Connecting the Candidates:
Consultant Networks and the Diffusion of Campaign Strategy in American Congressional Elections

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ABSTRACT

Modern American political campaigns are typically conceptualized as "candidate-centered" and treated as conditionally independent in quantitative analyses. In reality, however, these campaigns are linked by professional consulting firms, who are important agents of campaign strategy diffusion within the extended party networks of the contemporary era. To test our hypothesis that consultants disseminate campaign strategies among their clients, we analyze new data on U.S. House elections derived from Federal Election Commission records. Using spatial autoregressive models, we find that candidates who share consultants are more likely to use similar campaign strategies than we would otherwise expect conditional on numerous explanatory variables. These results, which largely withstand an extensive series of robustness and falsification tests, suggest that consultants play a key role in diffusing strategies among Congressional campaigns.

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1. INTRODUCTION

Contemporary American political campaigns are typically conceptualized as "candidate-centered." Most quantitative analyses treat campaigns as conditionally independent and identically distributed (*i.i.d.*) events (e.g., Canes-Wrone, Brady and Cogan 2002), implicitly assuming that what happens in one electoral district has no effect on the others. In this framework, election outcomes, campaign strategies, and candidate positions are assumed to be determined by candidate- and district-specific characteristics in isolation and the role of party organizations, allies, and co-partisan candidates is largely ignored (beyond, perhaps, a control variable for party affiliation).

It is true, of course, that formal party organizations play a more limited role in U.S. campaigns than in many advanced democracies, but this stylized fact should not blind us to the influence of what Koger, Masket and Noel (2009) refer to as the "extended party network." Numerous actors and institutions ranging from campaign staff to independent expenditure groups advance party goals in the electoral arena, marshaling support from co-partisans, transmitting information and ideas across districts, and generally supporting the party in its central task of electing party-affiliated candidates (Aldrich 2011).

In this article, we break with the traditional approach to researching campaign behavior and focus on a key component of these party networks — professional campaign consulting firms. While scholars have long recognized that consulting firms are central players in contemporary U.S. campaigns, their broader role in the political system remains poorly understood. With a few notable exceptions (e.g., Lathrop 2003; Herrnson 2009; Johnson 2011), scholarship on consultants has not advanced far since Thurber (1998) labeled it "a subfield in search of a theory." Studies have provided descriptive analyses of consultant practices or examined the correlates of consultant use at the campaign level, but few have produced general insights into the function of consultants in parties or elections.

We argue that consultants are important agents of campaign strategy diffusion within

the extended party network, playing a key role in the process of "organized trial and error" by which ideas and approaches are developed and spread within parties (Schlesinger 1984, 390). While party organizations like the House and Senate campaign committees provide assistance in this process, their influence is limited by logistical obstacles and legal restrictions on fundraising and coordination. In the absence of party-directed campaigns, we argue that political consultants function as a mechanism for the diffusion and coordination of campaign strategies among a party's candidates. By proposing strategies that have worked for one or more of their candidates to other clients, they create a more unified and effective communication strategy and brand image in a relatively decentralized fashion.

We provide support for these claims by analyzing a uniquely detailed dataset of campaign expenditures by U.S. House of Representatives candidates on consulting services, which allows us to construct party networks of candidates who share one or more consultants and estimate a series of spatial autoregressive models. Using the most prominent measures of general campaign strategy available (Druckman, Kifer and Parkin 2009), we find that the strategies of candidates who share consultants are more similar than we would otherwise expect conditional on numerous relevant explanatory variables, especially amongst non-incumbents and plausible candidates in unfavorable districts. These results, which are generally robust to multiple model specifications and falsification tests, suggest that consultants play a key role in diffusing strategies among Congressional campaigns.

2. THE ROLE OF CONSULTANTS IN U.S. PARTIES

Contemporary American political parties face a difficult organizational dilemma. Each affiliated candidate must independently organize what is essentially a medium-sized business in the months leading up to Election Day and successfully carry out a series of complex logistical, organizational, and strategic tasks. To be competitive, campaigns must raise hundreds of thousands (or millions) of dollars; conduct polls; develop a message; field mail, TV, and/or

radio ads; and much more. Executing these tasks successfully requires not only financial resources, but also experience, technical expertise, and an understanding of campaign strategy that is beyond the capacities of most candidates and their campaign staff. Moreover, parties have strong political incentives for affiliated candidates to maintain some level of message and strategy coordination. How can parties help candidates overcome these organizational obstacles and win election to public office while facilitating enough coordination across districts to maintain an effective party brand?

2.1. *Consultants as agents of intra-party strategy diffusion*

One approach to this dilemma is to organize parties like hierarchically structured firms. For instance, the House and Senate campaign committees of the major parties recruit candidates in certain races and conduct independent expenditures on their behalf. However, the intense time pressures of modern campaigns and the difficulty of coordinating activity across hundreds of House and Senate races have precluded the widespread adoption of such a top-down approach.[1] These obstacles are exacerbated by campaign finance laws specifically aimed at curtailing centrally-directed party campaigns. Thus, although formal party organizations exist, their influence and capacity has lagged behind the demands of the contemporary campaign environment (Gibson et al. 1983; Aldrich 2000).

In response to the growing demand for organizational capacity in the face of these institutional and legal barriers, American parties have instead evolved alternative mechanisms to aid party-affiliated candidates, relying on actors at the edges of the formal party organizations to provide strategic advice, services, and expertise to candidates while facilitating some limited degree of coordination (Schlesinger 1984). In particular, formal party organizations guide candidates to reputable consulting firms and then provide financial support rather than providing those services directly (Herrnson 1986; Kolodny 2000; Dulio 2004). As Aldrich

[1]The parties also employ consultants, but these are outside the scope of our study (Magleby 2010).

(2011, 272) writes, "Parties have come to believe in the mantra, 'Hire enough professionals ... and provide them with millions of dollars, and they will find a dazzling array of ways to employ their expertise and money.'" As a result, consulting firms now play a significant role in almost every credible campaign (Thurber and Nelson 1995; Johnson 2001, 2002).

In addition to providing technical expertise and advice, consultants are especially valuable in spreading new ideas and approaches from one candidate or campaign to another. It is useful to think of consultants as bridging structural holes in the flow of information among campaigns within a party (Burt 1992). Informally, structural holes exist when information is not fully shared between disconnected individuals or groups in a network. Consultants act as information brokers, taking the best ideas from one candidate or campaign and bringing them to another in the same way as the most effective corporate managers or other leaders (Burt 2004). Rather than passing through formalized channels, strategic insights instead spread between campaigns through networks of candidate-consultant relationships.[2] This process helps the party maintain a relatively unified brand and communication strategy while allowing for innovations to surface from within.

Our approach differs from prior research on consultants in two respects. First, previous studies have focused on exploring the circumstances under which individual campaigns and candidates adopt specific tactics such as negative advertising (e.g., Francia and Herrnson 2007; Grossman 2012). We take a more general approach, focusing on the role of consultants in formulating broad campaign strategies. Consultants help decide whether, for instance, to focus on issues that are "owned" by their party (Petrocik 1996), whether to prime certain issues or positions rather than others (Miller and Krosnick 1996), and whether to introduce additional dimensions of conflict (Riker 1986). These choices in turn influence public perceptions of and voter support for client candidates at the district level as well as the issue positions that those candidates adopt, which will (cumulatively) help to shape party reputations and platforms at the national level. Our findings therefore have broad implications for

[2]Unfortunately, we cannot directly test for structural holes in our empirical analysis because we study a projected network of candidates with links representing shared consultant ties (e.g., Opsahl 2013).

scholarly understanding of campaigns, political communication, and party competition.

Second, the literature on consultants has not tested whether strategies diffuse *between* campaigns who employ the same firm(s). We do so by identifying a set of relationships (consultants) that link the units in our data (Congressional candidates) to construct a network. However, we go beyond just describing the network's properties and instead test whether the behavior of interest (campaign strategy) diffuses via those ties.

2.2. *Consultants and parties*

Our view of consultants and their role in campaign strategy diffusion is consistent with a growing body of theoretical and empirical research on informal ties among members of contemporary parties and their allies.[3] However, the premise that consulting firms are influential players in parties sharply contrasts with several past studies arguing that the growing use of consultants is either a worrying symptom or significant cause of candidate-centered elections, weak party organization, and the increasing influence of "party-rivaling" organizations such as PACs (Sabato 1981; Shea 1996; see also Magleby, Patterson and Thurber 2000). We believe that this account takes too narrow a view of party strength. Contemporary parties may be using a less hierarchical approach because it is more effective (Powell 1990; Jung and Lake 2011), not because the parties themselves are weak. Such arrangements can reduce transactions costs and facilitate coordination and cooperation in the absence of centralized control, which is in any case largely precluded by campaign finance laws.

The close ties between parties and consulting firms are most obvious in the consultant selection process. For example, the parties may provide certain campaigns or candidates with lists of reputable consultants (Kolodny and Logan 1998). However, the party's role in the matching process is necessarily limited by logistical constraints given the massive size

[3]See, for instance, Schwartz (1990), Monroe (2001), Bernstein (2003), Dominguez (2005), Doherty (2006), Heaney and Rojas (2007), Koger, Masket and Noel (2009), Herrnson (2009), Grossman and Dominguez (2009), Masket et al. (2009), Koger, Masket and Noel (2010), Bawn et al. (2012), Cain (2012*a*,*b*), and Desmarais, La Raja and Kowal (2014).

of the marketplace (hundreds of races per cycle) and the timing of the hiring process (before party funding is available or primaries are resolved). As a result, campaigns are not typically constrained to hire specific firms chosen by the party, nor are consultants required to accept those campaigns as clients or to adopt particular issue positions or strategies. Instead, parties help create incentives for candidates to use firms "known" by the parties (Cain 2011, 2013). This process results in a loosely organized network of candidate-consultant relationships centered on a set of party-aligned firms rather than a set of strictly-organized relationships and strategies dictated by central party committees (Nyhan and Montgomery N.d.).

After they are hired, consultants function largely autonomously, providing strategic advice and organizational capacity to candidates without centralized control from formal party organizations. While it is possible that this organizational approach could lead to significant agency loss (Walton and Walter 2009; Martin and Peskowitz N.d.), there are several reasons to believe that consultants will select and disseminate strategies in a manner that generally serves the interests of parties and their candidates. First, many consultants previously worked for the parties and are likely to be partisan loyalists (Dulio 2004). Second, firms have strong incentives to maintain good relations with party organizations, which help direct candidates to consultants (Kolodny and Logan 1998) and also contract directly for consulting services (Kolodny and Dulio 2003; Cain 2013). Most importantly, market incentives should help ensure that party and consultant incentives are aligned. Like party organizations, consulting firms are primarily motivated by one goal – winning elections. Losses hurt a firm's bottom line by eliminating repeat customers and reducing the likelihood of attracting new clients. Conversely, consulting firms with strong track records attract new clients and become more central to the party consultant network over time (Nyhan and Montgomery N.d.).

