that they are of a type that is responsible, and this responsibility is known among the community. Another possibility is that these candidates re-

ceived votes from their spouses. While the test does not settle the issue dispositively, the evidence in Table 5 hues toward additional votes coming from the candidates' spouse. The magnitude of the effect is roughly equivalent to a single additional vote for being married and, if it were a signal of quality that was being transmitted through being married, candidates who were widowers would also receive this quality bonus. They do not – the impact of being a widower is indistinguishable from being single. The results that higher quality candidates – those with higher education and those who have taken past political action – receive more votes is hardly surprising. This result does, however, provide a *prima facie* check that considerations expected to be at play in an election of this type, are indeed being considered by voters.

4.1.2 Connectedness Hypothesis

Before presenting a fully specified model, I present the simple bivariate relationship between the connectedness and voteshare to demonstrate that there is a plausible relationship between the two *on their face*. Indeed, as Figure 6 demonstrates, there is a strong positive relationship between the number of times an individual is called a social relationship and the number of votes that he receives.

4.1.3 Model of Voteshare Explained by Degree

To assess the strength of the relationship between indegree and voteshare, I estimate two bivariate models, one a Poisson model to predict the count of votes received by a candidate, and the other an OLS to estimate the percentage of votes received by a candidate. The results of these model are shown in Table 4. The OLS model is easier to immediately interpret, and shows that in this model for each additional friendship nomination a candidate received that candidate is predicted to receive an additional 2.1% of the votes in the town. Figure 7 shows the predicted effects of a change in the number of social connections.

Table 4: Votes and vote share won by candidates as a function of the candidates' extitin-degree calculated two ways: among all social contacts, and among only social contacts who are friends.

	Dependent variable:			
	Votes Won		Vote share	
	Poisson		*OLS*	
	(1)	(2)	(3)	(4)
Indegree (All)	0.084***		0.021***	
	(0.004)		(0.005)	
Indegree (Friends)		0.090***		0.025***
		(0.004)		(0.005)
Constant	1.812***	2.005***	0.126***	0.164***
	(0.044)	(0.038)	(0.033)	(0.027)
Observations	113	113	111	111
R^2			0.171	0.175
Adjusted R^2			0.163	0.168
Log Likelihood	−614.464	−633.079		
Akaike Inf. Crit.	1,232.928	1,270.157		
Residual Std. Error (df = 109)			0.207	0.207
F Statistic (df = 1; 109)			22.467***	23.151***
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 5: Poisson model estimating factors associated with candidates winning more votes in each election.

	Dependent variable:			
	Votes Won			
	(1)	(2)	(3)	(4)
Indegree	0.084***		0.077***	0.092***
	(0.004)		(0.005)	(0.010)
Age		0.0003	0.0002	0.0003
		(0.001)	(0.001)	(0.001)
Years Edu		0.046***	0.064***	0.158***
		(0.014)	(0.016)	(0.023)
Married		1.524***	1.089***	0.981***
		(0.246)	(0.251)	(0.291)
Divorced		0.550*	0.343	0.181
		(0.309)	(0.311)	(0.343)
Widowed		0.688**	0.466	0.156
		(0.301)	(0.303)	(0.346)
Voted		−0.023	0.221**	−0.058
		(0.083)	(0.091)	(0.121)
Constant	1.812***	0.942***	0.500*	0.756**
	(0.044)	(0.268)	(0.275)	(0.358)
Town Fixed Effects	No	No	No	Yes
Observations	113	82	82	82
Log Likelihood	−614.464	−544.857	−436.125	−320.111
Akaike Inf. Crit.	1,232.928	1,103.715	888.249	718.222
Note:				*p<0.1; **p<0.05; ***p<0.01

4.1.4 Voteshare Explained by Degree and Betweenness

The second hypothesis derived from a social theory of voting is that voters will select candidates that bridge groups of voters in the social network. As I describe earlier, I operationalize this bridging using betweenness centrality – which just measures how many times a particular node is between two other nodes. To do so, I estimate model three in which includes a measure of candidate betweenness centrality. If voters are selecting candidates for their connectedness and also how well the bring groups of voters together, I would expect that both model terms would be positive and significant. However, these results suggest a negative relationship between betweenness centrality and candidate performance. This is most likely due to the correlation structure between indegree and betweenness centrality.

To interpret these poisson coefficients, displays the predicted vote share a candidate receives as a function of changing network characteristics (IVs) from the twenty-fifth percentile of the distribution to the seventy-fifth percentile of the distribution. Holding betweenness constant, and changing only the number of incoming social ties a candidate has from low to high leads to a predicted change in the number of votes from 8 to 12, or an increase of about 15% of the voteshare on average. Holding indegree constant and instead manipulating betweenness, a change in the IV from the twenth-fifth percentile of the variable's distribution to the seventy-fifth earns a candidate about two more votes, or about 8% of the total vote share in the election.

4.1.5 Voteshare Explained by a Full Model

Finally, in Table 5 Model (4), I include social and demographic characteristics of candidates. Including age and education covariates in this model increases the performance of the model. Estimate of the effect of network characteristics do not change including these covariates. The age of a candidate has no measurable impact on the number of votes a candidate receives, and is in fact a precisely estimated zero. Education increases

the number of votes a candidate receives. Each additional year of education has an impact that is similar in magnitude to the impact of additional social connections. Being married increases the number of votes a candidate receives (presumably because one's partner votes) against a baseline of being widowed, while being single decreases the number of votes a candidate receives. The marginal effects of these estimated parameters in Table 5 are presented graphically in Figure 9.

4.2 Elector Level Results

4.2.1 Social Proximity

The main competing theory is that of Sinclair (2012) who argues voters just cast votes for the candidate with whom they are the most socially connected, rather than using social information to coordinate actions. By Sinclair's conflict avoidance mechanism, voters are the least inclined to be in conflict with their closest social connections, and would therefore be most likely to vote for these individuals. A social proximity explanation also fits well with components of Rolfe's conditional cooperation argument because taking action for the more socially proximate candidates generates the small clusters of action around *unconditional* cooperators who are first-movers for larger political action. Then, if social proximity is the leading factor that shapes peoples' votes, previous theories more accurately characterize political behavior, taking back support from the theory of social information presented in this paper.

