The social control of political participation:
Conflict and contagion as processes (de)mobilizing voting

David Lazer, Northeastern University

Katya Ognyanova, Northeastern University

William Minozzi, The Ohio State University

Michael Neblo, The Ohio State University

Abstract

This study examines the impact of political discussants on individual electoral behavior in young adults. Previous research has identified two main mechanisms through which social ties exert influence on voting decisions: *contagion* and *conflict.* Contagion studies examine the spread of political behaviors through social networks. According to that literature, individuals are more likely to vote when a large proportion of their social ties demonstrate an observable intent of voting. Conflict frameworks suggest that exposure to diverse or opposing views may reduce levels of engagement. Cross-pressure from social ties is expected to make individuals less likely to go to the polling station.

Here, we examine contagion and conflict-based predictors of voting using full-network data from fourteen sites for four election years (2008, 2010, 2012, and 2014). Our results suggest that contagion is taking place, and is especially strong for more prominent presidential elections. We find no evidence that conflict with or within one's social network suppresses participation.

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Social structure has a known impact on electoral behavior. Our political choices are largely dependent on our connections, interactions, and affiliations. Family members, friends, colleagues, and neighbors share information with us, encourage us to go to the polls, and influence our candidate preferences (Nickerson, 2008). Online experiments find effects of mobilization efforts that spread beyond the treated individuals to their social ties (Bond et al., 2012). The effects are further enhanced by network cues signaling to people that their friends have already cast their ballot.

What is the social logic behind the act of voting? There have been two hypothesized mechanisms explaining the interdependence of voting among connected individuals. The first is *contagion*: where the act of voting by an individual's friends increases the probability that the individual will vote. The second is *conflict*: where the exposure of an individual to conflicting political preferences among their friends reduces the probability that the individual will vote.

In this paper we analyze whole-network data collected during four election years (2008, 2010, 2012, and 2014) from 14 college dormitories. We examine contagion and conflict, both separately and simultaneously, and evaluate them as potential predictors of political participation. The results of our analyses suggest that contagion is the dominant social logic that determines whether people will vote. Contagion patterns are especially prominent during the more visible and widely discussed presidential elections. We find no support for the conflict hypothesis. Our models show no evidence that disagreement in networks lowers political participation.

Contagion and conflict as drivers of political participation

Contagion

The logic of contagion is one that has a long standing tradition in the study of human behavior, including political actions and preferences (Katz & Lazarsfeld, 1955). In recent years political contagion has been examined by Fowler (2005), Nickerson (2008), Rolfe (2012), and Bond et al. (2012), among others.

The metaphor of social contagion suggests that behavior spreads roughly like an infectious disease (Easley & Kleinberg, 2010; Valente, 2010). People have a higher probability of "contracting" a specific behavior when their friends behave the same way. Depending on structural and other characteristics, individuals have varying capacities to spread preferences and practices among their social ties (Aral & Walker, 2012; Contractor & DeChurch, 2014; Katz & Lazarsfeld, 1955).

In the context of political behavior, two major mechanisms drive the contagion process.

Normative: The first mechanism of influence is normative, where the act of voting (or, more plausibly, communicating the intent of voting) conveys to peers that voting is the appropriate and expected behavior. There are two pathways of normative influence. One goes through the internalization of the norms (I vote because I feel it is the right thing to do). The second is based on the possibility of sanctions (I vote because it would be embarrassing to admit to my peers that I did not vote). Thus, for example, in the field experiment by Gerber, Green, and Larimer (2008) the possibility that your voting behavior would be reported to your neighbors was associated with an increased probability of voting by the subject.

Resource-based: There are multiple types of relevant resources embedded in social networks. For example, political expertise of peers has been shown to be predictive of voting (McClurg, 2003). Logistical knowledge around voting of peers—how to register, where to vote, etc. – is also plausibly related to whether someone votes. Material resources are potentially relevant as well – having someone to carpool with to the polling station, for example, can make a difference.

Interestingly, with only a few exceptions, most of the literature does not parse the normative versus resource-based processes of social influence. For example, Nickerson (2008), while exemplary in demonstrating the existence of a contagion (in a causal sense) cannot identify the pathway of contagion.

Conflict

Mutz (2002, 2006) lays out an alternative model by which networks might influence electoral choices. In particular, Mutz finds that heterogeneous networks are associated with a reduced probability of voting. This is a finding that has particularly troubling normative

implications. It suggests that a society that facilitates collisions among different political perspectives will suffer reduced political participation—indeed, the subtitle of Mutz' book was "Deliberative *versus* Participatory Democracy."

Mutz proposed two alternative mechanisms to explain this relationship, the first revolving around social control, and the second around ambivalence.

Social Control: There is a long standing tradition in the network literature highlighting the informational benefits of bridging otherwise disconnected parts of the network (Burt, 2000; Granovetter, 1973). The dark side of bridging otherwise disconnected groups is that the bridging individual potentially needs to meet the normative standards of multiple groups (Simmel, 1955). Krackhardt (1999), in a paper evocatively titled "The Ties that Torture", provides a case study of an individual who was a bridging tie between groups of employees in a company, one of which supported unionization, and the other opposed, documenting the difficult—ultimately paralyzing— countervailing pressures this individual experienced.

Applied to voting, the assertion is that an individual who experiences cross-cutting pressures will seek not to antagonize either set of partisan friendships by simply not voting. Following this logic, under the conflict hypotheses a homogeneous social network could also suppress participation. That would happen when a person is placed in an antipartisan environment – one where their social ties are overwhelmingly and uniformly on the opposite side of the political spectrum.

While in the contagion model discussed earlier nonvoting is *potentially* counternormative, in the conflict model voting for the opposition (antipartisan) is counternormative. The key ambiguity here is the preference ordering an individual might have vis a vis their alters. In a contagion model, one might imagine an individual having the following preferences vis a vis their friends:

Voting for copartisan = Voting for antipartisan > Nonvoting.

Whereas in the conflict model, the hypothesized preference ordering is:

Voting for copartisan > Nonvoting > Voting for antipartisan.