3. THEORETICAL EXPECTATIONS

Our theoretical perspective on the role of consultants in facilitating party goals suggests three empirical expectations. First, we predict that almost all campaign consulting firms are highly partisan. If campaign consulting firms are truly part of the extended party network, they cannot cross party lines. Thus, our theory requires that consultants work with clients of only one major party. This prediction, which is consistent with past research (e.g., Kolodny and Logan 1998), is important primarily to establish the basic premise for our study.

> *Hypothesis 1: Almost all consulting firms work exclusively with Congressional campaigns from only one of the major parties.*

Second, given their key role in contemporary campaigns, consultants have substantial latitude to influence the strategic choices of the candidates they advise. Indeed, consultants were already being criticized for having "helped homogenize American politics" by the early 1980s (Sabato 1981, 7). Subsequent studies found evidence of apparent consultant influence on the adoption of negative advertising (e.g., Swint 1998; Francia and Herrnson 2007; Grossman 2012), fundraising (Herrnson 1992; Dulio 2004; Cain 2012*a*), electoral outcomes (Medvic and Lenart 1997; Medvic 1998; Dabelko and Herrnson 1997; Dulio 2004; Cain 2012*b*), and the adoption of specific messages (Johnson 2001).

We therefore expect that consulting firms are likely to help spread favored strategies among their clients and to apply new approaches and strategies that seem to work for one client for others. These strategies may in turn be adopted and disseminated by collaborating firms who are jointly employed by the clients who have adopted the strategy. In this way, consultants can serve as an important broker for the dissemination of effective strategies.

To operationalize this theory of consultant diffusion of campaign strategy, it is necessary to account for the complex structure of the candidate-consultant network. Many campaigns employ multiple consultants who each have their own client lists. To account for this, we propose the following hypothesis:

Hypothesis 2: The similarity of candidates' campaign strategies will increase as the consultant ties between them become stronger.

An extreme example of the effects that consultants can have on campaign messaging was observed in the 2010 election cycle when a consultant named Tommy Hopper admitted to having "borrowed" a message he first used in a Kansas Congressional race for clients running for Congress in Tennessee and agriculture commissioner in Alabama (Weigel 2010; Clarkin 2010; see Katz 2010 and Ralston 2010 for other recent examples). Of course, the similarities between campaigns that share consulting firms will typically be more subtle. However, surveys and in-depth interviews of campaign professionals reveal that there is a great deal of practical wisdom traded and debated within the parties about the strategies that should be used in various electoral scenarios (e.g., Johnson 2011). The spatial statistical methods we employ below allow us to systematically test for the diffusion of these strategies among campaigns linked via shared consulting firms.

In particular, our expectation is that consultants' strategic influence will be strongest among candidates who require the most assistance to win – non-incumbents and candidates running in districts that are unfavorable to their party. In the House, incumbent re-election rates are typically extremely high, including during the 2002–2006 period we study (Center for Responsive Politics N.d.). Thus, though incumbents are more likely to employ consultants due to their greater financial resources, they face weaker incentives to adopt consultant-recommended strategies from other races. By contrast, open seat candidates and those challengers who can afford to hire consultants typically have some chance of winning but are much more likely to face difficult races and should thus be more open to following consultant advice to maximize their chances of victory.[4] In addition, incumbents typically are constrained by their extensive public record and rely on messages of experience that emphasize their past accomplishments in office. Just as incumbent legislators are well-known to "die in their ideological boots" (Poole 2007), incumbent campaigns are more likely to stick

[4]Some open seat candidates and challengers face extremely long odds and may therefore feel little pressure to follow consultant advice, but very few have the funds to hire consultants in the first place.

with established strategies (Druckman, Kifer and Parkin 2009), which reduces the scope for consultants to exert an independent influence. Non-incumbents will conversely be less likely to have an established record and campaign strategy than incumbents, which increases the scope for consultant influence on their strategic choices.

Similarly, major-party candidates running in districts that tend to favor the other party face a more difficult path to victory than candidates in districts that favor their own party. There are accordingly stronger incentives for these disadvantaged candidates to adopt recommended campaign strategies from consultants than for those candidates who are fighting the election on more favorable terrain. We formalize these hypotheses as follows:

> *Hypothesis 3a: The relationship between shared consultants and the similarity of campaign strategy should be stronger for non-incumbents than incumbents.*
>
> *Hypothesis 3b: The relationship between shared consultants and the similarity of campaign strategy should be stronger for candidates in unfavorable districts than for candidates in favorable districts.*

4. DATA AND METHODS

Our goal is to determine whether campaigns are more likely to adopt strategies that are also being used by other campaigns with which they share consultants (rather than being independent across districts as traditional statistical analyses would assume). In this section, we describe the data and statistical approach that we use to test this hypothesis.

4.1. *Dependent variable: Campaign strategy*

Unfortunately, there is surprisingly little systematic data available on campaign strategy, especially for challengers. One reason is that many campaigns, especially non-competitive races or those distant from major media markets, provide little direct evidence by which

their activities can be evaluated. They receive low levels of media coverage and do not advertise on television. The most comprehensive effort to date to assemble information on campaign strategy is provided by Druckman, Kifer and Parkin (2009, 2010),[5] who collected information from the websites of a random sample of major-party candidates for the House of Representatives in the ten days preceding the 2002, 2004, and 2006 general elections.[6]

Druckman, Kifer, and Parkin (hereafter DKP) evaluate campaigns along numerous dimensions. Here, we focus specifically on the broadest and richest measures of general strategy in the DKP dataset, which they term "risk-taking" and "issue ownership." The risk-taking scale, which ranges from -3 to 8, is calculated as the number of observed behaviors that DKP perceive to have uncertain consequences minus the number of strategies used that they view as safe.[7] The result is an index in which higher values are associated with risky strategies and lower values are associated with safe strategies—precisely the sorts of decisions over which consultants are likely to influence candidates.

Our second campaign strategy measure is DKP's measure of issue ownership, which ranges from -20 to 26 and takes higher values for candidates who focus their message on issues "owned" by their party (2009, 348). It captures the degree to which campaigns emphasize policy areas in which the candidates' party has a reputational advantage in national polls. Like risk-taking, this variable is also an excellent indicator of campaign strategy for our purposes since issue emphasis is a strategic choice that past research suggests consultants are especially likely to influence (Medvic 2001*b*, 433; Johnson 2011). In particular, while candidates are often unwilling to change their issue positions, they may be more willing to change which issues are emphasized in response to district conditions or polling results.

[5]Since most campaigns had websites during this period, the potential for selection bias is lower than comparable television advertising data (e.g., Goldstein and Rivlin 2007).

[6]DKP's data are structured as a rolling cross-section. They also collected data from the websites of all major-party Senate candidates, but the lack of Federal Election Commission data on Senate campaign expenditures precludes its use in this study (see below).

[7]Risky strategies were coded as providing negative information about opponents, emphasizing one's party label, providing numerous issue positions or endorsements, focusing on issues more advantageous to the opposing party, allowing public participation on the website, providing statements about the candidate's vision or agenda, and mentioning prior non-elected positions. Safe strategies were coded as mentioning the candidate's experience as an elected official, roots in the community, and role in obtaining constituent benefits.

DKP provide a thorough evaluation of these variables as well as a great deal of evidence that they capture fundamental elements of campaign strategy. For instance, they show that challengers and candidates in open seat districts disproportionately adopt riskier strategies (Druckman, Kifer and Parkin 2009, 352–354). However, these data are still noisy measures of overall campaign strategy, which should inflate the standard errors of our models and bias our results toward a null finding. In this sense, positive results should be interpreted as substantial evidence in favor of our theoretical predictions.

4.2. *Consultant-candidate data*

We study the random sample of major party House candidates (including open seat candidates and challengers as well as incumbents) in the 2002, 2004, and 2006 general elections whose campaign strategies were coded by DKP. To determine which consulting firms were employed by these candidates, we used expenditure data provided by House campaigns to the Federal Election Commission (FEC) and made available in an accessible format by the Center for Responsive Politics (2012*a*; 2012*b*; 2012*c*; see also Martin and Peskowitz N.d.).[8]

Our goal was to identify payments from campaigns to consultants and consulting firms. Because payments to consulting firms are not clearly labeled in the FEC data and campaigns are inconsistent in how they describe payment recipients, it was necessary to create a list of consulting firms to search for in the expenditure data. Given our interest in overall campaign strategy, we restrict our analysis to firms that self-identified as providing general, media, and/or polling consulting in scorecards published in the industry trade magazine *Campaigns & Elections* (henceforth, *C&E*) between 1990 and 2009 or a 2008 compendium in the insider publication *The Hotline*. From this list, we developed a library of terms that were used to identify payments made to a listed consulting firm.

This processing step resulted in a list of expenditures that trained research assistants

[8]Itemized expenditure data for Senate campaigns are not available in electronic format for this period and are thus excluded.

coded for matches to our list of strategy, media, and polling firms generated from the *C&E* scorecards. Ambiguous cases were further cross-checked against the *C&E Political Pages*, an annual directory of consulting firms and consultants published in the magazine, for the 2002, 2004, and 2006 election cycles. Only payments to firms in our sample of media, strategy, and polling firms or to individuals clearly listed as employed by those firms were retained. The result of this process was a list of 7,526 campaign-consultant payments totaling more than $168 million between 1,194 unique campaign-consultant dyads. Finally, we sum these payments for each campaign-consultant dyad to create a total expenditure value for the cycle. Additional details are provided in the Supporting Information (SI).

