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# An Experimental Study of Persuasive Social Communication

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## **Abstract**

Studies of contextual effects on political behavior are plagued by concerns about internal validity. Perhaps of greatest concern are possible selection mechanisms that appear to present statistical support for contextual influence when social communication has no real effect. This paper presents an experimental framework for testing contextual effects that ameliorates these concerns through exogenous assignment to communication networks. This experiment allows for an analysis of the factors that make discussion partners influential. These factors can be divided into two categories: (1) characteristics of the dyad and its members; (2) characteristics of the residual discussion network. The most robust findings suggest that factors in this latter category play the greatest role in the likelihood that a discussion partner is influential.<sup>1</sup>

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It may not be polite to discuss politics, but many people constantly talk about politics at home, in their businesses, and while they have an evening out. Many people are talking, but some are more influential than others. Some individuals speak and change minds, while others speak and their arguments are rebuffed. This paper is about persuasion narrowly defined as when individuals convince others to support the same candidate they support. There are many factors that could influence whether or not an individual is persuasive. This paper evaluates the effects of the partisanship and expertise of a discussion dyad, as well as, the messages being sent by other discussion partners.

There is a long and rich tradition of contextual research in political science and related fields (e.g., Berelson, Lazarsfeld and McPhee, 1954; Finifter, 1974; MacKuen and Brown, 1987; Huckfeldt and Sprague, 1995). In political science, the literature on contextual effects has been dominated by a single research strategy: the pairing of survey responses to contextual measures. Critics have pointed out that measurement error and endogeneity issues may lead researchers to find contextual effects when they do not actually exist (Achen and Shively, 1995; Johnson, Shively and Stein, 2002). These problems suggest the use of a laboratory experiment to overcome these internal validity concerns.

This paper presents the results of a unique, group-based experiment in which subjects are placed in parties and contexts as they try to choose between two candidates. Subjects decide on a candidate using information provided by two sources: private information and messages from their fellow subjects. The private information is accurate on average, but any single piece of information may be inaccurate. The socially communicated information may come from subjects who are uninformed or biased in favor of one of the candidates. This means that subjects are often forced to make a choice. Do they believe better informed sources with a different bias or lesser informed subjects who share their interests?

## **Influential Discussion Partners**

Many scholars view interpersonal influence as a political reality with potentially beneficial consequences for a public that is largely underinformed about politics. The key theoretical breakthrough in this line of reasoning is the two-step flow hypothesis (Lazarsfeld, Berelson and Gaudet, 1948; Katz, 1957) which posits that opinion leaders pay close attention to the political world and then pass along information to individuals who pay much less attention to politics. Hence, individuals with high information costs may use interpersonal communication to participate effectively in politics while reducing the price of participation (Downs, 1957). This division of labor could explain why a society marked by low individual levels of information often appears to respond sensibly to political events in the aggregate (Page and Shapiro, 1992; Erikson, MacKuen and Stimson, 2002).

Political discussion, however, does not necessarily have beneficial effects for voters. As Rousseau (1762/1994) noted if individuals discuss politics then they may support the interests of a particularly persuasive opinion leader to their own detriment (see also, Jackman and Sniderman, 2006). If an individual already possesses enough information to make a proper political decision, then information from friends and family could only harm the decision-making process (Lupia and McCubbins, 1998). Voters who speak with members of the other party are less likely to vote for their party's candidate (Beck, 2002) and less likely to vote for the candidate who best represents their issue positions (Sokhey and McClurg, 2008).

Regardless of whether social influence leads to better or worse vote decisions, it is important to understand the factors that make opinion leaders influential. How do we know when an opinion leader has influenced another individual? There are two common operational definitions of influence.<sup>2</sup> First, a discussion partner (an alter) may be measured as

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<sup>2</sup>A broader definition of influence would also include times in which individuals were forced to explain why another choice was not preferable. That is an individual is "influenced" if they are challenged to consider

influencing a voter (an ego) if the two members of the dyad choose the same candidate (e.g., Huckfeldt and Sprague, 1991). This measure is appropriate in cross-sectional studies, but it suffers from several potential confounds. For example, one discussion partner may have convinced the other to vote for that candidate, but it is impossible to tell who influenced whom. Further, the two individuals may have come to the same decision independently and their agreement was simply a coincidence or the result of an outside force that compelled them both.