The assumption of the normative contagion model is that (1) by not voting, an individual reinforces a norm of nonvoting, where the message to friends is that voting is counternormative,

or, more likely, that it is simply not important; and (2) by voting (and communicating intent thereof), an individual is expressing a strict preference for voting over nonvoting, with indifference between voting for copartisan and antipartisan.

The assumption of the conflict model is that individuals prefer that their alters not vote rather than vote for antipartisans. It is notable, however, that even in the conflict model, alter voting for copartisans is presumably preferred to nonvoting; that is, nonvoters in heterogeneous networks must be making all of their partisan friends a little unhappy. There are additional important but implicit assumptions made in this model (1) that it is better to make all of your partisan friends a little unhappy, than make some very happy and some very unhappy; and (2) that it is not possible to convey different information about yourself to different sets of friends.

There are of course various additional plausible permutations, some of which might have elements of contagion and control. For example, a preference ordering for alter behavior of:

Voting for copartisan > Voting for antipartisan > Nonvoting

would have some features of contagion and conflict. That is, you might apply more pressure to vote on friends with similar political preferences than different. If this were the typical scenario, we might expect voting to be highest among those individuals with friends who were politically active and had homogeneous political preferences, and lowest amongst those with politically heterogeneous, apathetic friends.

An additional puzzle vis a vis all of these models is that the mechanisms of social control are generally poorly explored. How often does ego actually *know* about its alters' political voting behavior? The possibility of sanctions/rewards only makes sense if ego knows how alter has behaved—in the contagion model, knowing that alter has voted, and in the conflict model the even higher burden of knowing how alter has voted. Manipulating the transparency of voting has been tested in field experiments exploring the contagion model (e.g. Bond et al., 2012; Gerber et al., 2008), but not the conflict model.

Ambivalence: The second process hypothesized to exist in the conflict model is intra-psychic. Individuals who have heterogeneous networks, in terms of partisan preferences, also get more varied information with respect to politics. Generally, such a structural position would be considered advantageous in terms of information access (Burt, 2000; Granovetter, 1973).

However, if probability of voting is in part a function of perceived relative "goodness" of candidates, an individual who received information on both sides might perceive a smaller difference in quality between the candidates and thus be less likely to vote.

Recent studies examining the conflict framework do not conclusively uphold its premises. Employing multiple conceptualizations of disagreement based on egocentric data, Klofstad, Sokhey, and McClurg (2013) find indications that conflict could negatively affect vote choice certainty and strength of partisanship. Their analysis, however, finds no evidence that exposure to disagreement affects voting in any way. Similarly, Pattie and Johnston (2009) report that in their models, network conflict has no impact on self-reported turnout – though it does have a small negative effect on actual turnout.

Summary: Conflict and/or contagion

The conflict and contagion models both have an internal and external locus of the proposed social influence on political participation, summarized in Figure 1.

< Insert figure 1 here>

Figure 2 summarizes the differential predictions of conflict and contagion models. In that figure, ego has four alters, all of which vote—which, according to the contagion model, should lead ego to vote. However, two of the alters have a Democratic vote preference, and two have a Republican vote preference, which, according to the conflict model, should immobilize ego.

< Insert figure 2 here>

A final observation: both contagion and conflict models might be valid. It might be, for example, that there is a marginal positive effect on probability of voting of alter voting; and also a marginal negative effect of having alters with heterogeneous partisan preferences. We thus present these not as competing models, but as alternative models, where one/both/neither might accurately capture the social dimensions of the decision to vote.

> ***Research Question 1 (Contagion)***: Does the voting of one's social ties positively predict individual voting probability?

> ***Research Question 2 (Conflict)***: Does exposure to social ties with diverse political preferences negatively predict the probability that an individual will vote?

Research design and methodological challenges

The methodological challenge

The core methodological challenge in studying the impact of network position on individuals is that the network structure is itself endogenous. If individuals who are in bridging positions in the network tend to be successful (Burt, 2000), are those individuals successful because of their network position, or might it be that capable people are more likely to find those positions in the network? If obese individuals are more likely to be friends (Christakis & Fowler, 2007), is that because they have influenced each other's eating and exercise habits, or are they friends because they live near each other, and their weight is affected by their shared environment? The earliest examinations of voting and social influence that achieved prominence within political science – breakage effects – disappeared under an onslaught of methodological critiques along these lines (Books & Prysby, 1988).

In this case, there are plausible alternative processes that might offer spurious inferences regarding the conflict and contagion models. For example, with the conflict model, it would be unsurprising that the politically disengaged might tend to have more politically heterogeneous networks – simply because for them politics was not a relevant criterion for creating friendships. Similarly, with the contagion model, it is plausible that political engagement affects the probability of friendship creation, which could in turn result in an apparent relationship between probability of voting for egos and alters.

There are several tools for parsing potential causal relationships in networks. The most compelling, in terms of causal inference, are field experiments, where either network structure, information dissemination given network structure, or node type are manipulated. Roommate studies would be an example of the first, where pretest data on roommates has been used to examine social influence on post exposure outcomes (Sacerdote, 2001). Sociotechnical systems make it easier to manipulate whether information regarding alters is made transparent – e.g., the Bond et al. (2012) experiment on Facebook and voting. And Nickerson (2008) is an example of a field experiment where get out the vote pitches were provided to one member of two-voter households. The turnout for the second person in the household was observed to increase substantially, relative to alters in the placebo condition. These approaches present the gold

standard in terms of causal inference, although at a major cost in interpretability or in fit with theoretical constructions of how networks matter. For instance, if our theorized path of influence is normative pressure, it matters whether the two-voter household members are spouses or roommates.

Here we use the longitudinal structure of the data, combined with an iterative analysis critically examining the most plausible alternative explanations for our findings. We also narrow down possible contagion pathways by focusing on a specific context and a well-defined relationship. Specifically, we examine political discussion among students in college dormitories. This type of tie was selected among a range of possibilities (e.g. friendship, academic, advice relations) as our political choices typically become known to others through conversations on that topic. As discussed earlier, both conflict and contagion mechanisms as defined here can only operate if individuals anticipate (accurately or not) the political behavior of their alters.