4.3. *Creating the candidate-candidate network*

Before testing our hypotheses, we must convert our candidate-consultant networks into single-mode networks of candidates linked by edges weighted by the number of shared consultants. This process is known as projection and is a standard practice in the social networks literature. For instance, we can represent a two-mode network of $i = 1, \ldots, n$ candidates and $j = 1, \ldots, m$ consultants as an $n \times m$ adjacency matrix $\mathbf{A}$. In this case, we have binary edges indicating whether total expenditures e on a consulting firm in a given election cycle were $25,000 or greater, a plausible minimal threshold indicating that the candidate employed the consulting firm for significant duties.[9]

The existence of a tie between candidate i and consultant j is thus represented in the

[9] As we discuss below, our results are largely robust to two alternative approaches that do not rely on a specific cutoff value — using either the product of logged spending on shared consultants to represent the strength of ties between campaigns or a binary measure of whether two candidates each spent $1 or more on *any* shared consultant. However, we prefer the approach presented above, which focuses on the number of shared consultants who played a *significant* role in both campaigns without assuming that influence is increasing in spending, which may vary by firm type (e.g., media firms often receive the largest payments because they purchase advertising for clients, but are not necessarily most influential).

adjacency matrix $\mathbf{A}$ as

$$\mathbf{A_{i,j}} = \begin{cases} 1 & \text{if } e_{i,j} \geq \$25{,}000 \\ 0 & \text{if } e_{i,j} < \$25{,}000. \end{cases} \tag{1}$$

To convert this two-mode network into a one-mode network of candidates linked by consultant edges, we post-multiply the adjacency matrix $\mathbf{A}$ by its transpose ($\mathbf{AA^T}$), which generates a one-mode $n \times n$ candidate adjacency matrix $\mathbf{W}$. In the projected candidate network $\mathbf{W}$, the edge weight between candidate c and candidate d is simply the number of consultants among the set $j = 1, \ldots, s$ on whom both spent \$25,000 or more in a given election cycle (where $\mathrm{I}(.)$ represents the indicator function):

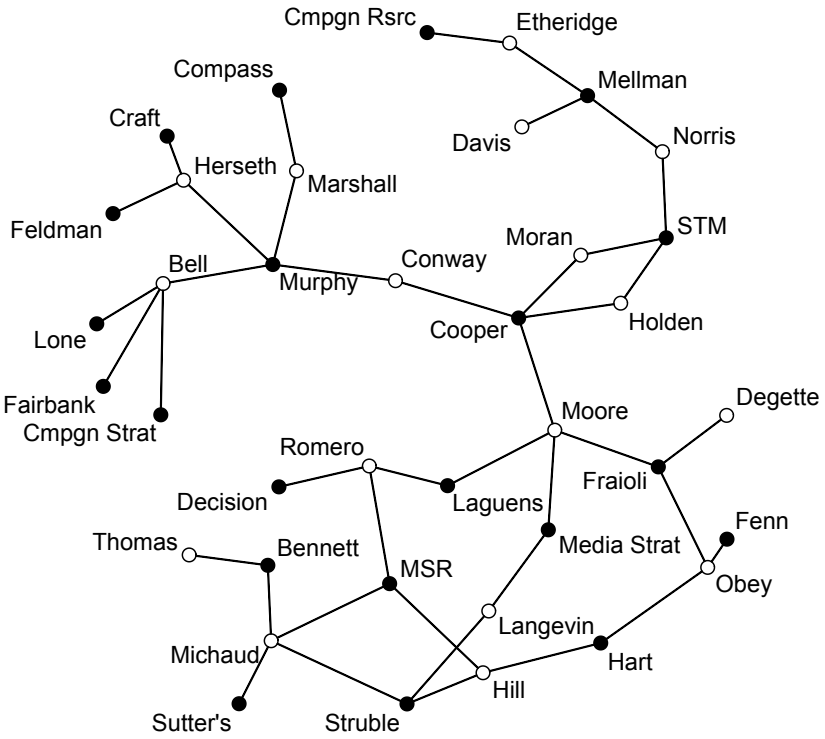
$$\mathbf{W_{c,d}} = \sum_{j=1}^{s} \mathrm{I}(e_{c,j} \geq \$25{,}000) \times \mathrm{I}(e_{d,j} \geq \$25{,}000) \tag{2}$$

Substantively, the edge weights in the projected matrix represent the extent to which candidates have an increasingly similar team of consultants.

Figures 1 and 2 provides an illustrative example of how projection works. Figure 1 depicts the consultants and candidates who constitute the largest connected component of the Democratic candidate network during the 2002 electoral cycle using our definition above for candidate-consultant ties (consultant nodes are solid black while candidate nodes are unfilled circles). We convert the candidate-consultant network in Figure 1 into a network of candidate nodes linked by the consultants they shared during that cycle, who are represented as edges in the plot. The largest connected component of the resulting candidate network is presented in Figure 2.

We then merged our consultant-candidate data with election and candidate data from CQ's Voting and Elections collection and data on House races collected by Gary Jacobson. These covariates allow us to account for candidate- and campaign-level factors that might affect campaign strategy and are available for all types of candidates (not just incumbents). However, we do not condition on pre-election measures like polls, competitiveness ratings,

Figure 1: The 2002 Democratic candidate-consultant network



Plot depicts the candidates and consultants in the largest component of the projected 2002 Democratic candidate network constructed from the Druckman, Kifer and Parkin (2009) House of Representatives candidate sample and FEC data (see text for details). Consultant nodes are solid circles; candidate nodes are unfilled circles.

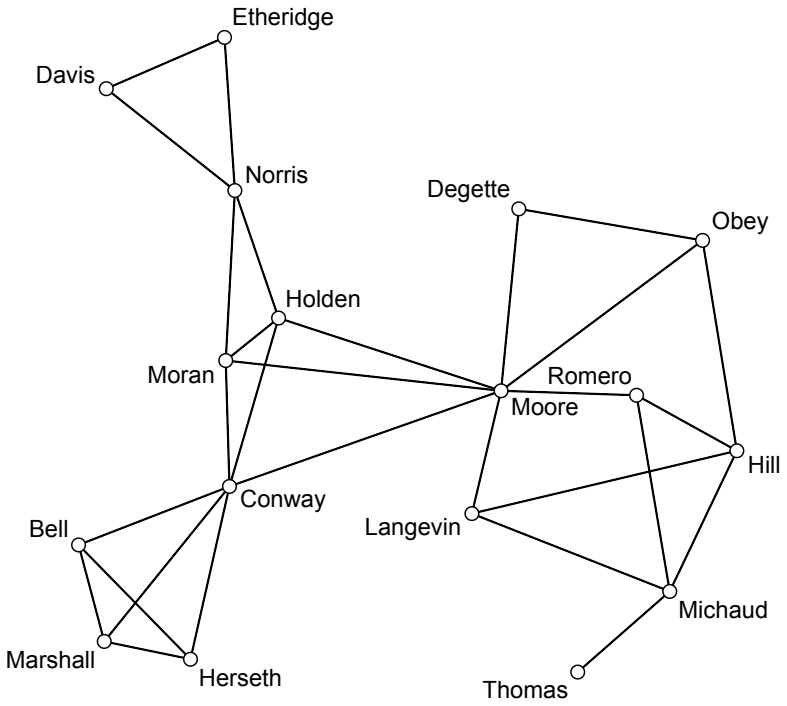
or fundraising totals that could be affected by consultant choice and therefore induce post-treatment bias (King and Zeng 2006; see, e.g., Cain 2012*a*).

4.4. *Spatial autoregressive models*

To test our diffusion hypotheses (Hypothesis 2 and Hypotheses 3a/3b), we estimate spatial autoregressive models to examine whether sharing consultants is associated with the use of similar campaign strategies. The spatial relationships that we model are thus ties within the candidate-consultant network rather than, say, geographic proximity.[10] Specifically, we

[10]This approach is frequently employed in the social networks literature. For recent examples, see Mizruchi, Stearns and Marquis (2006) and Papachristos (2009).

Figure 2: The 2002 Democratic candidate network



Plot depicts the largest connected component in the network of 2002 Democratic House candidates in the Druckman, Kifer and Parkin (2009) sample; edges represent shared consultant ties identified in FEC data.

estimate spatial autoregressive models with covariates (see, e.g., LeSage and Pace 2009).[11] For some continuous outcome y, the model assumes

$$y = \mathbf{X}\beta + \rho\mathbf{W}y + \epsilon, \tag{3}$$

where $\epsilon \sim N(0, \sigma^2\mathbf{I_n})$, n is the number of observations, $\mathbf{X}$ is an $n \times p$ covariate matrix with p covariates, and $\mathbf{W}$ is an $n \times n$ weight matrix with zeros along the diagonal.[12]

We construct the weight matrix $\mathbf{W}$ by row-standardizing the matrix $\mathbf{W}_{c,d}$ defined in

[11] All analyses were conducted in R using the `lagsarlm` function in `spdep`.

[12] This model assumes that we have a continuous outcome, while our main outcomes of interest are categorical. The risk-taking variable has 11 categories ranging from -3 to 8 and the issue ownership variable has 46. However, we are aware of no software routines for estimating ordered categorical spatial autoregressive models. Moreover, it is common to treat dependent variables with large number of categories as continuous in practice. For instance, ordered probit and ordinary least squares regression typically provide substantively identical results for dependent variables with ten or more categories.

Equation 2, which represents the number of consultants to whom candidates c and d both paid \$25,000 or more in a given election cycle. This procedure, which is standard in spatial econometrics and political science (e.g., Ward and Gleditsch 2008; LeSage and Pace 2009), normalizes the total effects of shared consultants to be equal across candidates. We perform this step so that our inferences are not distorted by substantial differences in the number of shared consultants per candidate. Specifically, the weight $W_{c,d}$ representing the strength of the association between candidates c and d is standardized by the total number of shared consultants per candidate such that $\sum_d W_{c,d} = 1$ for all candidates $c = 1, \ldots, n$ who have one or more shared consultant ($\sum_d W_{c,d} = 0$ for candidates with no shared consultants).

Substantively, this approach assumes that a candidate will be less likely to use a strategy like the one used by a candidate with whom she shares consultants as the number of consultants she shares with other candidates increases (because those other relationships presumably would also influence her strategy). Conversely, this procedure assumes that the similarity between campaigns will be greatest when no competing influences are present — namely, when two candidates share consultants only with each other.

Within this framework, the spatial autocorrelation coefficient ρ represents the influence of a weighted average of the strategies used by other candidates with whom a candidate shares consultants, capturing the tendency of candidates who are "closer" to each other in the network to employ similar campaign strategies (Ward and Gleditsch 2008). In other words, it captures the general tendency for strategies to covary among campaigns who share consultants. If we constrain ρ to be equal to zero, the model is identical to standard linear regression, which implicitly assumes that strategies are conditionally independent across campaigns. For instance, under the null model where $\rho = 0$, we are assuming that incumbent Republicans facing similar electoral environments would employ similar campaign strategies regardless of which consultants they are using. Our theory, on the other hand, suggests that $\rho > 0$. A positive and statistically significant spatial autocorrelation coefficient indicates that campaign strategies will be more similar between two campaigns than we would otherwise

expect[13] as their consultant ties strengthen controlling for party, year, district favorability, and other covariates. The individual-level treatment effect of ρ can be interpreted as the predicted change in the outcome y for a given unit c as the outcomes for all of c's neighbors are exogenously increased by one unit (Ward and Gleditsch 2008, 38).

In the analyses below, we report estimates for ρ and their asymptotic standard errors as well as likelihood ratio (LR) tests that compare the spatial autoregressive model (Equation 3) with the null model where $\rho = 0$,

$$y = \mathbf{X}\beta + \epsilon. \tag{4}$$

A significant LR test statistic indicates that the spatial autoregressive model in Equation 3 fits the data significantly better than the corresponding non-spatial model in Equation 4.