An alternative measure requires multiple observations of the same subject. For example, Kenny (1998) uses panel data to determine whether a voter changed her mind over the course of a campaign. If an ego changed her mind and voted for the alter's preferred candidate, it can be inferred that the alter influenced the ego. The downside of this measure is that it is impossible for an individual to influence someone who is predisposed to favor the same candidate. It is possible that the ego would have changed her mind if the alter had not been sending messages telling the ego to stick with her original choice. For example, imagine a dyad made up of two Republicans in San Francisco. One may only continue to vote Republican because the other Republican counter-argues the social messages from more common Democratic sources.

This paper will use both measures of influence. It utilizes an experiment in which subjects are asked three times for their updated beliefs about two computer-generated candidates prior to voting for one of the candidates. Subjects update their beliefs using information acquired from some of their fellow subjects. This process of repeatedly measuring their beliefs allows the researcher to determine whether the social information is being incorporated in the decision making process.

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alternative viewpoints and arguments even if they do not ultimately make a different decision (Ahn, Huckfeldt and Ryan, N.D.; Taber and Lodge, 2006). This form of influence is beyond the scope of this paper.

## **What Makes Someone Influential?**

Since, individuals may choose to follow the advice of many potential opinion leaders from among their acquaintances, what makes a particular person influential? Researchers have studied numerous theories from the intimacy of the relationship (Burt, 1987; Huckfeldt and Sprague, 1991; Kenny, 1998) to the strength of the argument used (Cobb and Kuklinski, 1997). This paper utilizes an abstract experiment that cannot speak to all of these theories. Rather, it is designed to isolate a few factors that play an important role in social influence, but also matter in any situation in which a decision maker is weighing evidence from advisors.

**Characteristics of the Dyad and Its Members** This paper focuses on two main characteristics of the dyad members: their expertise and their partisanship. Theorists who view political discussion as a potential information shortcut argue it is imperative that this person be knowledgeable because an uninformed - or worse, misinformed – discussion partner cannot provide useful information (Downs, 1957; Lupia and McCubbins, 1998). There is no reason to simply mimic expert discussion partners because politics is inherently subjective. An ego could reasonably conclude that an expert alter reached a different conclusion than the ego would have reached because the alter started from different political values (Ross, Bierbrauer and Hoffman, 1976).

The expertise of the ego matters as well. When individuals do not have access to their own information, then they need to rely on others as a source of news about candidates (Mondak, 1995). As Lupia and McCubbins (1998) note, at some point an individual has enough information to make a decision and additional information from associates is not helpful. If egos realize this, then alters will have a more difficult time influencing informed egos. Egos may view messages that differ from their preconceptions as incorrect and not consider them when updating their beliefs (Ahn, Huckfeldt and Ryan, N.D.).

Downs (1957) argues that ego and alter should have similar preferences if political discussion is to be an effective shortcut. Noting that the alter necessarily needs to omit some information, Downs argues that discussion partners with divergent preferences may omit information important to the individual. The problem of ego and alters with divergent preferences is also related to a problem of communication involving cheap talk (Crawford and Sobel, 1982). If alters do not have to pay a cost to provide information, then they potentially could send any signal they choose, even signals that are inaccurate. Because of this, signals sent via cheap talk often are not credible.<sup>3</sup>

These theories suggest three hypotheses:

*H<sub>1</sub>: Alters will be more influential as alter expertise increases.*

*H<sub>2</sub>: Alters will be more influential as ego expertise decreases.*

*H<sub>3</sub>: Alters will be more influential if ego and alter are members of the same party.*

This third hypothesis may be contingent on how influence is measured. If an alter needs to convince an ego to change her mind to "influence" her, then alters will have a difficult time being influential if they are from the same party as the ego. This is because both members of the dyad are predisposed to prefer the same candidate making it unlikely that the ego would change alter's mind. They may still be more influential than alters from a different party because the egos ignore what alters from a different party say. In this case, alters from the same would rarely be influential, but alters from a different party would never be influential.