Research context

The data used here were collected through a longitudinal online survey of college students from 14 universities located in nine U.S. states. The survey contained network questions capturing in full the social ties among the participants, as well as other items evaluating political affiliations and behavior. All respondents were recipients of a fellowship that included as one of its requirements that they live together in a shared chapter house. Online questionnaires were distributed twice a year to all students who lived in the fellowship dormitories at the time.

A key issue to reflect on in interpreting the results that follow is how the population and context interplay with the hypothesized processes. Are there reasons to believe that the social processes discussed above will be especially important (or unimportant in this setting)? That is, how generalizable are these results?

We would argue that there are several advantages to this research setting.

First, this setting provided a rare opportunity to study a relatively encapsulated social system in which we can plausibly use whole-network methods. Prior research confirms that the bulk of subjects' strong non-kin social relationships are contained within these dormitories. Part

of the logic of the fellowship program is that it creates a small, intense community that molds its members in a positive and lasting way.

As we capture the full social structure of these communities, it becomes possible to examine ego and alter symmetrically. Every participant has the opportunity to present their characterization of their own opinions and behaviors. And while the context is fairly homogeneous, the corollary is that this is a context that we understand—while most public opinion research encompasses a heterogeneity of contexts that is difficult to appropriately model.

Second, the key processes, especially around social control, should be especially operative in college dormitories, given the especially high level of social interaction, and the degree of interdependence inherent in a college residential setting. Exit is particularly problematic option, given that the living circumstances come coupled with four-year fellowships. This does mean that the results may not be generalizable to individuals in other settings. It does make this type of a setting a useful instrument to study these particular social processes.

Third, while the setting may not generalize to the whole population at a given point in time, over the lifespan it does generalize to a very large fraction of the population. Further, early adulthood is a key period for the crystallization of political identity. In fact, it may be the exceptional nature of college life may in fact make that period especially important as a forger of political identity. That is, college life might make up about 6% of the average college graduate's life, but over the life cycle might make up for a much larger fraction of political deliberation. A cross-sectional sample of the population thus might produce a very misleading picture of the structure of political deliberation over the lifespan.

Procedures and participants

Our work examines conflict and contagion-based network variables as predictors of individual decisions to vote in the 2008, 2010, 2012, and 2014 elections. The data used in the analysis came from eight survey waves. Four were pre-election, sent out before the start of the fall term at each university (August-September). The other four were conducted post-election, in November-December of the respective year. Network items (listing the names of all dorm residents and asking participants to mark everyone they habitually talked to about politics and current affairs) were included in the post-election waves. The number of participants in each wave varied from 568 to 806, and there were 1947 unique respondents over the eight waves

examined here. Thanks to the cooperation of the fellowship-granting organization in charge of the dormitories, the surveys had a very high response rate ranging from 75% to 100% (for more details see Table 1).

About 22-25% of the participating students were female; 78-85% were White, 4-10% identified as Hispanic, 3-5% as Black, and 1-2% as Asian. Some 24%-30% of the respondents were new students who had just started living in the dormitory in that particular year. Most of those were incoming freshmen, and the rest were students transferring from other universities.

The political discussion networks of the respondents was relatively sparse, with an average density across sites of 10% in 2008, 6% in 2010, 11% in 2012, and 13% in 2014. The average degree (number of political discussion ties) per respondent was 10 in 2008, 7 in 2010, 11.5 in 2012, and 11.6 in 2014.

Measurement

Descriptive statistics about the demographics of the participants and mean scores on the variables described below are available in Table 2 and Table 3.

Voting and Voting Intent.

Voting was constructed as a binary variable (1 = *Definitely voted*, 0 = *Did not vote*) based on the respondents' voting behavior as reported in the post-election (December) surveys.

Voting Intent was recorded in the pre-election (August) surveys and ranged from 1 (*I will definitely not vote*) to 5 (*I will definitely vote*).

Ideology and Party Identification.

Ideology was recorded on a scale ranging from 1 (*Extremely conservative*) to 7 (*Extremely liberal*). The *strength of ideology* (range 0 to 3) was computed as the individual distance from the ideological midpoint (4 = *Moderate*). *Party identification* was a categorical variable with four response options: Republican, Democrat, Independent, and Other.

Contagion Measures.

The main contagion variable used in the analyses reported below was *tie voting intent* (range 1 to 5), computed as the average pre-election-wave voting intent of the respondent's connections in

the political discussion network. A second variable, *tie voting* (range 0 to 1) was operationalized as the proportion of the participants' political discussion ties who reported voting in an election.

Respondents who had no political discussion ties were assigned the grand mean for the respective contagion variable. Those cases were fairly rare: they constituted less than 2% of the sample in 2008, under 5% in 2010, and under 1% in 2012-2014.

Conflict Measures.

The conceptualization of conflict included two separate dimensions with potentially distinct impact on political participation. The first involved the level of disagreement between the respondent and their social ties. The second measured the diversity (potential conflict) among those ties, regardless of their agreement with the respondent.

In the analyses presented below, the first type of conflict was operationalized as *ideological divergence*: the average ideological distance between the participant and his or her political discussion ties. Conflict among ties was operationalized through two variables. The first was *ideological diversity*, calculated as the standard deviation of the ideology scores of the respondent's ties. The second was *party fragmentation*, computed as one minus the Herfindahl-Hirschman concentration index (HHI) for party affiliations.

Higher *ideological divergence*, *diversity*, and *fragmentation* scores would correspond to potentially higher levels of conflict/disagreement.

Control variables.

Key controls included the *ideology*, *strength of ideology,* and *party identification* variables described above, as well as *political interest* (range 1 = *Not at all interested* to 4 = *Very interested*). Additional control variables included gender, race, and school year (1 = *Freshman* to 4 = *Senior*).

Missing Data

Most variables described above had less than 5% missing data. The one exception was *voting intent*. Missingness on that variable was not high within the pre-election waves where it was collected. The problem stemmed from the fact that our models used this August measure in models based on the post-election December data. Due to differences in participation across waves, there was a non-trivial percent of missing observations, ranging from 14% to 33% (N$_{2008}$

11

= 753 with 245 missing, N_{2010} = 776 with 122 missing, N_{2012} = 753 with 196 missing, N_{2014} = 678 with 92 missing).