5. ANALYSIS AND RESULTS

Following previous research (e.g., Kolodny and Logan 1998), we find that the consultant-candidate networks of the two major parties do not overlap in any meaningful way, which provides strong support for Hypothesis 1. We show in Table 1 that consulting firms over-

Table 1: Party loyalty among political consulting firms

Election cycle	Exclusively D or R	Both D and R
2002	131	0
2004	175	1
2006	181	0

Sample consists of consulting firms that received $25,000 or more from 2002–2006 House of Representatives general election candidates in the Druckman, Kifer and Parkin (2009) sample according to Federal Election Commission records. See text and SI for further details.

[13]The coefficient does not imply directionality. For instance, the positive spatial autoregressive coefficients reported below for issue ownership do not indicate that campaigns who share consultants are more likely to emphasize party-owned issues than would otherwise be expected. Instead, the positive ρ values indicate that campaigns sharing consultants are *more similar* in their emphasis (or lack thereof) on party-owned issues than we would expect conditional on other covariates.

whelmingly work only with candidates from only one party. Across three election cycles, we only observe one case in which a general, media, or polling consulting firm contracted with campaigns in both major parties in the same cycle — a tiny fraction of all consultant-candidate dyads in our data. This strict segmentation of the consulting market was also observed by Martin and Peskowitz (N.d.), who found only one of 1250 consultants listed in *Campaigns & Elections* during the 2002–2010 period did not affiliate with one party. Their behavior reflects a combination of party loyalty by consultants and intense market pressure from clients to remain loyal to a single party (e.g., Hamby 2009; Halperin 2010).

5.1. *Spatial autoregression results*

Turning to our regression results, we follow DKP by including members of both parties and pooling across the 2002, 2004, and 2006 elections in our analyses. In addition to the spatial weight matrix constructed from our data on shared consultant ties between campaigns, we include a number of relevant covariates in the models that are available for the full set of candidates in our data (which include many non-incumbents). In each of the analyses below, we include fixed effects for party and year (Republicans and 2002 are the reference categories, respectively); indicators for incumbents and open seat candidates (challengers are the reference category); and indicators for district favorability based on a quartile split of the two-party vote received by their party's presidential candidate in their district in 2000 (for the 2002 election) or 2004 (for the 2004/2006 elections).[14] This variable allows us to account for the competitiveness and partisan orientation of the district. One additional potential concern is that consultant ties may act as proxies for regional differences in campaign style. Democrats in the South may campaign differently than those in the Northeast, for instance, and use consultants who specialize in their region. We therefore include regional

[14]These indicators, which allow for possible non-linearities in the relationship between district favorability and campaign strategy, represent the following values in the data: 9–42% of the two-party presidential vote (the bottom quartile), 43%–51% (the second quartile), 52%–59% (the third quartile), and 60%–91% (the fourth quartile). The first (least favorable) quartile is the omitted category in the results below.

fixed effects (the Northeast is the reference category). Finally, we follow DKP in including their measure of "issue salience" as a control in models of issue ownership. After dropping observations due to missingness in the covariates, we are left with 545 observations.[15]

Table 2 presents the results of our spatial autoregressive models of DKP's campaign strategy measures of risk-taking and issue ownership. Our primary interest is not in the control variables (which we do not discuss further for space reasons but are largely consistent with expectations) but on estimates of the spatial autocorrelation coefficient ρ and the likelihood-ratio tests, which determine if there is a statistically significant improvement in model fit over a standard linear regression. A positive, statistically significant likelihood ratio test indicates that campaign strategies are more similar among candidates who share consultants than we would expect by chance (conditional on covariates).

The first column of Table 2 confirms our expectation that campaign strategies should be more similar among candidates who share consultants than we would otherwise expect. The spatial autocorrelation coefficient is positive and statistically distinct from zero ($\rho = 0.105$, s.e.=0.048) and we can reject the null hypothesis that the spatial autoregressive model does not fit better than a standard linear regression (LR statistic $= 5.111$, $p < .05$).[16] The third column of Table 2 finds an even stronger positive association between the number of shared consultants and issue ownership scores ($\rho = 0.346$, s.e.=0.046) and we can again reject the null of no improved fit versus a standard linear regression (LR statistic $= 49.066$, $p < .01$).[17]

One potential concern is that our results are confounded by unobserved similarities in candidate ideology. We therefore utilize the innovative Bonica (N.d.) estimates of candidate ideal point derived from campaign finance records, which he calls CFscores. These estimates

[15]Only 15% of the unique candidates appear in the dataset more than once (12% in two cycles and 3% in all three cycles). We therefore cannot include candidate-level fixed effects (though descriptive statistics suggest these candidates are adjusting their strategies between cycles as our hypothesis predicts; results available upon request). Our candidates are only linked by consultant ties *within* a given cycle so this choice should not cause spurious spatial autocorrelation.

[16]The autocorrelation term is already on the same scale as the dependent variable, facilitating interpretation. This result indicates that a one standard deviation increase in risk-taking by all of unit c's neighbors results in a roughly 0.105 standard deviation increase in risk-taking for unit c.

[17]Substantively, a one standard deviation increase in issue ownership by all of unit c's neighbors results in a roughly 0.346 standard deviation increase in emphasizing party-owned issues.

Table 2: Autoregressive models of risk-taking and issue ownership in House campaigns

	Risk-taking		Issue ownership	
	(1)	(2)	(3)	(4)
Intercept	-0.397	-0.358	-5.940	-3.897
	(0.334)	(0.363)	(1.486)	(1.635)
2004	0.119	-0.019	-1.809	-1.715
	(0.185)	(0.193)	(0.764)	(0.795)
2006	0.335	0.296	-1.576	-1.670
	(0.179)	(0.186)	(0.739)	(0.767)
Democrat	1.211	1.152	11.154	7.286
	(0.141)	(0.336)	(0.658)	(1.443)
Open seat	1.602	1.620	-0.273	-0.190
	(0.224)	(0.226)	(0.939)	(0.944)
Challenger	2.717	2.814	1.452	1.528
	(0.173)	(0.178)	(0.714)	(0.737)
District favorability: 2nd quartile	0.066	0.052	0.405	0.119
	(0.192)	(0.205)	(0.789)	(0.840)
District favorability: 3rd quartile	-0.086	0.008	2.304	2.184
	(0.209)	(0.220)	(0.865)	(0.911)
District favorability: 4th quartile	-0.117	-0.095	2.040	1.852
	(0.232)	(0.240)	(0.968)	(0.998)
Mid-Atlantic	0.198	0.352	-2.096	-2.168
	(0.311)	(0.322)	(1.296)	(1.340)
Midwest	0.729	0.689	-0.265	0.266
	(0.289)	(0.293)	(1.201)	(1.220)
Plains	0.473	0.477	0.811	1.230
	(0.328)	(0.328)	(1.371)	(1.371)
South	0.446	0.581	-0.783	-0.112
	(0.277)	(0.281)	(1.148)	(1.162)
Border	0.452	0.572	-0.118	0.143
	(0.307)	(0.312)	(1.277)	(1.300)
Mountain West	0.685	0.702	-1.150	-1.023
	(0.300)	(0.299)	(1.236)	(1.230)
West	0.488	0.363	-1.529	-0.842
	(0.350)	(0.363)	(1.445)	(1.491)
Conservatism (CFscore)		-0.080		-2.102
		(0.164)		(0.681)
Issue salience			9.091	8.322
			(1.960)	(2.069)
Number of shared consultants (spatial autocorrelation)				
ρ	0.105	0.078	0.346	0.350
	(0.048)	(0.048)	(0.046)	(0.047)
Nested model test for shared consultant dependence				
LR statistic	5.111	2.762	49.066	49.075
p-value	0.024	0.097	0.000	0.000
N	524	486	532	493

Models predict the Druckman, Kifer and Parkin (2009) campaign strategy measures of risk-taking and issue ownership among 2002–2006 House of Representatives general election candidates in their sample with no missing data on covariates. Edge weights represent the number of consulting firms that received $25,000 or more from both candidates according to Federal Election Commission records; the resulting adjacency matrix is then row-standardized. Indicators for district favorability represent quartiles for the party presidential vote by district (the least favorable quartile is the omitted category; see footnote 14 for details). Estimated using the `lagsarlm` function in the `spdep` package for R.

allow us to map incumbents and non-incumbents into a common ideological space, which is otherwise impossible given the lack of comparable legislative voting or survey data for most non-incumbents. When we control for the CFscore estimates of candidate ideal points in the second and fourth columns of Table 2, our results for ρ are largely unchanged and the likelihood ratio statistics testing the autoregressive models against standard linear regressions remain statistically significant for both risk-taking ($p < .10$) and issue ownership ($p < .01$).[18]

Hypotheses 3a and 3b predict that the relationship between campaign strategy and shared consultants will be strongest among non-incumbents and candidates in unfavorable districts due to the increased competitive pressures that they face. We therefore disaggregate our data by incumbency status and district type and estimate separate models in Tables 3 and 4. The first two columns of each table contrast results for incumbent and non-incumbent candidates, respectively, while the third and fourth columns divide the data by district favorability using a median split on presidential vote.[19]

Again, our focus is not on the regression coefficients themselves, but on the estimates of ρ and the likelihood ratio tests at the bottom of the tables. The risk-taking models in Table 3 provide statistically significant evidence of an association between campaign strategy and shared consultants that is consistent with Hypotheses 3a and 3b. Specifically, likelihood ratio tests indicate find that accounting for shared consultant ties produces a positive and statistically significant increase in model fit for both non-incumbents and those in unfavorable districts ($p < .10$ and $p < .05$, respectively; see the first and third columns of Table 3). This difference is not observed among incumbents or candidates in favorable districts (the second and fourth columns of Table 3).[20]

By contrast, the issue ownership models in Table 4, while consistent with Hypothesis 2,

[18]We lose 38 cases by including this covariate due to candidates who do not receive a sufficient number of contributions and/or do not file reports with the FEC.

[19]Districts in which the presidential nominee from the candidate's party received less than 51% of the vote in the previous election district are classified as unfavorable.

[20]While the evidence against the null hypothesis within each model is consistent with both Hypotheses 3a and 3b, we do not know of a valid test for differences in spatial autocorrelation between non-nested spatial autoregressive models. We therefore cannot formally reject the null hypotheses of no difference in ρ between incumbents and non-incumbents and between candidates in favorable and unfavorable districts.