**The Effect of the Residual Network** The messages communicated between a dyad are not sent in isolation. As a result, the influence of a particular discussion partner may

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<sup>3</sup>There are, however, situations involving cheap talk in which an alter with a divergent preference may be compelled to provide accurate information to the ego. For example, as Lupia and McCubbins (1998) argue, alters will provide accurate information if there is the possibility that the ego will attempt to verify the information the alter provides. Further, Calvert (1985) notes that biased alters who send signals contrary to their preferences may provide useful information. For example, if an independent discusses politics with a Republican who says she is voting for Barack Obama, then the independent may infer that the Obama has positive characteristics because this Republican is willing to forego her partisan preferences.

also be contingent on the information provided by others. An autoregressive theory of political influence (Huckfeldt, Johnson and Sprague, 2004) suggests that an ego will ignore messages from an alter if those messages do not conform to the messages provided by other alters.

There are two key distinctions between this theory and the previous arguments. First, theorists like Downs (1957) and Lupia and McCubbins (1998) argue individuals should purposefully search for discussion partners who meet certain criteria. These criteria should lead to homogeneous discussion networks in which all members send similar signals.<sup>4</sup> The autoregressive influence theory, on the other hand, argues that discussion networks are often formed for reasons unrelated to politics and may be heterogeneous as a result.<sup>5</sup> This leaves open the possibility that an alter with different preferences than the ego may be still be influential.

The second distinction is that individuals are more concerned with the messages than the messenger. Thus, three poorly informed individuals could be influential as long as they all say the same thing. This is true even though none of them should be a particularly credible source because they lack expertise. When psychologists discuss “source credibility” (Hovland, Janis and Kelly, 1953; Pornpitakpan, 2004), they say that a credible source should possess expertise and trustworthiness. An expert source that sends a signal that conflicts with messages sent by inexperienced outside sources might be seen as lacking trustworthiness especially when the expert’s message seems to serve the expert’s biases. Further, a biased source may seem more trustworthy if her message is supported by another source even if both sources have the same biases. This leads to the fourth hypothesis:

*H<sub>4</sub>: Alters will be more influential if they send messages that are similar to the mes-*

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<sup>4</sup>Even if individuals do not purposefully choose discussion partners, individuals should evaluate these messengers when deciding whether to incorporate the messages into their candidate evaluations.

<sup>5</sup>While many discussion networks are heterogeneous (Huckfeldt, Ikeda and Pappi, 2005), individuals may attempt to avoid disagreement in discussion by speaking ambiguously (MacKuen, 1990) or by restricting conversation to less controversial topics (Huckfeldt, 2007).



*sages sent by members of the ego's residual network.*

In an effort to combine the Downsian criteria with the autoregressive influence theory, Richey (2008) provides evidence that the effect of an alter's expertise is autoregressive. That is, an expert alter is most influential when that alter is the sole expert providing information. If a discussion network is made up of many expert alters, then any particular alter is going to be less influential because the alter is in a redundant position in the network. As in the autoregressive influence theory, the influence of a discussion partner is dependent on the characteristics of the remaining members of the discussion network. According to Richey (2008), therefore, the previous hypothesis about alter expertise should be modified.

*H<sub>4</sub>: Alters will be more influential as the alter expertise increases and residual network expertise decreases.*

## **An Experimental Approach to Studying Contextual Effects**

This paper is part of a literature that investigates contextual effects on electoral behavior. A contextual effect is "any effect on individual behavior that arises due to social interaction within the environment" (Huckfeldt and Sprague, 1993, p. 298). Contextual theories recognize that voters do not make decisions in isolation and that interpersonal communication can affect how a person votes (MacKuen and Brown, 1987; Huckfeldt and Sprague, 1995; Beck, 2002) and even whether or not a person votes at all (Mutz, 2002; McClurg, 2006). Contextual researchers typically survey individuals and pair their responses with measures of the contexts in which the individuals live - for example, the two-party vote-share in the individuals' congressional districts or the partisanship of the people with whom the individuals discuss politics.

There are several major concerns with this method of testing for contextual effects. Arguably the most serious problem is related to an inability to differentiate between con-

textual effects and selection effects (Achen and Shively, 1995; Johnson, Shively and Stein, 2002). If individuals choose to locate themselves in a context for political reasons, then the contexts are endogenously related to opinions, vote choices, and other political dependent variables. Few would argue that many people make their decisions about where to live based on politics solely, but some say that people make decisions about where to live because a location fits their preferred lifestyle and those lifestyles are often related to political preferences.<sup>6</sup> Further, individuals may not choose the cities they live in for political reasons, but they may choose their political discussion partners for political reasons (MacKuen, 1990).