To address the issue, the models presented here were estimated in three different ways: (1) with list-wise deletion, (2) with multiple imputation of missing data (100 imputed datasets), and (3) with missing cases recoded to 0 and an additional binary variable in the model indicating missingness on the covariate. The estimation results were fairly similar, regardless of technique.

Analysis

The analyses were conducted using the R platform for statistical computing (R Core Team, 2015) and RStudio (2015). The *mice* package (Stef van Buuren & Groothuis-Oudshoorn, 2015) was used for multiple imputation procedures.

The basic contagion models used here regress *ego voting* (measured in December) on *ego voting intent* and *tie voting intent* (measured in August). Given the variable operationalizations discussed above, this is a variant of a network autoregressive model of the form $y = \rho W y + X\beta + \varepsilon, \; \varepsilon \sim (N, \sigma^2 I)$, where y is the binary vector of voting behavior, W is the row-normalized form of $M + M^T$, and M is a binary adjacency matrix of political discussion ties among students. X includes the controls described above, as well as the participant voting intent in August.

A series of papers by Neuman et al (Mizruchi & Neuman, 2008; Neuman & Mizruchi, 2010; Wang, Neuman, & Newman, 2014) evaluated this class of network autocorrelation models. Examining a variety of graph sizes, densities, and structures, they concluded that the models systematically underestimate the network effect. The studies also found, however, that a moderately-sized effect ($|\rho|>.3$) was still likely to be detected, even in small networks.

As the dependent variable (voting) was binary and the data used in the analysis comes from fourteen separate sites (the respondents are students at fourteen different universities), the analysis used logit models with cluster-bootstrapped standard errors.

Since elections in the data differ in type and prominence, it is likely that the importance and nature of contagion and conflict mechanisms would vary across them. Accordingly, each model discussed here was estimated separately for each of the four election years: 2008, 2010, 2012, and 2014.

Results

Contagion mechanisms

The models were estimated through logistic regressions and standard errors were obtained through a cluster-bootstrap procedure with 1000 resamples. The MacFadden pseudo-R^2 scores indicated a good model fit for all four years ($R^2_{2008} = .58$, $R^2_{2010} = .30$, $R^2_{2012} = .48$, $R^2_{2014} = .35$).

Tie voting intent was one of the three largest and most consistent predictors of voting among students, along with the ego's own *intent to vote*, *political interest*, and *strength of ideology* (see Figure 3).

The *tie voting intent* estimates were positive and large in all four years, and significant at the .05 level in 2008 and 2012 ($OR_{2008} = 2.71$, $SE_{2008} = 1.26$, $p_{2008} < .01$, $OR_{2010} = 1.37$, $SE_{2010} = 1.14$, $p_{2010} < .1$, $OR_{2012} = 2.64$, $SE_{2012} = 1.38$, $p_{2012} < .05$, $OR_{2014} = 5.04$, $SE_{2014} = 2.22$, $p_{2014} > .1$). Holding other variables at mean, the predicted probability of voting in 2008 increased from 15% if one's average political tie voting intent was 1, to 91% if the average tie voting intent was 5. That predicted probability increase was 11% to 29 % in 2010, 8% to 80% in 2012, and 1% to 48% in 2014 (see Figure 4). The only other independent variable of comparable magnitude in the model was individual voting intent ($OR_{2008} = 2.80$, $SE_{2008} = 1.16$, $p_{2008} < .001$, $OR_{2010} = 1.83$, $SE_{2010} = 1.11$, $p_{2010} < .01$, $OR_{2012} = 2.88$, $SE_{2012} = 1.11$, $p_{2012} < .001$, $OR_{2014} = 1.93$, $SE_{2014} = 1.13$, $p_{2014} < .01$).

The results reported above come from models with case-wise deletion of missing data. All models were also replicated (1) using a bootstrap-based algorithm to generate a hundred imputed datasets, and (2) with missing values recoded to 0 and a missingness indicator included for voting intent. The parameter estimates for the contagion variable were still positive and large when calculated with imputed data ($OR_{2008} = 2.26$, $SE_{2008} = 1.27$, $p_{2008} < .001$, $OR_{2010} = 1.40$, $SE_{2010} = 1.2$, $p_{2010} < .1$, $OR_{2012} = 2.23$, $SE_{2012} = 1.25$, $p_{2012} < .001$, $OR_{2014} = 3.06$, $SE_{2014} = 1.51$, $p_{2014} < .01$) and with missingness added as a level in the dependent variable ($OR_{2008} = 2.17$, $SE_{2008} = 1.24$, $p_{2008} < .05$, $OR_{2010} = 1.38$, $SE_{2010} = 1.15$, $p_{2010} < .1$, $OR_{2012} = 2.44$, $SE_{2012} = 1.25$, $p_{2012} < .01$, $OR_{2014} = 4.60$, $SE_{2014} = 2.05$, $p_{2014} > .1$).

To further explore the nature of network-based predictors of voting, we conducted a series of post-hoc analyses. In one of those, we examined separate samples of likely voters (those

with voting intent of 4 or 5) and unlikely voters (those with voting intent of 1 or 2). The results were similar to those for the full sample (see Table 5) indicating that the contagion variable predicts voting for individuals with low and high voting intent both.

Additionally, we estimated models exploring the effect of co-partisan and cross-partisan ties on voting. Those replicated the original contagion models using modified versions of the network variables. The average voting intent was computed separately for co-partisan and cross-partisan ties. The results (see Table 5 and Figure 4) suggested that, at least in the more high-profile general election years (2008, 2014), both co-partisan and cross-partisan ties predict political participation.

Another relevant consideration here was that voting intent for young adults likely forms and is discussed with others relatively late in the year, close to the day of the election. Additional tests were conducted to examine how well the voting patterns (as opposed to the August intentions) of political ties predict ego voting. The network variable used in these tests was based on the proportion of one's ties who voted. The parameter estimates for that variable were positive and large. They were also significant at the .05 level for all years except 2010 (see Table 5). The large odds ratios reported there also reflect the fact that a unit change in these models corresponds to the difference between having *no voting friends at all* and having *only voting friends*.