Table 3: Autoregressive models of risk-taking by incumbency and district favorability

	Incumbency		District favorability	
	Non-incumbent	Incumbent	Unfavorable	Favorable
Intercept	1.106	0.414	-1.166	0.734
	(0.417)	(0.640)	(0.443)	(0.440)
2004	0.464	-0.320	0.496	-0.237
	(0.260)	(0.255)	(0.264)	(0.248)
2006	0.641	-0.097	0.629	0.022
	(0.251)	(0.248)	(0.258)	(0.238)
Democrat	1.139	1.415	1.250	0.959
	(0.207)	(0.216)	(0.220)	(0.226)
Open seat			2.211	1.185
			(0.343)	(0.294)
Challenger	1.005		2.688	2.869
	(0.247)		(0.251)	(0.260)
District favorability: 2nd quartile	0.169	-0.609	-0.001	
	(0.223)	(0.480)	(0.198)	
District favorability: 3rd quartile	-0.033	-0.603		
	(0.276)	(0.475)		
District favorability: 4th quartile	-0.506	-0.637		-0.020
	(0.398)	(0.468)		(0.194)
Mid-Atlantic	0.055	0.314	0.423	-0.229
	(0.451)	(0.430)	(0.440)	(0.433)
Midwest	0.684	0.763	1.217	-0.098
	(0.410)	(0.412)	(0.423)	(0.426)
Plains	0.747	-0.036	0.857	-0.320
	(0.454)	(0.489)	(0.480)	(0.489)
South	0.250	0.680	0.986	-0.477
	(0.400)	(0.397)	(0.419)	(0.412)
Border	0.284	0.695	0.815	-0.201
	(0.427)	(0.443)	(0.453)	(0.434)
Mountain West	0.696	0.746	1.182	-0.231
	(0.431)	(0.437)	(0.448)	(0.438)
West	0.514	0.342	1.233	-0.441
	(0.500)	(0.475)	(0.480)	(0.494)
Number of shared consultants (spatial autocorrelation)				
ρ	0.103	0.042	0.151	-0.006
	(0.055)	(0.087)	(0.061)	(0.065
Nested model test for shared consultant dependence				
LR statistic	3.521	0.234	6.283	0.009
p-value	0.061	0.629	0.012	0.924
N	286	238	271	253

Models predict the Druckman, Kifer and Parkin (2009) campaign strategy measure of risk-taking among 2002–2006 House of Representatives general election candidates in their sample with no missing data on covariates. Edge weights represent the number of consulting firms that received $25,000 or more from both candidates according to Federal Election Commission records; the resulting adjacency matrix is then row-standardized. Favorable districts are defined as those where the presidential nominee of the candidate's party received 51% of the vote or more (the median value in the data); unfavorable districts are those in which the presidential nominee of the candidate's party received less than 51% of the vote. Indicators for district favorability represent quartiles for the party presidential vote by district (see footnote 14 for details). Estimated using the `lagsarlm` function in the `spdep` package for R.

Table 4: Autoregressive models of issue ownership by incumbency and district favorability

	Incumbency		District favorability	
	Non-incumbent	Incumbent	Unfavorable	Favorable
Intercept	-8.080	-0.423	-8.908	-0.667
	(1.937)	(2.812)	(2.003)	(1.982)
2004	-1.145	-3.023	-0.566	-3.256
	(1.084)	(1.093)	(1.116)	(1.075)
2006	-1.004	-2.436	-0.338	-2.749
	(1.033)	(1.058)	(1.075)	(1.029)
Democrat	10.514	11.028	10.795	10.366
	(0.889)	(1.038)	(0.956)	(1.076)
Open seat			1.083	-0.730
			(1.456)	(1.251)
Challenger	1.305		1.667	1.770
	(1.024)		(1.046)	(1.112)
District favorability: 2nd quartile	0.874	-3.195	0.493	
	(0.922)	(2.045)	(0.835)	
District favorability: 3rd quartile	2.513	-0.546		
	(1.137)	(2.024)		
District favorability: 4th quartile	0.126	-0.558		-0.265
	(1.642)	(1.994)		(0.829)
Mid-Atlantic	-1.616	-2.545	-0.514	-3.342
	(1.879)	(1.819)	(1.864)	(1.866)
Midwest	1.720	-1.982	2.212	-2.597
	(1.717)	(1.739)	(1.797)	(1.826)
Plains	2.010	0.218	4.359	-2.607
	(1.901)	(2.065)	(2.034)	(2.109)
South	0.389	-1.957	1.106	-2.677
	(1.666)	(1.676)	(1.775)	(1.760)
Border	1.899	-2.246	1.760	-2.136
	(1.780)	(1.873)	(1.915)	(1.862)
Mountain West	1.764	-3.575	1.174	-3.323
	(1.798)	(1.845)	(1.901)	(1.879)
West	-2.816	0.368	-1.382	-0.390
	(2.081)	(2.004)	(2.034)	(2.111)
Issue salience	11.754	6.685	9.495	9.285
	(2.707)	(2.857)	(2.630)	(2.972)
Number of shared consultants (spatial autocorrelation)				
ρ	0.264	0.344	0.287	0.339
	(0.071)	(0.060)	(0.071)	(0.057)
Nested model test for shared consultant dependence				
LR statistic	12.454	27.905	15.856	28.704
p-value	0.000	0.000	0.000	0.000
N	286	238	271	253

Models predict the Druckman, Kifer and Parkin (2009) campaign strategy measure of issue ownership among 2002–2006 House of Representatives general election candidates in their sample with no missing data on covariates. Edge weights represent the number of consulting firms that received $25,000 or more from both candidates according to Federal Election Commission records; the resulting adjacency matrix is then row-standardized. Favorable districts are defined as those where the presidential nominee of the candidate's party received 51% of the vote or more (the median value in the data); unfavorable districts are those in which the presidential nominee of the candidate's party received less than 51% of the vote. Indicators for district favorability represent quartiles for the party presidential vote by district (see footnote 14 for details). Estimated using the `lagsarlm` function in the `spdep` package for R.

do not support Hypotheses 3a and 3b—the spatial autocorrelations are statistically significant and of comparable magnitude for incumbents and non-incumbents (the first and second columns) and for candidates in favorable or unfavorable districts (the third and fourth columns). In other words, consultant ties appear to play a similarly important role for all of these subsets of candidates. This result suggests that the influence of consultants on issue positioning is more universal, while their effects on risk-taking are more context-dependent.

In general, our findings support the hypothesis that consultants have come to play an important role in disseminating overall campaign strategy among Congressional candidates. Despite our reliance on dependent variables that are likely to be measured imprecisely, the strategies of campaigns who share consultants are more similar than we would expect by chance even after controlling for factors such as incumbency, year, party, and district favorability (Hypothesis 2). In addition, shared consultant relationships are most closely related to candidate risk-taking among non-incumbents (Hypothesis 3a) and candidates in unfavorable districts (Hypothesis 3b)—precisely those who most likely to need consultant advice.[21]

5.2. *Robustness and falsification tests*

Though the results above are largely supportive of our hypotheses, we further investigate the robustness of our results to alternative parameterizations of the spatial weights matrix and conduct falsification tests to assess other threats to the validity of our findings.

First, one possible concern is that these results may be sensitive to measuring network ties as the number of shared consultants on whom both candidates spent at least $25,000 in a given election cycle. As a robustness check, we re-estimate the models for risk-taking and issue-ownership among non-incumbents and candidates in unfavorable districts (specifically: the first and third columns of Tables 3 and 4) in the Supporting Information (SI) using

[21]The differences in results that we observe by incumbency status above do not appear to be the result of differences in shared consultant usage. While incumbents are unsurprisingly more likely to employ a consultant than non-incumbents (90% versus 51%, respectively), the proportion of candidates who have one more consultants and share consultants with other candidates is virtually identical (89% versus 92%).

two alternative parameterizations of the spatial weight matrix $\mathbf{W}$: the log product of joint expenditures on a consultant (which avoids the use of a threshold value indicating the presence of a candidate-consultant tie) and binary edge weights indicating that both candidates spent any funds at all or more on one or more of the same consultants (these weights are then row-standardized in both cases; see SI for further details).

The results are largely consistent with the findings above: both the risk-taking and issue ownership measures are significantly associated among candidates when we operationalize shared consultant ties using the log product of joint consultant expenditures or a binary indicator for having at least one shared consultant who received any payment from both candidates ($p < .10$ and $p < .01$, respectively). However, the results for risk-taking among non-incumbents, while only somewhat diminished in the magnitude (i.e., the estimated value of the spatial autocorrelation coefficient ρ), show that accounting for shared consultants using either alternate spatial weight specification does not significantly improve model fit in likelihood ratio tests ($p < .24$ in both cases). Given their greater sensitivity to our modeling choices above, these results should be interpreted with more caution.[22]

One additional concern is that the spatial autocorrelations reported above may be spurious due to an unobserved candidate characteristic that is correlated with consultant selection. It is possible, for instance, that two similar candidates may be more likely to run similar campaigns *and* to hire the same consultants, which could induce a spurious correlation between shared consultant usage and campaign strategy similarity. We therefore conducted an extensive series of falsification tests described in the Supplementary Information in which we divided the data into groups of similar candidates and randomly shuffled consultant ties amongst candidates within those groups. The three partitions were candidate type (e.g., Republicans contesting open seats in 2002), district type (e.g., Democrats in the least favorable

[22]The Supporting Information also contains results for two narrower campaign strategy measures from Druckman, Kifer and Parkin (2009): number of positions taken and use of negativity. The results for these measures are broadly consistent with those above (i.e., positive spatial autocorrelations) but the statistical significance varies across the various spatial weight specifications. Given that these results are less robust and the strategy measures are more limited, we do not discuss them further.

third of districts in 2004), and region (e.g., a Republican candidate in the Northeast in 2006). If we observe comparable levels of spatial autocorrelation in candidate strategy using these permuted consultant ties, it would suggest that our results are the spurious result of clustering in consultant selection among similar candidates. By contrast, a lack of significant spatial autocorrelation would increase our confidence in the results we report above.

Reassuringly, we find that observed LR statistic for risk-taking is greater than 95% of simulated LR statistics generated using the candidate and district type permutations and 97% of those from the region permutations. Similarly, the observed LR statistic from Table 2 exceeds 96% of the LR statistics from the candidate type permutations and 99% of those from the district type and region permutations. These findings suggest that our results are not the result of spurious clustering in consultant selection among similar candidates.

6. CONCLUSION

Traditional analyses interpret modern American political campaigns as "candidate-centered," neglecting the many party actors and institutions that connect co-partisans and transmit information and learning across electoral districts. In this paper, we deviate from this approach and instead explore how the activities of campaigns diffuse across districts via the extended party networks of the contemporary era. In particular, professional political consultants often serve as brokers, bridging informational gaps between campaigns and bringing ideas and approaches to new settings. While some agency loss is likely in any principal-agent relationship (Walton and Walter 2009; Martin and Peskowitz N.d.), consultants have strong reputational and financial incentives to win elections, which is also the principal goal of the party organizations. At the aggregate level, their work helps parties respond to changing electoral circumstances and diffuse campaign strategy in a decentralized manner, which should contribute to a more unified party image and communication strategy.

To test this theory, we assemble the most comprehensive dataset of consultant-candidate

relationships constructed to date and provide substantial evidence that Congressional candidates who share consultants are more likely to use similar strategies than we would otherwise expect conditional on a series of covariates. These results, which largely withstand numerous robustness and falsification tests, provide the first quantitative evidence that consultants play an important role in diffusing general campaign strategies between campaigns, especially for candidates who are likely to face longer odds in their campaigns and are more open to influence by their consultants — non-incumbents and candidates in unfavorable districts.