In fact, there is a complex relationship between social distance and the vote choice. Figure 10 shows the empirical distribution of votes as a function of social distance. Surprisingly, only thirty percent (12 of 40) of people who were assigned to be candidates voted for themselves; seventy percent cast a vote for another candidate. This low rate might mean there was some trepidation on the part of candidates who may have been uncertain about the requirements for the position. Alternatively, this low vote-rate might

indicate that a relatively large number of candidates were skeptical of their chances to win election, and cast a vote for some other candidate. Of voters who had a direct social alter assigned as a candidate, forty-eight percent (154 of 320) cast a vote for that candidate. As voters and candidates become further separated — friends of friends, friends of friends' friends — voters are decreasingly likely to cast a vote for a candidate.

The top panel of Figure 11 presents the distribution of social distances between voters and the candidates for whom they voted. The bottom panel of Figure 11 and the candidates for whom they did not vote. On average, in these 30 communities, voters are about 3 social connections separated from the candidates they vote for and about 3.8 social connections separated from the candidates they did not vote for. Because the assumption of independent samples is untenable in this case, I rely on randomization for inference to assess how likely this difference is to be caused by change.

For this randomization inference regime, I hold the social networks and candidates constant, but repeatedly simulate random votes. This generates a hypothetical distribution of geodesic distances under the null hypothesis that there is no relationship between social distance and voting for a particular candidate. If this simulation of random voting returned an average social distance between candidates and voters that was demonstrably larger than observed in this field experiment—say, the random distribution found that the mean distance was 3.5 geodesics —it would suggest that there is positive vote-selection based on social proximity. This would mean that voters more frequently cast votes for candidates with whom they held stronger relationships. This is not the case.

Under the null-hypothesis simulation, the 90% CI ($\alpha = 0.10$) for the mean geodesic distance between a voter and the candidate she votes for is $3.00 \pm 0.05 = [2.95, 3.10]$. The 95% CI ($\alpha = 0.05$) is $3.00 \pm 0.07 = [2.93, 3.11]$. These estimates of social distance under a random voting rule are precisely the same as the estimate observed in the election, and suggest that a mean social distance of 3 between candidates and voters is *exceedingly* likely to be caused by random chance. Therefore, there is little evidence from this trial

that social distance is the mechanism that led some candidates to do better than others in the election.

4.2.2 Social Information

To further examine whether social proximity outweighs the coordination incentive, in Table 6 I present a regressions that predict whether a voter cast a vote for a candidate. All models are fit on identical data – a "tall" dataset organized at the voter-candidate dyad level with 4362 dyad observations. While the point estimates for the relationships beween these RHS variables and the voters' choice in the election can be reliably estimated without bias in this framework, the nature of the repeated observations, if simply calculated, would downward bias the standard error estimates and increase the probability of detecting false-positives. To address this concern, following Ling and Zeger (1986) and Yan and Fine (2004), I correct for multiple observations of an individual voter's decision by clustering the standard errors at the voter level.[6] The advantage of this method over other ML-type estimators is that the empirical covariance can be estimated rather than specified *ex ante*. Although this comes at an efficiency cost, the results of MCMC trials suggest this penalty is slight (Schildcrout & Heagerty, 2005).

Model 1 includes only social distance as a predictor of the vote. Here, social distance is negatively associated with casting a vote or a candidate, consistent with the theories of Sinclair and Rolfe. In Models 2, 3, 4, and 5 I include centrality and betweenness characterizations. Including these model features decreases the estimated effect of social proximity by a factor of about 4.5, suggesting that it isn't social distance *per se* that leads to a vote, but rather that candidates who are better connected, tend to be more socially proximate to everyone.

The centrality indicators in Models 2, 3, 4, and 5 support a theory that central actors are more frequently voted on. Regardless of the conceptualization of centrality, and

[6]Practical execution is via the R package geepack (Yan and Fine, 2004).

the operationalization of that concept, more central actors earn more votes, while social proximity plays no estimated role in the process.

4.3 Robustness

4.3.1 Connectedness is not just a low-quality candidate screen

The large number of candidates who received zero votes is evidence of how experimental control comes at the tradeoff of real-world mechanisms. By randomly selecting men to serve as candidates, we excluded the important real-world election process of clearing the field of unqualified candidates. In the American case, the party and primary elections clear the field; in contexts like Honduras, it is likely that social sanctioning or other informal mechanisms would have led to the selection of different candidates. Because the differences in this process are real, it limits the ability to make predictions *in the real world* about absolute vote shares as a function of social connections; however, it does not in any way limit the interpretation of the causal mechanism.

Social information, rather than helping voters positively coordinate their votes, may instead flag some candidates as poor quality candidates. That is, it may be that selecting candidates at random from meant that some candidates were presented to the voters who would never have otherwise been under consideration for this leadership role. In this argument, there are two reasons that low-quality candidates would not make it onto the ballot. First, low-quality candidates, knowing their type, would not select to run for the position. Because there is some cost associated with running for office – time, material, or social – if a potential candidate knew that he had a zero probability chance of winning office, he would never incur that cost. Second, low-quality candidates would not be placed on the ballot because in typical elections, institutional factors clear the field of weak candidates before the balloting begins. While both of these mechanisms are in play during *in situ* elections, if I restrict the sample of candidates to include only those

who meet some minimum quality threshold, and the analysis still identifies a role for social information, then one may still draw the inference that social information plays a role in candidate selection, even when field-clearing mechanisms remove deadbeat candidates.