Conflict mechanisms

We estimated a series of logit models predicting voting that included each of the three conflict variables (*divergence*, *diversity* and *fragmentation*) on its own, as well as all three variables together. We also conducted principal component analysis on the diversity variables and examined models that included the first identified component (which explained 61% to 71% of the variance in conflict across the four years, and had high loadings for divergence and diversity). Finally, we estimated a model that included the three conflict variables and the contagion variable.

Results for models containing the three conflict/diversity variables are available in Table 5 and Table 6. In those models, none of the three key variables were significant in any the four years. In the full conflict-and-contagion model (see Table 5), estimates for ideological divergence ($OR_{2008} = 1.22$, $SE_{2008} = 1.46$, $p_{2008} > .1$, $OR_{2010} = 0.83$, $SE_{2010} = 1.19$, $p_{2010} > .1$, $OR_{2012} = 1.01$,

$SE_{2012} = 1.15$, $p_{2012} > .1$, $OR_{2014} = 1.01$, $SE_{2014} = 1.22$, $p_{2014} > .1$), diversity among ties ($OR_{2008} = 0.65$, $SE_{2008} = 1.40$, $p_{2008} > .1$, $OR_{2010} = 0.95$, $SE_{2010} = 1.41$, $p_{2010} > .1$, $OR_{2012} = 1.10$, $SE_{2012} = 1.41$, $p_{2012} > .1$, $OR_{2014} = 1.34$, $SE_{2014} = 1.32$, $p_{2014} > .1$), and party fragmentation ($OR_{2008} = 3.14$, $SE_{2008} = 2.25$, $p_{2008} > .1$, $OR_{2010} = 1.64$, $SE_{2010} = 1.76$, $p_{2010} > .1$, $OR_{2012} = 2.26$, $SE_{2012} = 2.72$, $p_{2012} > .1$, $OR_{2014} = .51$, $SE_{2014} = 2.58$, $p_{2014} > .1$) were also not consistent in their direction across waves.

Adding conflict variables did not improve the model fit, as evidenced by likelihood ratio tests comparing the corresponding nested models with and without conflict variables ($p_{2008} = 1$, $p_{2010} = .5$, $p_{2008} = .7$, $p_{2014} = 1$).

Causal interpretations

The results presented above demonstrate that *tie voting intent* variables are excellent predictors of individual voting, a finding consistent with the theoretical mechanisms of network contagion. Tie diversity variables, on the other hand, do not significantly predict voting in any of the years, their magnitude is small, and their direction is not consistent across models. We find no support for the conflict mechanism – our analyses find no indications that network diversity might suppress political participation.

While the results are consistent with a contagion hypothesis, confirming a causal link between network effects and political behavior is a more difficult proposition. Establishing patterns of influence in social systems is one of the more complex and controversial endeavors that researchers in the field face (Fowler, Heaney, Nickerson, Padgett, & Sinclair, 2011). A number of challenges discussed in the literature stem from issues with confounding variables (Shalizi & Thomas, 2011). In our case, one possibility might be that similarities in voting across ties are driven in part by selection. That is to say, there may be a tendency for people to select discussion ties who have similar levels of political activity, or who are similar in other ways that affect political activity and are not captured by our control variables.

In order to evaluate potential selection effects, we looked for homophily using the pre-election August waves of the survey. One advantage of the research design employed here is that it allows for a variation on the "nascent network" approach introduced by Lazer et al. (2010). That approach suggests examining individuals at a point when they have had no prior exposure

to the social network. Pre-exposure evaluation provides measurements that should be clean of network influence.

In this case, the first pre-election measurements are taken after the students have spent the summer apart and have had little or no opportunity to discuss the upcoming election and influence each other's voting intent directly. Similarities found at that point in time can therefore largely be attributed to homophily in link formation.

For each year in the data, we examined the relationship between political discussion in December and voting intent in August. We used quadratic assignment procedure tests (Krackhardt, 1988) to assess the graph correlation between the fourteen discussion networks (one per university) and the voting intent difference in dyads of students within each site. Significant negative correlations would point to homophily – individuals with similar voting intent would be more likely to form connections.

The tests found that the graph correlations between political discussion and dyadic distance in voting intent were small (all $\leq .1$ in absolute value) and, in 52 out of 56 cases (14 networks x 4 years) non-significant. Permutation-based network regression models with voting intent distance as the dependent variable and controls for party affiliation, political ideology, political interest, and demographic variables also found no significant association between political discussion and voting intent before the start of the semester.

Even as these results suggests that homophily/selection are not plausible explanations for the predictive power of tie behavior, additional assumptions still need to be made in order to interpret this link as causal. The most obvious issue is the stable unit treatment value assumption (SUTVA). For these analyses to be interpreted as causal, we would need to assume that individuals' choices of social ties, as well as any contagion resulting from these ties, is independent of the potential outcomes of other members. One way in which this assumption might hold would be under a standard econometric model in which (1) contagion takes the form of a constant additive shift in the linear predictor of the probability of turnout, and (2) these shifts in contagion all occur simultaneously, so that there are no spillovers from one person's post-contagion probability of turnout into another's. Although these assumptions are strong, they are also unnecessary to warrant the conclusion that we have presented more empirical evidence of contagion than conflict in voting.

Conclusion

This study set out to examine two mechanisms through which embeddedness in social structures potentially affects our likelihood of participating in the political process. The results are suggestive: estimates for the contagion variable are large, positive, and significant for prominent elections when voting is a more likely subject of conversation. That pattern holds across likely and unlikely voters (identified based on self-reported voting intent three months before the election). Interestingly, we find no evidence of differential impact from copartisan and cross-partisan ties. Having a large proportion of voting copartisan ties is a condition that both conflict and contagion frameworks would suggest increases one's likelihood of voting. A large proportion of voting anti-partisan ties would be expected to enhance voting in a world where contagion effects are present, but not in one where the conflict hypothesis holds.

Modeling conflict directly in a wide variety of ways (only some of which were reported here), we did not find any evidence to support its effect on political participation. Neither a diverse social network, nor a strongly antipartisan one, seemed to predict electoral behavior. The estimates were not only smaller in size, but also inconsistent in their direction across variables and election years. This is good news for deliberative democracy, as it suggests that among young people, diverse viewpoints and high participation are not mutually exclusive.