Before concluding, it is important to note the limitations of the present study. First, available measures of campaign strategy that do not suffer from severe selection bias are noisy and infrequently measured. Second, we cannot fully rule out the possibility that candidates adopt similar strategies in part due to party influence in the consultant selection process. Unfortunately, there is no way to directly observe which consultants are recommended to candidates by parties or measure which are most closely aligned with party campaign committees. Future research should consider alternative measures of campaign activity and investigate the party role in the consultant selection process and develop new approaches to estimating its independent effects on campaign strategy.[23] Finally, it is difficult to entirely rule out the possibility that candidates are selecting consulting firms based on the strategies they advocate. The robustness and falsification tests presented above increase our confidence that the spatial autocorrelations we find are not spurious, but candidates may select firms partly as a result of the strategies that firms typically advocate (or vice versa). Future research should investigate this relationship further and test the robustness of the relationship that we find.

Despite these limitations, we believe this research provides a new view of consultants as playing a crucial role in linking Congressional candidates and campaigns within the parties. While the normative consequences of this shift can be debated, the importance of consul-

[23] One approach to measuring party/consultant ties would be to use payments from parties directly to specific firms (Kolodny and Dulio 2003; Magleby 2010; Cain 2013). However, direct financial payments for party-related activities are not necessarily meaningful indicators of the degree to which specific consultants may be recommended to campaigns. Legal prohibitions against candidate-party coordination may encourage parties to avoid forming formal ties with some favored consulting firms.

tants to contemporary campaigns and parties can no longer be ignored. Indeed, these results suggest several paths forward for future research. First, we should analyze the dynamic evolution of the consultant-candidate network over time (Nyhan and Montgomery N.d., e.g.,). With more fine-grained data, it should be possible to track the spread of new campaign innovations through the campaign-consultant network both within and between campaign cycles. A second extension should build on Walton and Walter (2009) and Martin and Peskowitz (N.d.) and investigate the extent of the agency loss parties experience in relying on consultants to set campaign strategy. In some cases, consultants may disseminate strategies that harm the party's interests or prioritize profits over client or party interests, but the extent of this problem is not clear. Finally, our findings contribute to the development of social network and diffusion research in political science. Rather than simply providing a descriptive account of a network or characterizing a general pattern of diffusion, we test theoretical hypotheses about consultant-driven strategic diffusion among Congressional campaigns using network data and conduct falsification tests to address concerns about spurious relationships. This approach could be extended to examine other types of consultants (e.g., donors and fundraising consultants; see Cain 2012*a*) as well as other non-party actors who link contemporary campaigns or elected officials.

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SUPPORTING INFORMATION

This Supporting Information (SI) first provides additional details on the process by which we identified payments to consulting firms from FEC records. It then presents results of spatial autoregressive models of candidate strategy using alternative parameterizations of the edge weights between candidates as well as alternate measures of campaign strategy. Finally, we present technical details on the falsification tests summarized in the main text.

CONSULTANT-CANDIDATE DATA

Our goal was to find direct payments from campaigns to consultants and consulting firms recorded in the expenditure data provided by House campaigns to the Federal Election Commission (FEC) and made available in an accessible format by the Center for Responsive Politics (2012*a*; 2012*b*; 2012*c*).[1]

CRP did not report expenditures for 70 campaigns in the DKP sample that spent less than $50,000 (further details available upon request). Broadly speaking, these were symbolic candidates that did not wage competitive campaigns. For instance, there were 227 total campaigns in the sample in the 2006 cycle. Of those, 28 were not included in the Open Secrets expenditure data. The relevant candidates and their overall spending totals (as reported by Opensecrets.org) are reported in Table SI-1. As can be seen, most of these campaigns spent only enough money to run a minimal campaign, including nine who spent so little that they did not file a FEC report.

Given their extremely low levels of spending, it is very unlikely that these campaigns contracted with a professional consulting firm (let alone one that had another client in our data). However, as a further check, we examined the *Campaigns & Elections* scorecards for each cycle (see below). No campaign excluded from the Open Secrets dataset was listed as having worked with any firm on the scorecard. As a result of these additional checks, we feel safe in assuming that these campaigns had no relationships with the firms in our list.

The combined set of available Open Secrets expenditure files for the campaigns in the DKP sample consisted of 4,410,732 reported expenditures. Our procedure for identifying relevant expenditures from this universe is described below.

1. We first eliminated all expenditures that were obviously not payments to consulting firms. These included, for instance, contributions to candidates, political action committees, and party committees; expenditures clearly labeled with irrelevant terms such as "auto fuel"; and payments made to recognizable firms not on the consulting list such as Verizon. The complete library of search terms used to eliminate these expenditures will be archived online with our replication files at the time of this article's publication. This step left us with 106,653 expenditures by campaigns in our sample.

2. Payments to consulting firms are not clearly labeled in the FEC data and campaigns are inconsistent in how they list recipients of outgoing payments. Firm names are duplicated both within the consulting sector and across areas of business operations

[1] See also Martin and Peskowitz (N.d.), who use FEC data to analyze the political consulting market.

Table SI-1: House campaigns in 2006 DKP sample with missing expenditure data

Candidate Name	State	District	Spending Amount
Robert Belin	Illinois	2	No report filed
David Bertelsen	Missouri	3	$7,578
Laurence Scott D'Amboise	Maine	2	$18,526
Robert Denison	Michigan	10	$14,077
Michael Ray Ellisor	South Carolina	2	No report filed
Bill Glass	North Carolina	9	$7,692
Bob Harms	Florida	4	$42,727
Richard Noah Hough	Hawaii	1	$16,551
Charles Hutchinson	Illinois	7	No report filed
Chuck James	Alabama	2	$5,117
David Nelson Jones	California	30	$21,825
Tom Kovach	Tennessee	5	No report filed
Darcy Linn	California	10	$6,716
Scott MacLean	Connecticut	1	No report filed
Rich Mancuso	Colorado	2	$14,498
Jimmy Mathis	Maryland	2	$8,448
Garth McGinn	Kansas	4	$25,612
Anne Melichar	Illinois	4	No report filed
Gary R. Page	Texas	24	$10,135
Greg Pierce	Alabama	3	$7,674
Patrick Pillion	Georgia	11	$3,318
Jim Rinck	Michigan	3	$20,632
Jonathan Scott	Rhode Island	1	$9,542
Hal Spake	Oklahoma	4	$31,091
Jeff Stein	Maryland	8	$28,013
Lindsey String	Ohio	11	No report filed
Viola Thomas-Hughes	New Jersey	2	$26,903
Jack Truman	Missouri	7	No report filed
Joseph Vollano	Connecticut	3	No report filed

Candidates missing from the Open Secrets expenditure data spent very small amounts of money and are unlikely to have hired a national consulting firm (total spending data from Opensecrets.org).

(e.g., "Advantage, Inc."). Campaigns regularly report expenditures using vague descriptions, incorrect names, or both. Consulting firms may be identified by the name of the firm, the name of the primary consultant, some combination of these, or neither. Further, examining the data shows that expenditures described using the term "consult" (or some variant) *could* indicate actual political consulting but may also indicate meetings with a law firm, IT support, and much more. For instance, Mitt Romney's campaign for the 2008 Republican presidential nomination described expenditures for candidate makeup as "communications consulting" (Vogel 2007).

Given these difficulties, it was not possible to code the remaining 106,653 records by hand and accurately identify all expenditures to consulting firms. Instead, we use scorecards published between 1990 and 2009 cycles in the industry trade magazine *Campaigns & Elections* (henceforth *C&E*) as well as a 2008 compendium in the insider publication *The Hotline* to create a list of consulting firms we could search for in the remaining records.[2] *C&E* allows each consulting firm to identify the kinds of consulting services they provide, which enables us to cast a wide net for potentially influential consulting relationships (many firms provide multiple descriptors for the services they provide).

Our focus is on consultants that might plausibly play a role in developing broad messaging strategies and campaign themes (Medvic 2001*b*, 49-51). We therefore restrict our analysis to firms who self-identified as providing general, media, and/or polling consulting using the following coding scheme to classify firms:

- General consulting: "advisory," "campaign management," "campaign management and strategy," "consulting," "full service campaign firm," "general," "general consulting," "general strategy," "government affairs," "issue advocacy," "political," "political campaign management," "strategic," "strategic and organizational planning," "strategic planning"
- Media consulting: "advertising," "media," "media buying," "media relations," "media strategy and buying," "radio," "Spanish language media," "television," "television and radio advertising"
- Polling consulting: "polling"

In using this approach, we sought to cast as broad a net as possible in searching for qualifying expenditures in the FEC data while maintaining our focus on consulting firms that were most likely to influence the general campaign strategies we measure. All firms that provided general, media, or polling consulting services to *any* candidate in *any* cycle in the 1990–2009 period were included by this procedure (*C&E* does not specify which services were provided to specific campaigns). For instance, if the firm was listed as "Direct mail" in 2002 but also "General" in 1994, the firm was coded as "General" under our scheme. Thus, only firms that *never* identified themselves as being involved in general, media, or polling consulting over the entire 1990–2009 time period were excluded. These excluded firms can be thought of as carrying out

[2]Martin and Peskowitz (N.d.) employ a similar approach.

campaign strategies or delivering pre-determined messages. They were typically specialists in discrete functions such as fundraising, research, or list vendors. (Alternative approaches to identifying categories of relevant consultants are possible — see, e.g., Herrnson 1992; Medvic and Lenart 1997.)

Finally, we developed a library of 1,101 terms that were used to identify payments in the larger dataset that may pertain to a firm on our list. For instance, the firm Anzalone-Liszt Research provided the keywords "anzalone" and "liszt." All payments made to any recipient whose name included those terms was flagged for further investigation. This processing step narrowed the data to a list of 47,441 expenditures.

3. Trained undergraduate research assistants coded for matches to our list of strategy, media, and polling firms generated from the *C&E* scorecards. Coders were also instructed to indicate ambiguous expenditures (e.g., payments to Michael Fraioli, the founder of Fraioli & Associates). The two coders reached identical conclusions for 98% of expenditures. A few disagreements concerned ratings of expenditures as ambiguous or not; only 1.9% of cases were true disagreements. We arbitrated between coders in these cases, generating a set of 7,716 potential payments to consulting firms on our list.

4. We generated a list of all payment recipients from these data corresponding to our master list of firms that provided general, media, or polling consulting services during the 1990–2009 period or to individuals clearly listed as employed by those firms.[3] In ambiguous cases, we cross-checked payment recipients against the *C&E Political Pages*, an annual directory of consulting firms and consultants published in the magazine, for the 2002, 2004, and 2006 election cycles. The result of this process was a list of 7,526 campaign-consultant payments totaling more than $168 million between 1,194 unique campaign-consultant dyads in our sample. Finally, we sum these payments by campaign-consultant dyad to create a total expenditure value for the cycle.