Decades of research have provided a great deal of evidence as to the importance of contextual effects on public opinion and vote choice, but most of these studies have relied on a single research strategy: the survey. All correlational designs have concerns regarding their internal validity, but there is reason for heightened concern in these studies given the problems discussed above. This suggests a need for a program of research that will compliment the observational studies, while providing greater internal validity. Laboratory experiments can overcome endogeneity and measurement issues while providing new insights into how interdependent voters influence one another (e.g., Ahn et al., 2008; Boudreau, Coulson and McCubbins, 2008; Druckman and Nelson, 2003; Lupia and McCubbins, 1998).

This paper presents the results of an experimental analysis designed to address questions of interpersonal influence. It overcomes the measurement issues related to survey research in this area. Egos provide beliefs prior to social communication and then update those beliefs based on the information their alters provide. These discussion networks are exogeneously determined by the researcher. The experimental design allows the researcher

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<sup>6</sup>This lifestyle argument may be overstated. For example, Achen and Shively (1995) point out that people who tend to hunt tend to “cluster together” (p. 227). Some people may move to certain areas because they enjoy hunting, but others no doubt enjoy hunting because of the influence of those around them.

to parse out the extent to which a discussion partner's expertise, her preferences, and the expertise and preferences of the residual network affect the probability that a discussion partner is influential.

While the experiment lacks mundane realism in many ways, it does have a great deal of psychological and experimental realism (Aronson, Wilson and Brewer, 1998). Subjects behave like real voters, even displaying partisan bias. This experimental campaign does differ from most democratic elections in a number of important ways. There is no incumbent - there is not even an incumbent party. Subjects, therefore, cannot retrospectively evaluate a candidate's performance in office. There is no rhetoric. Candidates cannot use their arguments to set the agenda or frame the issues to their advantage. No subjects abstain and the electorate is made up of only nine voters – a single vote could be decisive. These abstractions from reality were necessary to make the analysis manageable and to allow the experimenter to maintain control, but it also means that one must be cautious when reaching conclusions about real world behavior.

## **Experimental Design**

Subjects in the experiment participate in groups of nine as they take part in an election between two candidates.<sup>7</sup> The candidates, Adams and Bates, represent the A and B parties, respectively. Three subjects are assigned to the A party. Three subjects are assigned to the B party. Three subjects are independents. Adams and Bates are proposing competing payoffs. Subjects will receive the payoff proposed by the winning candidate plus an additional party payoff. Subjects receive a party bonus when the candidate from their party wins the election. If the candidate from the other party wins the election, subjects receive a penalty.

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<sup>7</sup>The 135 subjects for this experiment were recruited from undergraduate political science courses at the University of California, Davis. The subjects received a ten dollar show up fee plus whatever earnings they accrued during the experiment. The experiment is programmed using zTree - software for designing experiments in behavioral economics (Fischbacher, 2007).

Independents receive neither a bonus nor a penalty regardless of the election outcome.

Subjects know their individual party bonus and penalty, but they are unaware of the payoffs proposed by the subjects. To determine the payoff proposals subjects receive randomly drawn private information. Subjects are assigned a private information level and some subjects do not receive any private information at all. Subjects also receive information from three of their fellow subjects. The partisan preferences and information levels of these discussion partners vary. Some subjects receive information from three well informed subjects; others from poorly informed subjects. Some subjects primarily receive information from members of their own party; others receive information primarily from members of the other party. At the end of each experimental period, subjects use their private and social information to determine which candidate will provide them with the higher payoff and then they vote for that candidate.

### **Parties and Candidates**

Adams and Bates are proposing payoffs for all subjects. The payoffs are independently and randomly drawn from identical, uniform distributions with a lower bound of 20 Experimental Currency Units (ECUs) and an upper bound of 100 ECUs.<sup>8</sup> The payoffs are drawn from the same distribution and, therefore, the expected value of Adams' and Bates' proposed payoffs is equal at 60 ECUs.