This study has several limitations that we discuss throughout the text. While our results are consistent with social contagion, we would need to make additional assumptions in order to claim a causal link between network structure and voting. This is a limitation that applies to most research on social influence. Our examination of alternative hypothesis leads us to believe that contagion is by far the most likely mechanism at play.

Another key question involves the generalizability of our conclusions. As this work explores a particular social system, one could argue that our findings may not hold outside of the focal population. There are several considerations we present in that regard. First, this complication is difficult to avoid since real-life social networks are always placed within a specific context. Interpersonal ties are necessarily embedded in a social environment – they emerge in a shared setting, be it geographic, institutional, or virtual. Second, based on existing literature, it seems likely that conflict and contagion mechanisms would operate similarly, if with varying intensity, in a number of social contexts. Even if that is not the case, however, we

maintain that the setting and sample we have selected are particularly interesting and important. Early adulthood is a key life stage with a long-term impact for the shaping of political identity, preferences and behaviors (Ghitza & Gelman, 2014; Klofstad, 2015). Understanding the drivers of those behaviors may provide insights into patterns of political participation throughout the lifespan, even if individual responses to social influence do change over time.

We should also note that our study unpacks conflict and contagion mechanisms, but it cannot definitively identify all aspects of their inner workings. We suspect, for instance, that political behavior in this context spreads through both normative and resource-based pathways. Additional data collection and analysis are needed, however, to evaluate the relative impact of those factors.

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Tables

Table 1. *Response rate 2008-2014 (AAPOR RR5)*

	Aug 2008	Nov 2008	Aug 2010	Nov 2010	Aug 2012	Nov 2012	Aug 2014	Nov 2014
Scholars Total	754	754	793	793	769	769	806	781
Respondents N	568	753	727	776	687	753	695	678
Response Rate	75%	100%	92%	98%	89%	98%	86%	87%

Table 2. *Descriptive statistics, ordinal and ratio variables*

Descriptive Statistics, 2008-2014	2008 M (SD)	2010 M (SD)	2012 M (SD)	2014 M (SD)
School Year (1-4)	2.3 (1.1)	2.5 (1.1)	2.5 (1.1)	2.4 (1.1)
Ideology (1-7, Liberal-Conservative)	3.8 (1.5)	3.9 (1.5)	4.1 (1.5)	4.1 (1.5)
Ideology Strength (1-4, Moderate-Extreme)	1.3 (0.9)	1.2 (0.9)	1.2 (0.9)	1.2 (0.9)
Political Interest (1-4)	3.0 (0.9)	2.6 (0.9)	2.6 (1.0)	2.6 (1.0)
Proportion of ties who voted	.75 (.24)	.30 (.29)	.56 (.29)	.25 (.28)
Ideological divergence from ties	1.3 (0.9)	1.4 (1.0)	1.3 (0.9)	1.3 (0.9)
Ideological diversity among ties	1.5 (0.5)	1.3 (0.6)	1.3 (0.5)	1.4 (0.5)
Concentration of party IDs among ties	0.5 (0.2)	0.6 (0.3)	0.5 (0.2)	0.5 (0.2)
Voting Intent, August (1-5)	4.2 (1.0)	3.6 (1.1)	4.0 (1.1)	3.6 (0.7)
Average Political Tie Voting Intent, August	4.3 (0.6)	3.8 (0.7)	4.1 (0.5)	3.7 (0.3)

Table 3. *Descriptive statistics, nominal variables*

Descriptive Statistics, 2008-2014	2008	2010	2012	2014
Voting: Percent who voted	72%	26%	56%	23%
Gender: Female	22%	22%	24%	25%
Gender: Male	78%	78%	76%	75%
Race and Ethnicity: White	79%	82%	78%	85%
Race and Ethnicity: Black	3%	5%	3%	5%
Race and Ethnicity: Hispanic	4%	6%	7%	10%
Race and Ethnicity: Asian	1%	2%	2%	2%
Race and Ethnicity: Other	13%	5%	10%	2%
Party ID: Republican	31%	36%	39%	40%
Party ID: Democrat	43%	39%	34%	32%
Party ID: Independent	23%	23%	24%	22%
Party ID: Other	3%	2%	3%	6%
Status: New Residents	30%	24%	28%	29%
Status: Returning Residents	70%	76%	72%	71%

Table 4. *Contagion and conflict logit models with ego voting as the dependent variable, and tie voting intent, political, and ideological diversity as treatments. The coefficients are odds ratios, standard errors are cluster-bootstrapped by university.*

Contagion Models	2008	2010	2012	2014
Average tie voting intent (August)	2.71 (1.26)**	1.37 (1.14) •	2.64 (1.38)*	5.04 (2.22)
Voting Intent (August)	2.80 (1.16)***	1.83 (1.11)**	2.88 (1.11)***	1.93 (1.13)**
Female	1.07 (1.42)	0.97 (1.38)	1.26 (1.38)	1.30 (1.35)
Race: White	1.57 (1.49)	1.10 (1.61)	1.42 (1.43)	3.19 (1.48)*
Race: Black	8.93 (5.17)	0.92 (1.57)	1.35 (1.72)	2.32 (1.56)
Party ID: Republican	1.09 (2.05)	3.87 (2.11)	0.97 (2.04)	0.67 (2.14)
Party ID: Democrat	3.23 (2.08)	5.97 (1.85)	1.89 (2.07)	0.81 (1.58)
Party ID: Independent	1.44 (1.91)	4.79 (2.04)	1.56 (2.05)	0.41 (2.08)
School Year (1-4)	1.07 (1.18)	1.30 (1.14).	1.04 (1.10)	1.07 (1.14)
Ideology (Conservative-Liberal)	1.20 (1.12)	0.98 (1.09)	1.20 (1.12)	1.08 (1.08)
Ideology strength (Moderate-Extreme)	1.60 (1.18) •	1.41 (1.13)*	1.33 (1.15).	1.40 (1.16) •
Political Interest	1.85 (1.25)*	1.87 (1.12)***	1.14 (1.15)	2.20 (1.16)***
Observations	504	630	548	568
AIC	406	635	568	485
McFadden pseudo-R^2	.58	.30	.48	.35