5. As a final check, we compared this list of candidate-consultant relationships in the FEC records with those reported in the scorecards published at the end of each cycle in *Campaigns & Elections*. The *C&E* scorecards, which are typically a combination of self-reports by consulting firms and research by the magazine's staff, are perhaps the most comprehensive alternative source by which we can validate our data. *C&E* scorecards have been used as a source of data on candidate-consultant relationships in numerous published studies (Medvic and Lenart 1997; Medvic 1998, 2001*a*,*b*; Grossman and Dominguez 2009; Cain 2011).

   Table SI-2 shows the results of the comparison between FEC records and the *C&E* scorecards. We recover 86% (392) of the 455 candidate-consultant ties reported in *C&E* as well as 802 additional ties not disclosed in the magazine. In other words, roughly three times as many campaign-consultant relationships can be located in FEC records than *C&E*—a level of omission that may reflect consulting firms selectively

[3] During this process, we eliminated alternative spellings of firm names as well as additional expenditures to firms that did not provide general, media, or polling consulting.

reporting from their list of clients. In addition, further research suggests that the relationships reported in *C&E* that were not also in the FEC records are false positives. Payments from these campaigns to the listed firms could not be found in the full FEC expenditures dataset. We therefore exclude dyads from *C&E* that could not be verified in the FEC data from our study.

Table SI-2: A comparison of FEC and *Campaigns & Elections* consultant data

	Reported in *C&E*	Not reported in *C&E*	Total
Found in FEC data	392	802	1194
Not found in FEC	63	–	63
Total	455	802	1257

ADDITIONAL RESULTS

In the main text, we measure network ties using the number of shared consultants—specifically, how many consulting firms received $25,000 or more from both candidates according to Federal Election Commission expenditure records. Here, however, Tables SI-3 and SI-4 present results for the risk-taking and issue ownership measures of campaign strategy analyzed in the main text using two alternative edge weight specifications—the log product of shared consultant expenditures and a binary indicator for having at least one consulting firm that received any payment from both candidates (both are then row-standardized). Finally, Table SI-5 presents results for spatial autoregressive models of two alternate measures of campaign strategy from Druckman, Kifer and Parkin (2009). In all cases, the spatial weight matrices were row-standardized.

Log product of shared expenditures

We represent the two-mode network of $i = 1, \ldots, n$ candidates and $j = 1, \ldots, m$ consultants as an $n \times m$ adjacency matrix $\mathbf{A}$ where the edge weights are measured as the log of a candidate's expenditures e on a consulting firm in a given election cycle. The edge weight between candidate i and consultant j is represented in the adjacency matrix $\mathbf{A}$ as

$$\mathbf{A_{i,j}} = \begin{cases} \log(e_{i,j}) & \text{if } e_{i,j} > 0 \\ 0 & \text{if } e_{i,j} = 0. \end{cases} \tag{1}$$

To convert this two-mode network into a one-mode network of candidates linked by consultant edges, we post-multiply the adjacency matrix $\mathbf{A}$ by its transpose ($\mathbf{AA^T}$), which generates a one-mode $n \times n$ candidate adjacency matrix $\mathbf{W}$. In the projected candidate network $\mathbf{W}$, the edge weight between candidate c and candidate d is the log product of their

expenditures e on shared consultants among the set of consultants $j = 1, \ldots, s$:

$$\mathbf{W_{c,d}} = \sum_{j=1}^{s} \log(e_{c,j}) \times \log(e_{d,j}) \tag{2}$$

where $e_{c,j}$ represents spending by candidate c on firm j. The edge weights in the projected matrix thus represent the extent to which candidates spent heavily on the same consultants.

Binary ties (one or more shared consultants)

This spatial weight matrix is a binary measure indicating simply whether or not any pair of campaigns share a consulting firm. To convert the two-mode adjacency matrix described in equation 3 in the main text into a one-mode network of candidates linked by consultant edges, we post-multiply the adjacency matrix $\mathbf{A}$ by its transpose ($\mathbf{AA^T}$), which generates a one-mode $n \times n$ candidate adjacency matrix $\mathbf{W}$. In the projected candidate network $\mathbf{W}$, we then test whether there exists at least one consultant among all consultants $j = 1, \ldots, s$ on whom candidates c and d both spent \$1 or more in a given election cycle:

$$\mathbf{W_{c,d}} = \max_{s} \Big(\mathrm{I}(e_{c,j} \geq \$1) \times \mathrm{I}(e_{d,j} \geq \$1) \Big) \tag{3}$$

Alternate campaign strategy measures

In Table SI-5, we present results using all three adjacency matrix specifications for two additional measures of campaign strategy coded from campaign websites (Druckman, Kifer and Parkin 2009, 349):

- Number of positions (0–4): "the number of unambiguous issue positions (where a counter position is easily identified) offered by the candidate on the front page or issues part of the site"
- Negativity (0–1): "a dichotomous variable indicating whether a candidate included material on the site that was negative or critical of his or her opponent (in tone or explicitly)"

The negativity measure is binary so the spatial autoregressive model we use to maintain comparability with the other models reported above is technically a linear probability model.

FALSIFICATION TESTS

To implement these tests, we create three separate partitions of similar candidates using measures available for all observations. The first partition, which we call *candidate type*, separately divides all the candidates by party, year, and race type (e.g., Republicans contesting open seats in 2002). The second partition groups the candidates by *district type*, dividing them by tercile of district presidential vote, party, and year (e.g., Democrats in the least favorable third of districts in 2004). Finally, the third partition divides the candidates by *region* as well as party and year (e.g., Republican candidates in the Northeast in 2006).

Table SI-3: Autoregressive models of risk-taking (alternative adjacency matrices)

	Logged dollars		Binary ties	
	Non-incumbent	Unfav. dist.	Non-incumbent	Unfav. dist.
Intercept	1.082	-1.215	1.083	-1.219
	(0.420)	(0.447)	(0.420)	(0.446)
2004	0.457	0.505	0.456	0.503
	(0.262)	(0.266)	(0.262)	(0.266)
2006	0.675	0.685	0.675	0.683
	(0.251)	(0.257)	(0.251)	(0.257)
Democrat	1.183	1.288	1.182	1.286
	(0.207)	(0.219)	(0.207)	(0.219)
Open seat		2.222		2.224
		(0.345)		(0.345)
Challenger	0.986	2.678	0.986	2.681
	(0.249)	(0.256)	(0.249)	(0.256)
District favorability: 2nd quartile	0.208	0.043	0.208	0.044
	(0.223)	(0.199)	(0.223)	(0.199)
District favorability: 3rd quartile	-0.001		-0.002	
	(0.279)		(0.279)	
District favorability: 4th quartile	-0.458		-0.458	
	(0.404)		(0.404)	
Mid-Atlantic	0.060	0.423	0.060	0.425
	(0.454)	(0.443)	(0.454)	(0.443)
Midwest	0.681	1.177	0.681	1.179
	(0.412)	(0.425)	(0.412)	(0.425)
Plains	0.704	0.818	0.703	0.820
	(0.456)	(0.483)	(0.455)	(0.483)
South	0.225	0.987	0.226	0.989
	(0.401)	(0.422)	(0.401)	(0.422)
Border	0.281	0.761	0.281	0.763
	(0.429)	(0.455)	(0.429)	(0.455)
Mountain West	0.677	1.176	0.676	1.174
	(0.434)	(0.456)	(0.434)	(0.456)
West	0.452	1.175	0.451	1.175
	(0.503)	(0.484)	(0.503)	(0.484)
Spatial autocorrelation				
ρ	0.062	0.105	0.063	0.107
	(0.053)	(0.059)	(0.053)	(0.059)
Nested model test				
LR statistics	1.424	3.434	1.441	3.547
p-value	0.233	0.064	0.230	0.060
N	286	271	286	271

Models predict the Druckman, Kifer and Parkin (2009) campaign strategy measure of risk-taking among 2002–2006 House of Representatives general election candidates in their sample with no missing data on covariates. Edge weights represent either the log product of expenditures to shared consulting firms or whether the candidates both paid $1 or more to the same consulting firm according to Federal Election Commission records; the resulting adjacency matrix is then row-standardized in either case. Favorable districts are defined as those where the presidential nominee of the candidate's party received 51% of the vote or more (the median value in the data); unfavorable districts are those in which the presidential nominee of the candidate's party received less than 51% of the vote. Indicators for district favorability represent quartiles for the party presidential vote by district (see footnote 14 in the main text for details). Estimated using the `lagsarlm` function in the `spdep` package for R.

Table SI-4: Autoregressive models of issue ownership (alternative adjacency matrices)

	Logged dollars		Binary ties	
	Non-incumbent	Unfav. dist.	Non-incumbent	Unfav. dist.
(Intercept)	-8.255	-8.769	-8.262	-8.754
	(1.907)	(1.977)	(1.906)	(1.975)
2004	-1.108	-0.559	-1.102	-0.560
	(1.066)	(1.100)	(1.065)	(1.099)
2006	-0.837	-0.325	-0.832	-0.324
	(1.016)	(1.058)	(1.016)	(1.057)
Democrat	9.880	10.313	9.862	10.293
	(0.934)	(1.001)	(0.934)	(1.001)
Open seat		1.162		1.150
		(1.437)		(1.435)
Challenger	1.310	1.744	1.316	1.730
	(1.007)	(1.032)	(1.006)	(1.031)
District favorability: 2nd quartile	0.918	0.607	0.917	0.595
	(0.902)	(0.824)	(0.902)	(0.823)
District favorability: 3rd quartile	2.295		2.290	
	(1.113)		(1.112)	
District favorability: 4th quartile	0.078		0.085	
	(1.614)		(1.613)	
Mid-Atlantic	-1.008	-0.424	-1.006	-0.412
	(1.850)	(1.839)	(1.849)	(1.837)
Midwest	2.097	2.017	2.107	2.021
	(1.691)	(1.774)	(1.690)	(1.772)
Plains	2.229	4.028	2.235	4.000
	(1.874)	(2.007)	(1.873)	(2.005)
South	0.839	1.220	0.857	1.223
	(1.643)	(1.752)	(1.642)	(1.751)
Border	2.477	1.745	2.498	1.759
	(1.749)	(1.891)	(1.748)	(1.888)
Mountain West	1.774	0.852	1.790	0.852
	(1.767)	(1.877)	(1.766)	(1.874)
West	-2.250	-0.829	-2.236	-0.815
	(2.051)	(2.005)	(2.050)	(2.003)
Issue salience	11.225	9.279	11.214	9.297
	(2.658)	(2.595)	(2.657)	(2.593)
Spatial autocorrelation				
ρ	0.308	0.320	0.311	0.324
	(0.067)	(0.066)	(0.067)	(0.066)
Nested model test				
LR statistic	21.762	22.448	22.104	22.973
p-value	0.000	0.000	0.000	0.000
N	286	271	286	271

Models predict the Druckman, Kifer and Parkin (2009) campaign strategy measure of issue ownership among 2002–2006 House of Representatives general election candidates in their sample with no missing data on covariates. Edge weights represent either the log product of expenditures to shared consulting firms or whether the candidates both paid $1 or more to the same consulting firm according to Federal Election Commission records; the resulting adjacency matrix is then row-standardized in either case. Favorable districts are defined as those where the presidential nominee of the candidate's party received 51% of the vote or more (the median value in the data); unfavorable districts are those in which the presidential nominee of the candidate's party received less than 51% of the vote. Indicators for district favorability represent quartiles for the party presidential vote by district (see footnote 14 in the main text for details). Estimated using the `lagsarlm` function in the `spdep` package for R.