To check this threat to inference, I restrict the sample to include only those candidates who receive more than zero votes and re-run the models presented in Table 5, and Table 6. This robustness check does not re-run the experiment, and so the results are not fully independent. However, continuing to increase the threshold for inclusion in the re-estimated models provides a series of increasingly stringent tests for an alternative hypothesis that the results are being driven selection of low-quality candidates that would not have otherwise be elected. After fitting these models, included in an appendix available on request, I perform the same prediction task as Figure 8. The results of this prediction find a consistent, identical relationship for thresholds up to a minimum of twenty-one votes: even among more restrictive samples, better connected candidates receive more votes.[7] Beyond twenty-one votes, there become relatively few observations to fit the model to, and the standard-errors around the estimates increase.

4.3.2 Social distance does not confound connectedness results

One concern about the models fit in subsubsection 4.2.2 concerns the difficulty in simultaneously estimating the relationship beween social connectedness and social distance. This concern arises because of the structural relationship between the two variables: that one candidate for office had relatively higher connectedness metrics is guaranteed to decrease that candidates' social distance from alters in the network. Indeed, in the case of closeness, the two concepts are fundamentally the inverse of one another – the canonical calculations of closeness centrality is the inverse of the average distance beween and ego and her alters. The consequence of this relationship between RHS variables would be

[7] Plots demonstrating this relationship are available online at:
http://polisci2.ucsd.edu/dhughes/robustnessSubset.pdf.

those of classic collinearity, and would mean potentially failing to identify a relationship when in truth one exists.

To evaluate this possibility, in this section I employ a strategy in the style of matching analyses. For every voter in the dataset, I identify instances where the voter was randomly assigned candidates who were equally socially distant. In the simplest case, this would take the form of a mother (who is a voter) who lives in a town where we randomly assigned two of her sons to stand for election.[8] Another example is a voter in a town where we randomly assigned two of her friends to stand for election. Importantly, although both of these examples are framed in terms of a social distance of one between ego and alter, the analysis is conducted across all matching pairs of candidate – extending up to 6 degrees of separation between the voter and nominated candidates.

The empirical prediction from a theory of social information and coordination is that among these matched pairs of candidates, the more highly socially connected candidate should be voted for more frequently. Because this method effectively eliminates social proximity as a consideration, the chief social consideration on voters minds can only be one of social connectedness.[9] As a final benefit of this analysis, it is still possibly to estimate the relationships between covariates and vote choice at the individual level.

Figure 12 plots the relationship between social distance, mean indegree of candidates and the vote among matched pairs of candidates. Because this is a complicated conditional statement, some care is due to explain the plot. At a social distance of zero, the voter is the candidate; there is no evidence that these voters' choice to vote for themselves has a social component. At every social distance from one to 6 the average indegree of candidates who received a vote is higher than the average indegree of candidates who did not receive a vote. The decrease in mean indegree as social distance increases is sensible – candidates who are socially distant from the voters must be relatively peripheral

[8] In practice, this *particular* instance did not occur.

[9] This method has the added benefit of controlling for the possibility of homophily. In this framework, because all candidates are equally socially distant there is no possibility for selection on RHS variables to cause the observed relationship between vote choice and connectedness.

in the social network.

Figure 13 plots the proportion of the time the better-connected candidate was voter for (rather than the lesser-connected candidate). When the candidate pair are both one degree separated from a voter, the better connected candidate was voted for 66% of the time (95% CI 0.58 – 0.66). When the candidate pair was two-degrees separated from the voter, the better connected candidate was received the vote 57% of the time (95% CI 0.52 – 0.61). Importantly, this test is relatively crude because it fails to evaluate the strength of the social connectedness beyond ranking the two candidates' connectedness. Because it is likely difficult for voters to make fine-grained distinctions between two candidates who are reasonably close in social connectedness, this is a conservative test. **??** presents a closely related regression specification that estimates the relationship between increasing social connectedness and the probability a candidate receives a vote. For each additional social connection, the probability a candidate earns a vote increases nearly 6%.

5 Discussion

In this paper, I examine how social networks shape political coordination in elections. I begin by arguing that for nearly fifty years, much political science has ignored the importance of connections between actors. The first generation of political scientists to seriously reexamine correlates of political behavior and social network (Fowler, 2005; Sinclair, 2012; Rolfe, 2012) utilized technological advances unavailable to early scholars (Berelson, Lazarsfeld and McPhee, 1954) and generated considerable new knowledge about how our friends' political behaviors shape our own (Bond et al., 2012). However, some concerns exist surrounding observational studies in this complex social-information environment (Noel and Nyhan, 2011).

By measuring social networks and randomly assigning actors to stand for candidate in an election, I avoid these criticisms, and for the first time, show how social networks

cause some candidates to earn more votes in an election. Furthermore, I present clear evidence that performance in these elections is not caused by voters voting for candidates who are socially proximate; instead voters prefer candidates who are well connected within the social network. This has important implications for our understanding of how actors function in their pursuit of politics. In the American context, this provides more evidence for how Congressional co-sponsorship may be influenced by social connections. It might also explain how groups of actors come to hold norms of behavior—like who they will support among a broad slate of primary candidates. In the Comparative context, this finding might mean that delegated governance to local powers, under some circumstances, may not lead to increase provision of personalistic goods.

5.1 Limitations

Despite the researcher's efforts to carefully design this experiment, there remain limitations work considering. First, to avoid the myriad set of unobserved factors that a pre-election campaign begets, the experiment was expressly designed so that campaigning could not occur. Voters were fully informed of the stakes at play and the identities of the candidates, but they were not familiar with the particular policy positions *per se* the candidates might perform. This is an acknowledged limitation, and one which well cuts against the generalizability of this finding into a context where a vibrant campaign plays a critical role in the eventual slate of candidates brought to the vote.

However, a well-established line of research has previously undertaken limited or artificial campaign environments to evaluate features of voters' preferences (e.g. **?**). Other research projects in this area have constructed information boards, mailed synthetic election information, shown either organic or synthetic campaign ads (e.g. Brader, 2005; Gerber et al., 2011; Bartels, 2006; Freedman, Franz and Goldstein, 2004; Hillygus and Jackman, 2003; Thielmann and Wilhite, 1998; Finkel, 1993).