Conflict Models	2008	2010	2012	2014
Ideological divergence	1.27 (1.41)	.84 (1.19)	1.06 (1.17)	.94 (1.16)
Ideological diversity	.86 (1.39)	.96 (1.40)	1.36 (1.43)	1.54 (1.40)
Party fragmentation (1-HHI)	1.92 (2.16)	1.57 (1.76)	1.92 (2.65)	.27 (3.04)
Voting Intent (August)	2.85 (1.15)**	1.76 (1.11)**	2.94 (1.12)***	1.97 (1.14)***
Female	1.11 (1.44)	1.01 (1.45)	1.43 (1.30)	1.37 (1.33)
Race: White	1.45 (1.48)	1.27 (1.48)	1.46 (1.40)	3.10 (1.47)*
Race: Black	7.21 (5.78)	.98 (1.64)	1.24 (1.62)	2.72 (1.45) •
Party ID: Republican	1.21 (2.12)	3.46 (2.22)	.68 (2.16)	.69 (2.08)
Party ID: Democrat	2.94 (2.17)	4.85 (1.92)	1.41 (2.25)	.71 (1.62)
Party ID: Independent	1.45 (1.88)	4.64 (2.06)	1.26 (2.24)	.41 (1.97)
School Year (1-4)	1.09 (1.17)	1.27 (1.16)	1.12 (1.09)	1.09 (1.14)
Ideology (Conservative-Liberal)	1.17 (1.12)	.96 (1.09)	1.23 (1.11) •	1.10 (1.08)
Ideology strength (Moderate-Extreme)	1.48 (1.20) •	1.64 (1.17)*	1.35 (1.16) •	1.34 (1.16) •
Political Interest	1.59 (1.23) •	1.84 (1.16)**	1.17 (1.16)	2.15 (1.18)***
Observations	485	554	536	557
AIC	416	571	577	497
McFadden pseudo-R^2	.58	.38	.48	.34

Contagion & Conflict Models	2008	2010	2012	2014
Average tie voting intent (August)	2.74 (1.22)**	1.32 (1.16) •	2.72 (1.34)*	5.64 (2.29)
Ideological divergence	1.22 (1.46)	.83 (1.19)	1.01 (1.15)	1.01 (1.22)
Ideological diversity	.65 (1.40)	.95 (1.41)	1.10 (1.41)	1.34 (1.32)
Party fragmentation (1-HHI)	3.14 (2.25)	1.64 (1.76)	2.26 (2.72)	.51 (2.58)
Voting Intent (August)	2.85 (1.14)***	1.77 (1.11)**	2.90 (1.12)***	1.97 (1.12)***
Female	1.04 (1.50)	1.00 (1.44)	1.17 (1.34)	1.29 (1.38)
Race: White	1.50 (1.52)	1.26 (1.50)	1.27 (1.47)	2.85 (1.46)*
Race: Black	9.92 (6.02)	1.03 (1.60)	1.37 (1.71)	2.54 (1.53) •
Party ID: Republican	1.30 (2.11)	3.46 (2.24)	1.06 (2.41)	.68 (2.15)
Party ID: Democrat	3.33 (2.09)	4.92 (1.92)	1.90 (2.41)	.75 (1.60)
Party ID: Independent	1.48 (1.81)	4.62 (2.09)	1.69 (2.41)	.43 (2.05)
School Year (1-4)	1.07 (1.20)	1.28 (1.16)	1.06 (1.10)	1.09 (1.14)
Ideology (Conservative-Liberal)	1.17 (1.12)	.97 (1.10)	1.20 (1.12) •	1.07 (1.08)
Ideology strength (Moderate-Extreme)	1.50 (1.22)	1.65 (1.17)**	1.35 (1.16) •	1.36 (1.16) •
Political Interest	1.75 (1.26)*	1.86 (1.16)**	1.17 (1.15)	2.22 (1.17)***
Observations	485	554	536	557
AIC	401	571	559	479
McFadden pseudo-R^2	.60	.38	.49	.37

*** p<.001, ** p<.01, * p<.05, • p<.1

Table 5. *Network effect in logit models (average political tie voting intent as treatment): base, missing data, multiple imputation, same and cross-party, as well as likely and unlikely voter samples. November models examine percent of voting ties instead of average voting intent. The coefficients are odds ratios with cluster-bootstrapped errors.*

Year	2008	2010	2012	2014
Base models	2.71 (1.26)**	1.37 (1.14) •	2.64 (1.38)*	5.04 (2.22)
Missing data models	2.17 (1.24)*	1.38 (1.15) •	2.44 (1.25)**	4.60 (2.05)
MI models (MI = 100)	2.26 (1.27)***	1.40 (1.20) •	2.23 (1.25)***	3.06 (1.51)**
Same-party models	1.88 (1.20)**	1.28 (1.11)*	1.58 (1.19)*	2.03 (1.68)
Cross-party models	1.94 (1.18)**	1.07 (1.18)	1.88 (1.20)*	2.46 (1.48)
Likely voter models	2.65 (1.24)**	1.58 (1.25) •	2.87 (1.34)*	4.76 (2.17)
Unlikely voter models	2.34 (1.24)*	1.37 (1.15) •	2.42 (1.26)**	4.63 (2.02) •
December models	17.80 (1.89)**	5.52 (1.86) •	16.46 (1.93)**	29.95 (1.74)***

*** p < .001, ** p < .01, * p < .05, • p < .1   *Coefficients are odds ratios for voting.*

Table 6. *Conflict logit models: single variable, diversity PCA first component, and full models (including all three diversity variables). Full models include base, multiple imputation, and missing data. The coefficients are odds ratios with cluster-bootstrapped errors.*