Recall that at the end of each experimental round, subjects are awarded the payoff proposed by the winning candidate as well as either a party bonus or penalty depending on the outcome of the election. An individual's partisan payoff is randomly drawn from a uniform distribution with a maximum of 20 cents and a minimum of 10 cents.

On average subjects in party A are better off if Adams is elected and subjects in party

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<sup>8</sup>At the end of the experiment subjects were paid at a rate of 1 ECU equals 1 cent.

B are better off if Bates is elected because of these partisan payoffs.<sup>9</sup> Because the expected value of both candidates' payoffs is the same, independents without any information about the payoffs should be indifferent between the candidates. Subjects are aware of the distribution of proposed benefits and of their own party payoffs, but do not know the candidates' payoff proposals in any given election. To determine this, subjects will receive private information and social information from three of their fellow subjects.

The experiment takes place over seven "stages". Each "stage" is a computer screen with which the subject interacts.

### **Stage One: Private Information**

The first task for subjects is to estimate the global benefits that the candidates' offer based on unique information given to each subject. The nine subjects are assigned an information level from 0 to 4 which measures the number of piece information about candidate a subject will receive. Only one subject receives the maximum four pieces of information while there are two subjects at the other four information levels. This includes two subjects who do not receive any private information about the candidates. Subjects are assigned to an information level based on one of five different information treatments outlined in Table 1A.

Each piece of information contains signals about both candidates. These signals are independently and randomly drawn from a uniform distribution centered on the candidate's true benefit and extending 25 ECUs above and below that true benefit.<sup>10</sup> This means that on average the signals accurately represent the candidate's true position, but any particular

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<sup>9</sup>In expectation, the weakest partisans-those with a partisan pay of 10 cents - should vote for the candidate from their party 71.2% of the time; partisans with the mean partisan pay - 15 cents - should vote for the candidate from their party 79.8% of the time; the strongest partisans - those with a partisan pay of 20 cents - should vote for the candidate from their party 86.9% of the time.

<sup>10</sup>As a result, the possible signals extend beyond the limits of possible benefits. For example, if a candidate offered the lowest possible benefit of 20, then subjects may receive signals suggesting that the candidate's benefit is as low as -5.

signal is just as likely to largely over- or underestimate candidate's true benefit as it is to be on the mark. Subjects receiving multiple signals would benefit from greater variance in the signals. For example, if a subject received two signals that suggest that candidate A's benefit was either 45 or 46 ECUs, then the subject knows that the candidate's benefit lies somewhere between 21 and 70 ECUs. All of the values between that upper and lower bound are equally likely to produce signals of 45 and 46. On the other hand, if the signals were 45 and 95, then the subject would know that the candidate offers a benefit of 70 ECUs. This is because only 70 ECUs could produce both a signal of 45 and of 95.

Based on these private signals, subjects are asked to estimate the candidates' benefits. These initial estimates are the subjects' judgmental priors about the candidates. They will be used to determine how the subjects would have voted if they had been asked to vote without receiving information from some of the fellow subjects.

### **Stage Two: Sharing Information**

Subjects next share information with three of their fellow subjects. The subjects send a signal about their estimate for the global benefits offered by each candidate. In this stage, subjects are alters passing along information to egos. Subjects provide information to one subject from each party and an independent. Subjects know the partisanship and the information level of each ego.<sup>11</sup> They are told that they do not have to provide identical information to each subject, but they are not encouraged to misrepresent their beliefs.<sup>12</sup> Subjects may send messages strategically, however, because they know the information level and partisanship of each ego.

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<sup>11</sup>Survey evidence suggests that individual can accurately identify the preferences of their political discussion partners (Huckfeldt et al., 1998), as well as, differentiate between political expert and inexperienced individuals (Huckfeldt, 2001).

<sup>12</sup>The exact instructions to subjects are provided in the Appendix.

### **Stage Three: Receiving Social Information**

In this stage, subjects are now egos receiving information that the alters provided in the previous stage. Subjects receive information from the network of alters listed in Table 1B. These networks are combined with the information levels to place egos into several network “treatments” in which the partisan makeup and the information level of the network are manipulated.