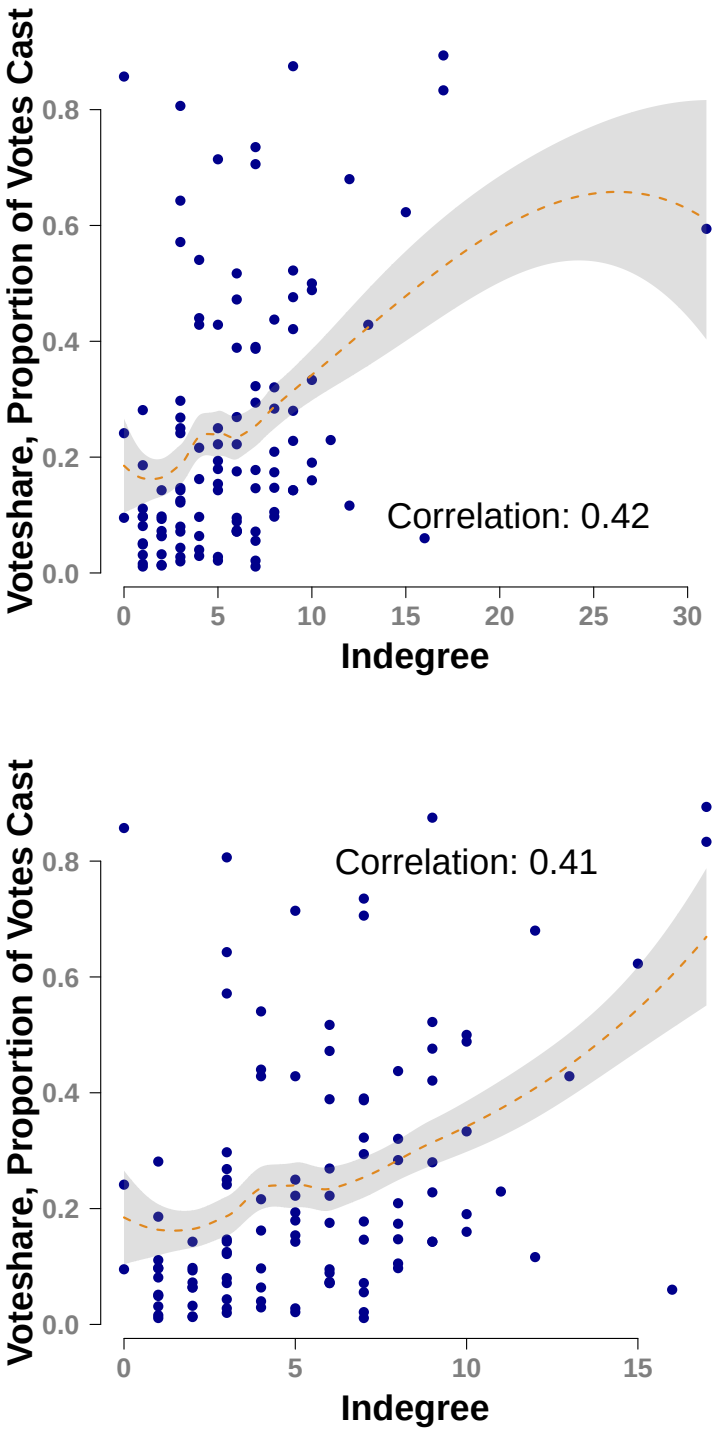

Figure 6: Proportion of votes cast won by a candidate as a function of the indegree of the friends, siblings, and spouses of that candidate. Correlation reported is Spearman rank order correlation. The bottom panel displays the same information, but excludes the outlying candidate with 31 social connections. The relationship remains largely unchanged.

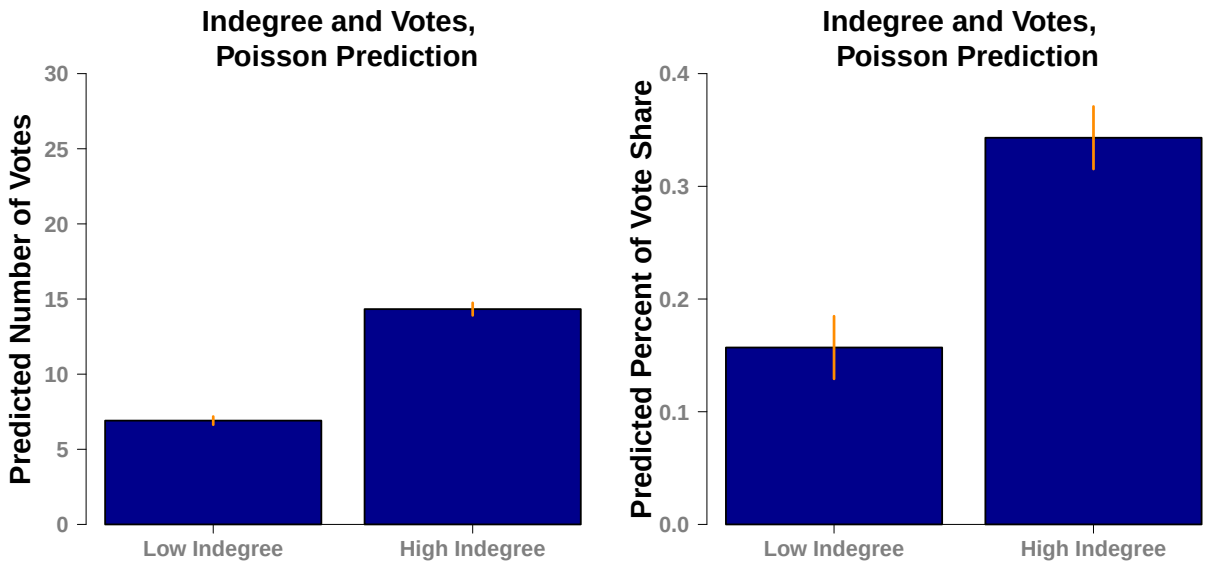

Figure 7: Predicted first differences in number (Left Panel) and percent (Right Panel) drawn from poisson and OLS models, respectively. For each panel, the change in the dependent variable is a function of a change in the independent variable from one standard error below the mean to one standard error above the mean. Error bars are standard errors of the prediction. All differences are significant.