Year	2008	2010	2012	2014
Divergence only	1.04 (1.39)	.90 (1.16)	1.18 (1.16)	0.94 (1.19)
Diversity only	1.03 (1.35)	.98 (1.38)	1.49 (1.34)	1.33 (1.30)
Fragmentation only	1.39 (1.61)	1.18 (1.85)	1.19 (2.15)	0.48 (1.97)
Diversity PCA: 1st comp.	1.16 (1.34)	.88 (1.22)	1.21 (1.16)	1.04 (1.19)
Full model: base				
Diversity	1.27 (1.41)	.84 (1.19)	1.06 (1.17)	0.94 (1.16)
Divergence	.86 (1.39)	.96 (1.40)	1.36 (1.43)	1.54 (1.40)
Fragmentation	1.92 (2.16)	1.57 (1.76)	1.92 (2.65)	0.27 (3.04)
Full model: MI (MI=100)				
Diversity	.83 (1.19)	.88 (1.15)	1.16 (1.17)	1.11 (1.20)
Divergence	1.26 (1.23)	.97 (1.20)	1.25 (1.24)	1.26 (1.27)
Fragmentation	1.25 (1.66)	1.11 (1.54)	.90 (1.66)	0.55 (1.82)
Full model: missing data				
Diversity	.95 (1.25)	.86 (1.16)	1.14 (1.20)	1.17 (1.15)
Divergence	1.09 (1.25)	.89 (1.34)	1.27 (1.34)	1.22 (1.21)
Fragmentation	1.92 (2.23)	1.44 (1.61)	1.57 (2.22)	0.54 (2.28)

*** p<.001, ** p<.01, * p<.05, • p<.1   *Coefficients are odds ratios for voting.*

Figures

Figure 1. *Locus of Interdependence in Contagion and Conflict models of political participation.*

Model

	Contagion	*Conflict*
Internal	Individuals calibrate what they feel is appropriate level of participation based on peer behavior.	Heterogeneous information about political choices leads to ambivalence and indifference amongst choices.
External	The possibility of sanctions for inappropriate level of participation will lead to sanctions by peers.	The possibility of sanctions for voting for anti-partisans of peers.

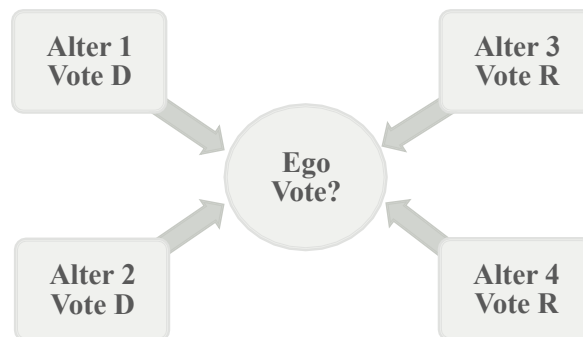Figure 2: *Conflict versus contagion in egonets*

Figure 3. Conflict and contagion effect estimates, logit models for voting with cluster-bootstrapped errors.
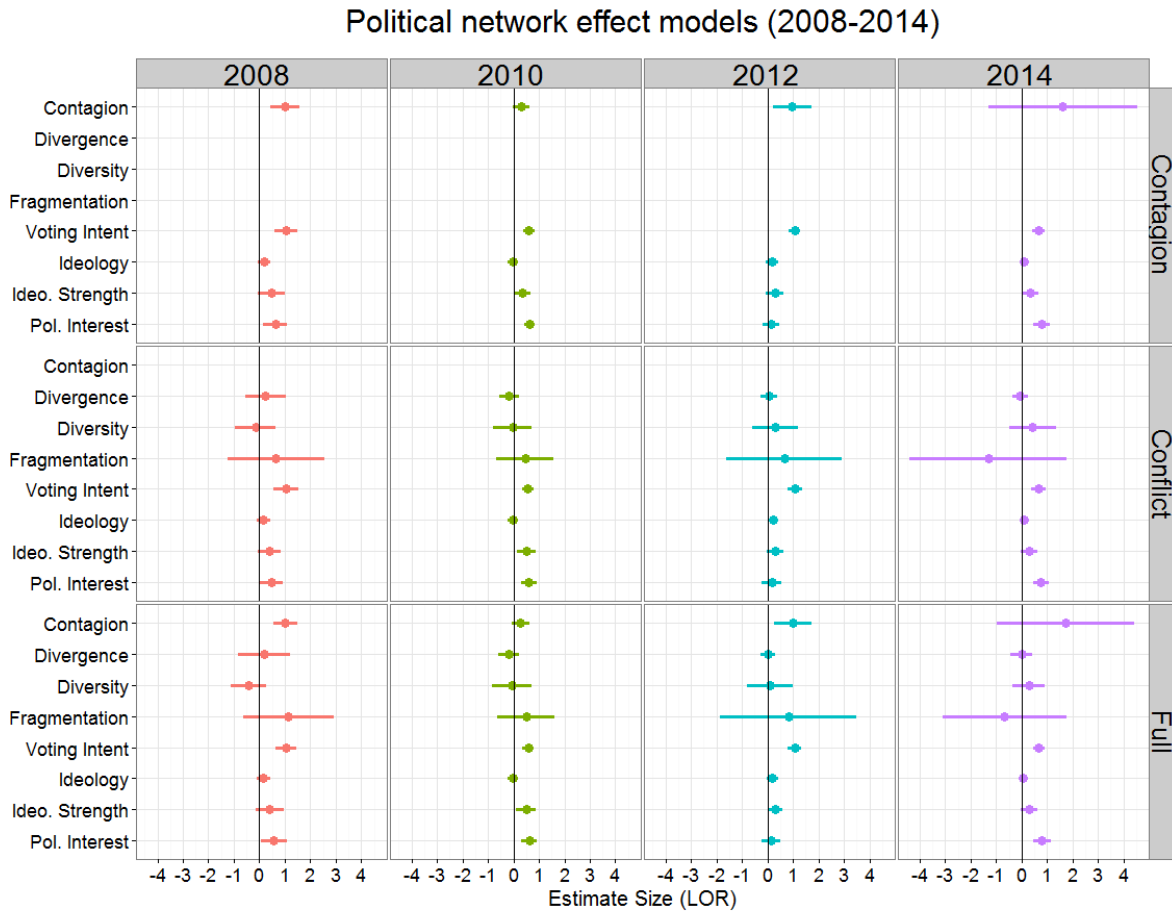

Figure 4. Predicted student voting based on the average voting intent of their political ties, all other variables held at mean.