Table SI-5: Autoregressive models of position-taking/negativity (all adjacency matrices)

	Number of positions			Negativity		
	Shared	Logged	Binary	Shared	Logged	Binary
(Intercept)	1.122	1.068	1.069	0.157	0.159	0.160
	(0.205)	(0.208)	(0.208)	(0.089)	(0.089)	(0.089)
2004	0.017	0.016	0.016	0.112	0.114	0.115
	(0.112)	(0.112)	(0.112)	(0.049)	(0.050)	(0.050)
2006	0.142	0.141	0.141	0.195	0.205	0.207
	(0.109)	(0.109)	(0.109)	(0.048)	(0.049)	(0.)049
Democrat	0.082	0.083	0.083	0.015	0.018	0.019
	(0.082)	(0.082)	(0.082)	(0.036)	(0.036)	(0.036)
Open seat	0.533	0.530	0.530	0.260	0.262	0.263
	(0.138)	(0.138)	(0.138)	(0.060)	(0.060)	(0.060)
Challenger	0.443	0.464	0.463	0.446	0.439	0.438
	(0.107)	(0.107)	(0.107)	(0.046)	(0.046)	(0.046)
District favorability: 2nd quartile	0.046	0.033	0.033	-0.002	0.002	0.003
	(0.117)	(0.117)	(0.117)	(0.051)	(0.051)	(0.051)
District favorability: 3rd quartile	0.211	0.191	0.192	-0.165	-0.157	-0.156
	(0.129)	(0.129)	(0.129)	(0.056)	(0.056)	(0.056)
District favorability: 4th quartile	0.060	0.049	0.049	-0.195	-0.198	-0.197
	(0.142)	(0.142)	(0.142)	(0.062)	(0.062)	(0.062)
Mid-Atlantic	0.323	0.338	0.338	-0.019	-0.017	-0.018
	(0.188)	(0.188)	(0.188)	(0.082)	(0.083)	(0.083)
Midwest	0.156	0.162	0.162	-0.002	-0.003	-0.004
	(0.176)	(0.176)	(0.176)	(0.077)	(0.078)	(0.078)
Plains	0.458	0.452	0.452	0.022	0.021	0.021
	(0.201)	(0.200)	(0.200)	(0.088)	(0.088)	(0.088)
South	0.194	0.208	0.208	-0.046	-0.047	-0.048
	(0.169)	(0.168)	(0.168)	(0.074)	(0.074)	(0.074)
Border	0.178	0.179	0.179	0.030	0.033	0.032
	(0.187)	(0.187)	(0.187)	(0.082)	(0.082)	(0.082)
Mountain West	0.358	0.353	0.354	0.033	0.040	0.040
	(0.182)	(0.182)	(0.182)	(0.080)	(0.080)	(0.080)
West	0.295	0.291	0.291	-0.019	-0.028	-0.028
	(0.212)	(0.212)	(0.212)	(0.093)	(0.093)	(0.093)
Spatial autocorrelation						
ρ	0.044	0.076	0.075	0.118	0.056	0.049
	(0.041)	(0.043)	(0.043)	(0.058)	(0.063)	(0.063)
Nested model test						
LR statistic	1.209	3.155	3.062	4.542	0.867	0.663
p-value	0.272	0.076	0.080	0.033	0.352	0.415
N	545	545	545	541	541	541

Models predict the Druckman, Kifer and Parkin (2009) campaign strategy measures of number of positions taken and negativity among 2002–2006 House of Representatives general election candidates in their sample with no missing data on covariates. Edge weights represent either the number of consulting firms that received $25,000 or more from both candidates according to Federal Election Commission records; the log product of expenditures to shared consulting firms; or whether the candidates both paid $1 or more to the same consulting firm. In all cases, the resulting adjacency matrix is then row-standardized. Indicators for district favorability represent quartiles for the party presidential vote by district (the least favorable quartile is the omitted category; see footnote 14 for details). Estimated using the `lagsarlm` function in the `spdep` package for R.

We then randomly permute the consultant ties for candidates within each partition, creating 500 permuted sets of consultant ties.[4]

Table SI-6: Illustration of falsification test procedure

Actual data

	Murphy	Axelrod	Harrison	Kiley	...
Stephanie Herseth 2002	1	0	0	0	
Bob Etheridge 2002	1	0	0	0	
Rahm Emanuel 2002	0	1	0	0	
Patrick Kennedy 2002	0	1	1	1	
⋮					

Randomly permuted data

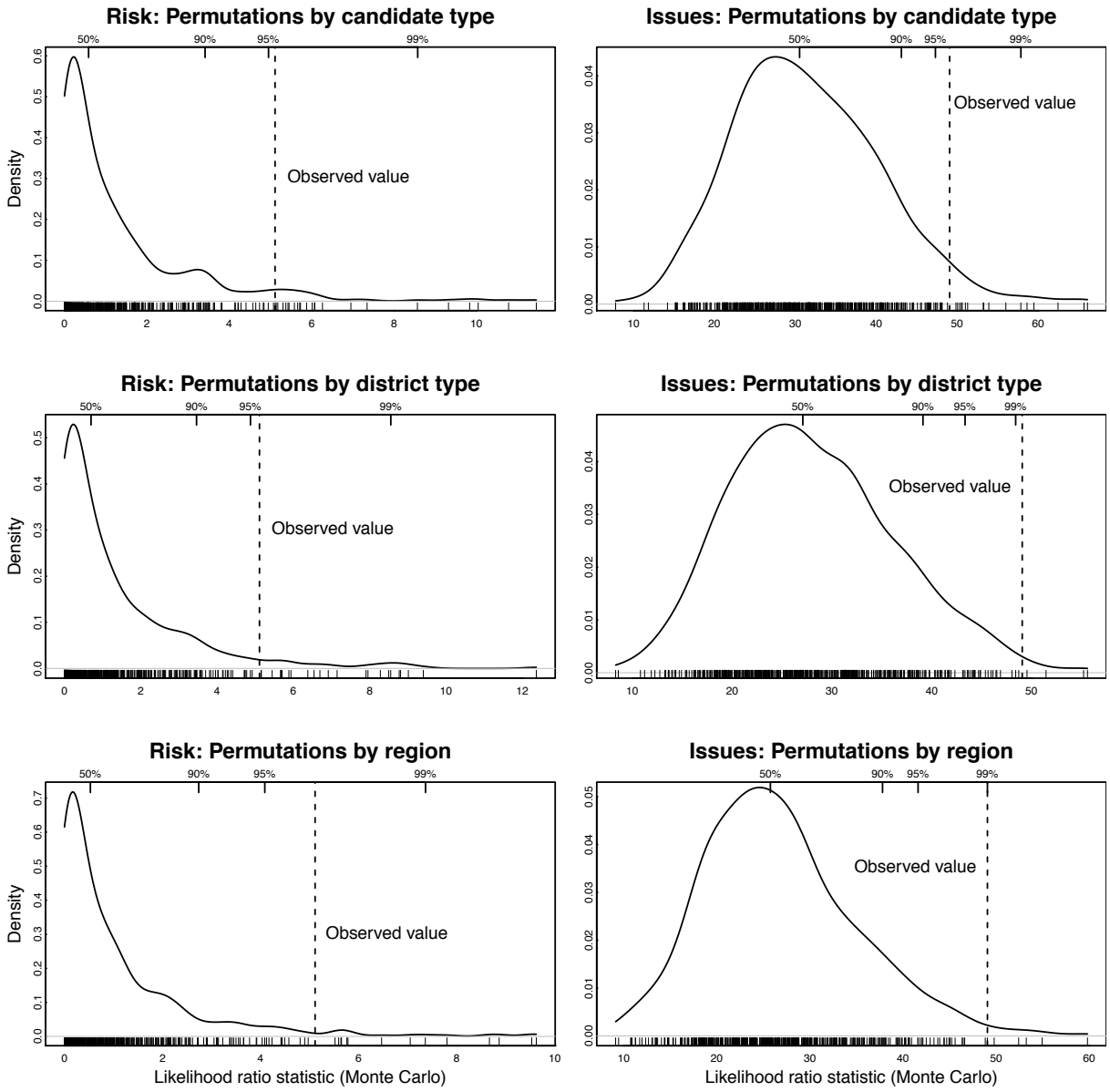
	Murphy	Axelrod	Harrison	Kiley	...
Stephanie Herseth 2002	0	1	1	1	
Bob Etheridge 2002	0	1	0	0	
Rahm Emanuel 2002	1	0	0	0	
Patrick Kennedy 2002	1	0	0	0	
⋮					

Table SI-6 provides an example of how this process works using a group of four Democratic incumbents from 2002 and a subset of the consultants they used in the cycle (Murphy Putnam Media, Axelrod & Associates, Harrison & Goldberg, and Kiley & Company). In the example, the firms contracted by Bob Etheridge and Rahm Emanuel (highlighted in bold) are hypothetically switched, as are the consultants used by Stephanie Herseth and Patrick Kennedy (who are indicated by italics).

After randomly permuting consultant ties among similar candidates in this way, we recalculate our spatial weight matrix **W** and refit the models reported in the first and third columns of Table 2 for each of 500 randomly permuted adjacency matrices. The likelihood ratio statistics from these falsification tests, which are summarized in Figure SI-3, offer little indication that our results are spurious. As noted in the main text, the observed likelihood ratio statistic exceeds 95% or more of the simulated values for each partition of the data on both dependent variables, suggesting that our results are not driven by clustering in consultant selection among structurally similar candidates.

[4]More precisely, we permute the candidate-consultant adjacency matrix, shuffling the vectors representing consultant ties within each group of similar candidates.

Figure SI-3: Falsification test results



The figures show the distribution of estimated likelihood ratio statistics as estimated using random permutation of the observed adjacency matrix. The vertical dashed lines show the observed LR statistic as estimated in the first and third columns of 2. Note that the observed value is larger than nearly all of the estimates generated using the random permutations, indicating a reduced risk that our results reflect a spurious relationship.