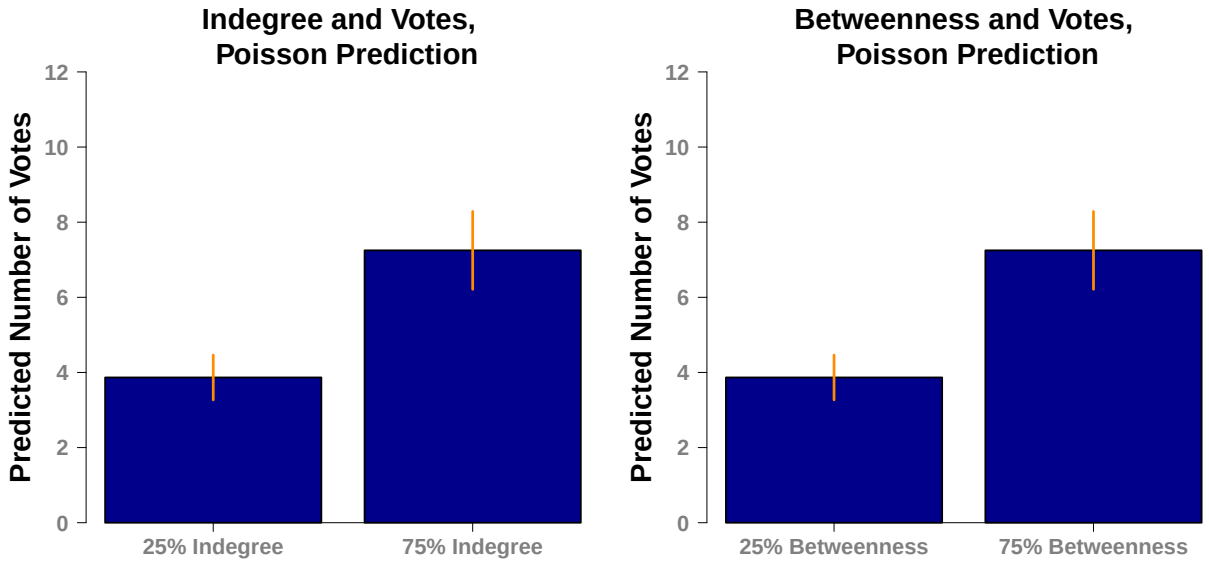

Figure 8: The left panel shows the predicted change in voteshare as a result of changing indegree from the 25% of the indegree distribution to the 75% of the indegree distribution. The right panel shows the predicted change in voteshare as a result of changing betweenness from the 25% of the betweenness distribution to the 75% of the betweenness distribution.

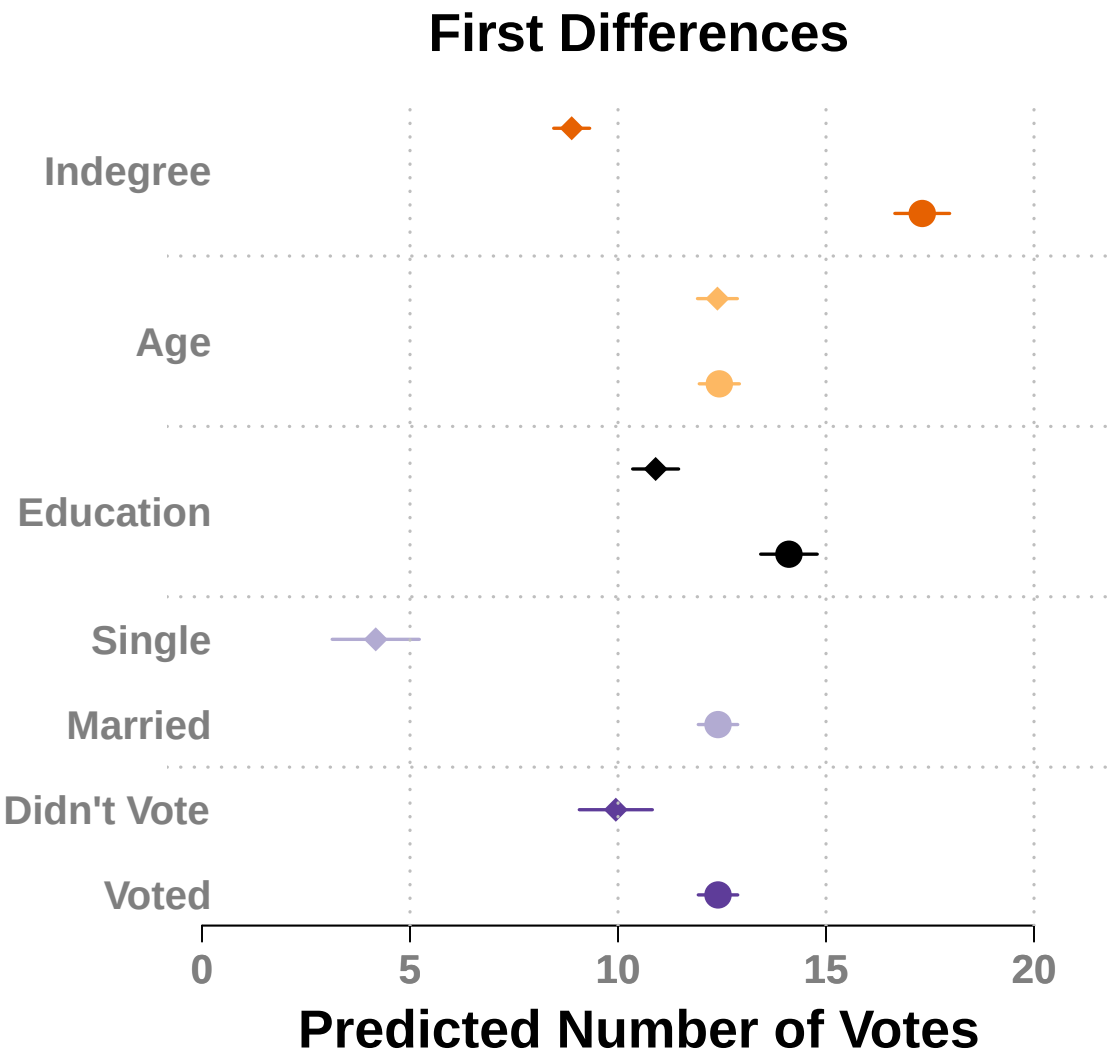

Figure 9: Marginal Effects on Voteshare. Colors are matched for Independent Variables. For each IV, the top row sets the IV at the 25th percentile of the variable's distribution and the bottom row sets the IV at the 75th percentile of the variables distribution. The prediction scale is on predicted number of votes a candidate will receive. Changing degree is causes a candidate to earn five more votes. Changing Betweenness also causes a candidate to garner five more votes. Age has no effect. Additional years of education garner three votes per year, and changing from being married to being divorced causes a candidate to lose ten more votes. Bars are standard errors.

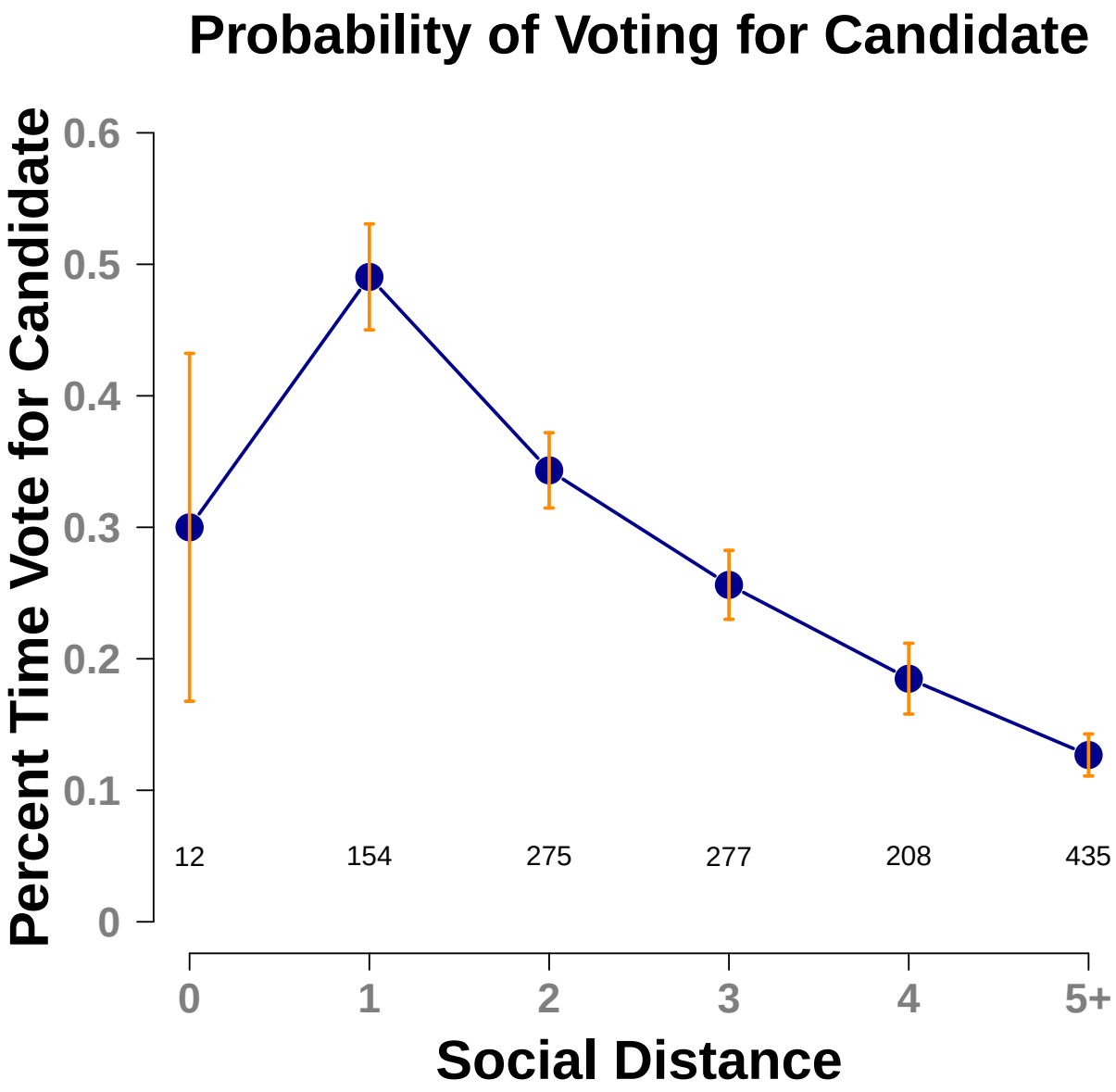

Figure 10: Probability of voting for a candidate, conditional on the social distance between the candidate and elector. Social distance of zero is a voter who was himself a candidate; social distance of one is an immediate friend, or family member, social distance of two is a friend of a friend, and so on. The small numbers at y=0.5 represent the number of votes cast at each social distance. For example, there were 154 votes cast for candidates at a social distance of one degree.

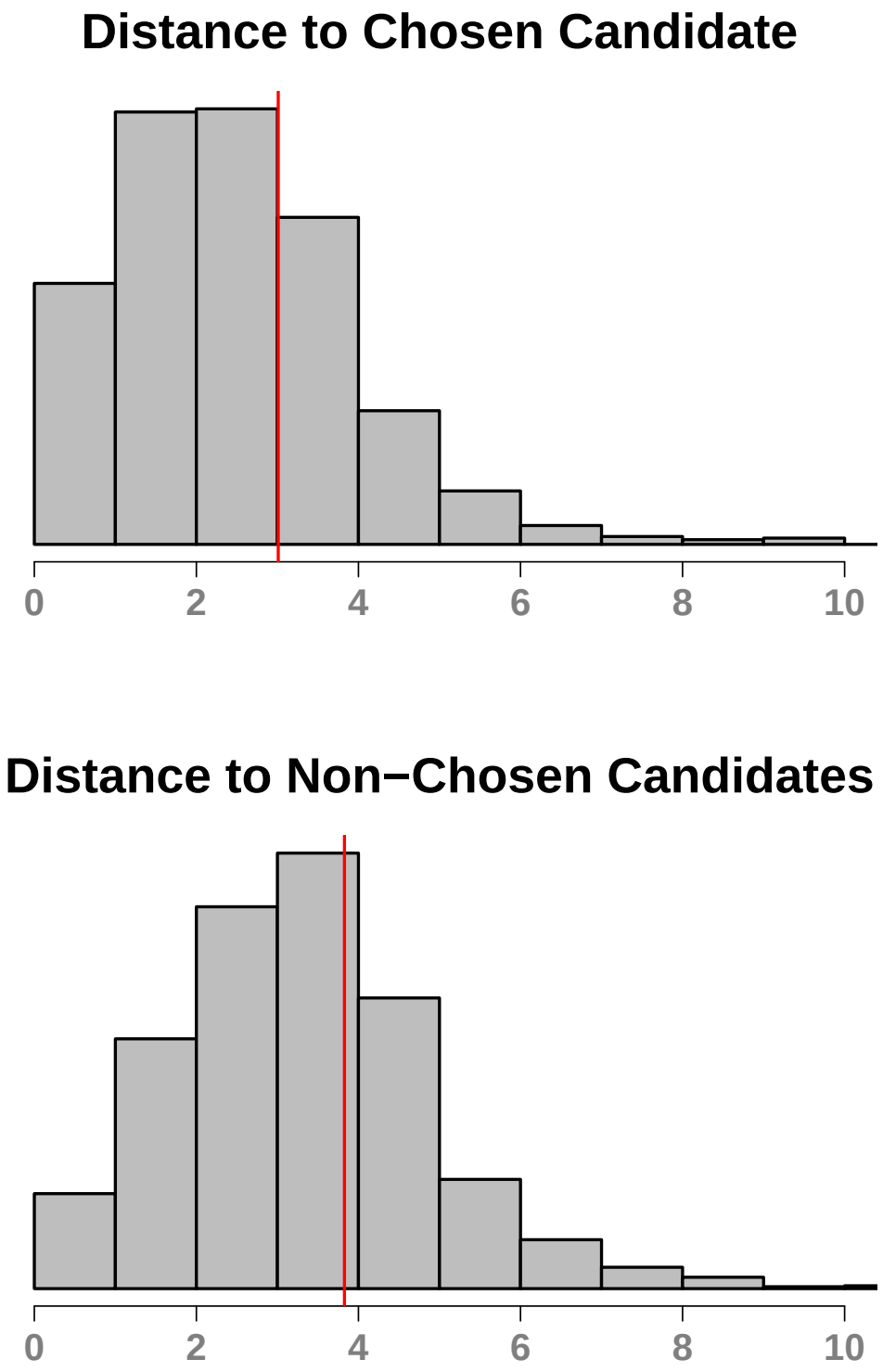

Figure 11: *Top Panel:* Histogram of distance between each voter and the candidate for whom she voted. *Bottom Panel:* Histogram of distance between each voter and the candidates for whom she did not vote. The vertical red line in each is the mean geodesic distance for that subset.

Table 6: Voting for a Candidate as a Function of Social Characteristics

	Vote for a particular Candidate				
Geodesic Distance	-0.018^{***}	-0.004	0.002	0.009	0.011
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Candidate Indegree		0.013^{***}	0.013^{***}	0.008^{***}	0.009^{***}
		(0.001)	(0.001)	(0.002)	(0.002)
Candidate Eigenvector			0.566^{***}		0.225^{*}
			(0.106)		(0.117)
Candidate Betweenness				5.387^{***}	4.913^{***}
				(0.692)	(0.773)
Constant	-1.154^{***}	-1.313^{***}	-1.390^{***}	-1.409^{***}	-1.432^{***}
	(0.023)	(0.030)	(0.036)	(0.032)	(0.036)

*p<0.1; **p<0.05; ***p<0.01

Note: Logit model of vote choice at the voter-candidate dyad level; Huber-White standard errors clustered at the voter level. Betweenness is $B'(e)$, scaled betweenness centrality. All models include demographic and quality controls (not reported).

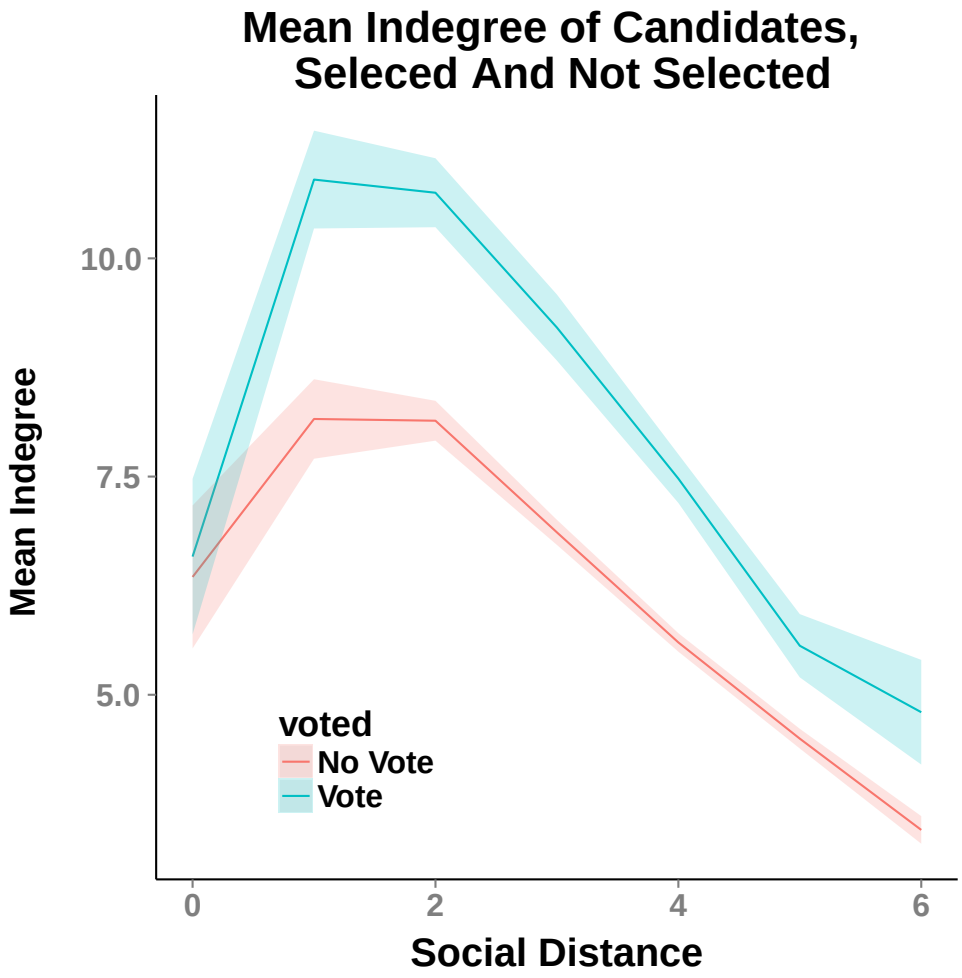

Figure 12: The mean indegree of matched pairs of candidates who received voted (in blue), and did not receive voted (in red). Candidates who receive votes uniformly have higher indegree. The polygon shape is a 95% CI for the mean.

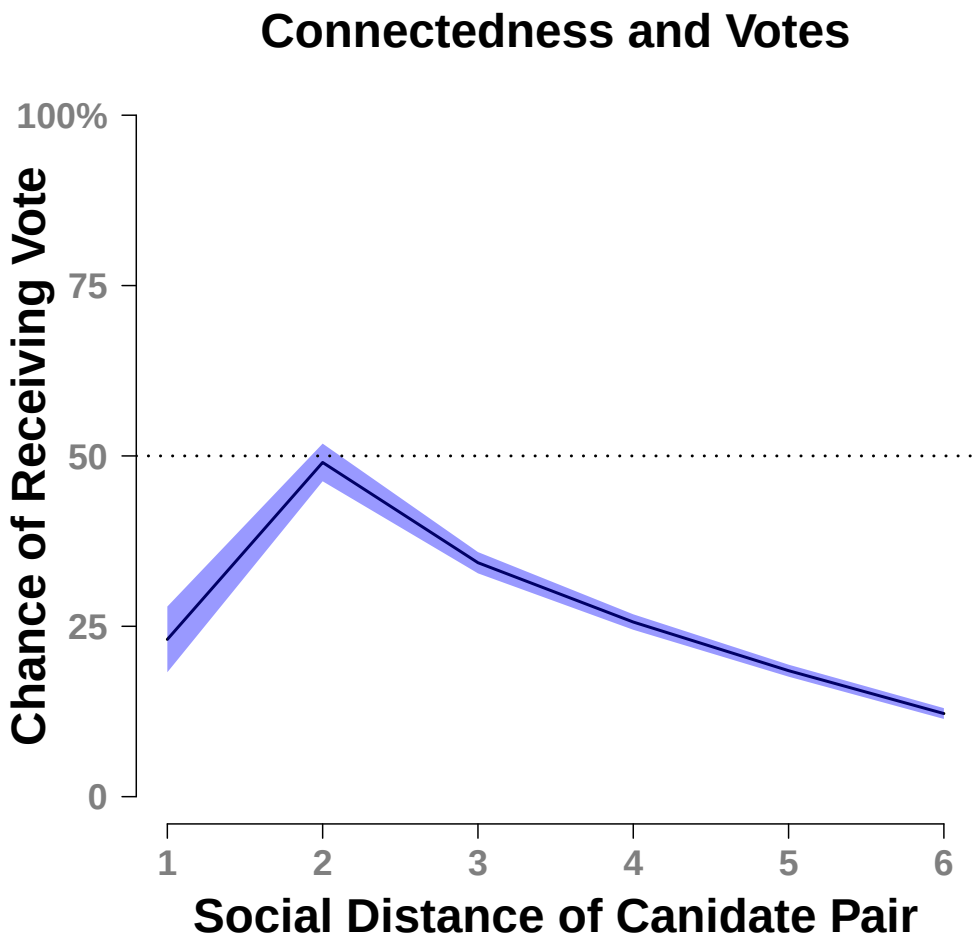

Figure 13: The probability distribution and 95% CI for the proportion of *higher-ranked* candidates receiving a vote.

Table 7: Binomial regression with matched candidate dataset.

	Dependent variable:
	Ego Voted for Alter
Indegree	0.141^{***}
	(0.013)
Age	-0.0002
	(0.001)
Years Edu	0.233^{***}
	(0.033)
Married	0.878^{***}
	(0.184)
Widowed	-0.319^{*}
	(0.166)
Divorced	-0.106
	(0.430)
Voted	-1.622^{***}
	(0.604)
as.factor(town_number)4	0.086
	(0.735)
as.factor(town_number)5	-1.225^{**}
	(0.622)
as.factor(town_number)6	0.339
	(0.270)
as.factor(town_number)7	0.775^{**}
	(0.346)
as.factor(town_number)8	0.201
	(0.362)
as.factor(town_number)9	-0.287
	(0.300)
as.factor(town_number)10	-0.782^{***}
	(0.278)
as.factor(town_number)11	-1.089^{***}
	(0.281)

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