Networks in this experiment take on one of three types: heterogeneous, homogeneous A, homogeneous B. In heterogeneous networks, there is one member of each party. In homogeneous networks, there are two members of either party A or party B and an independent. Partisan subjects, therefore, may receive messages from a majority of likeminded subjects, a heterogeneous network, or without any subjects that share their biases. The alters providing information may also be well informed (all having three or four pieces of information), poorly informed (all have no information or one piece of information), or something in between.

When they receive this social information, subjects are asked to estimate candidate positions again. They are reminded of their previous estimate and may update their estimate based on the social information they have just received.

### **Stages Four through Seven: Sharing Again and Voting**

Subjects provide social information a second time. The process is the same as in stages two and three. Subjects provide to and receive information from the same set of subjects as before. This second information sharing period allows subjects to incorporate the social messages they previously received into the messages they are sending now. After receiving the second round of social information, subjects make a third and final estimate.

After making this final estimate, subjects vote for their favored candidate. The out-

come of the election is revealed to the subjects as are the true benefits of the candidates. Payoffs are awarded to the subjects based on the proposed payoff of the winning candidate and the subjects' partisan payoffs. Subjects then participate in a new campaign with new, randomly-drawn, candidate benefits. The subjects' parties, partisan pay, information levels, and networks remain the same.

Subjects participate in as many elections as they can complete within one hour. In the analyses that follow, I use data from the first seven elections of each experimental session. There was a great deal of variation in the number of elections subjects completed.<sup>13</sup> Capping the number of elections at seven allows for balance across all fifteen sessions.

### **Summary of Experimental Design**

- **Stage 1.** Subjects receive private information and estimate candidate benefits.
- **Stage 2.** Subjects convey information about the candidates to three other subjects.
- **Stage 3.** Subjects receive social information from three other subjects and estimate candidate benefits.
- **Stage 4.** Subjects convey information to three other subjects.
- **Stage 5.** Subjects receive social information from three other subjects and estimate candidate benefits.
- **Stage 6.** Subjects vote for the candidate they believe will provide them with the larger payoff.

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<sup>13</sup>All subjects participate in one practice campaign. In that practice campaign, all subjects have a party pay of 15 ECUs and receive two pieces of private information. The practice campaign is not used in the analysis. After the practice campaign, one experimental session participated in five campaigns, one participated in six, two participated in seven, one participated in ten and one participated in twelve campaigns.



- **Stage 7.** Votes are tallied and payoffs are awarded. Subjects begin again at **Stage 1.**<sup>14</sup>

## **Persuasion as Agreement**

What are the characteristics that make an alter influential? To what extent does the alter's information level play a role? Do egos reject information from alters who are not like-minded partisans? How can other alters affect the influence of a particular alter? The following analyses address these questions by looking at when ego and alter vote for the same candidate.

The dependent variable in the logit models in Table 2 is coded one if ego and alter vote for the same candidate and zero if they vote for different candidates. The data is split according to the nature of the partisan relationship between members of the dyad. The first model includes dyads in which ego and alter have the same partisanship - both are members of party A or party B or both are independents. The second model examines dyads in which ego and alter are members of opposing parties - one member of the dyad is an A partisan while the other is a B partisan. Dyads in the final model have one independent and one partisan.

These three types of dyads represent three different expectations about the frequency of vote agreement. Members of the same party should vote for the same candidate, while members of competing parties should vote for different candidates. The raw numbers support this expectation. When ego and alter have the same partisanship, they vote the same way three-fourths of the time. Egos and alters vote for the same candidate less frequently when they are members of different parties, but still agree about half the time. This set up

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<sup>14</sup>One might expect subject behavior to change as they participate in repeated elections. For this reason, all analyses in this paper were replicated with period interaction effects and on a period by period basis. These analyses do not support any hypotheses about learning by subjects. Individual subjects may have learned and changed their behavior over the rounds, but on average it does not appear that happened.

directly tests four of the five hypotheses. Arguments about the effect of partisan agreement between ego and alter ( $H_3$ ) are not tested in these models because the data is split based on this dyadic relationship.

The autoregressive influence theory ( $H_4$ ) is tested using the variables Residual Agreement and Residual Disagreement which measure the extent to which the beliefs of the alter in dyad are the same as the ego's other alters. Residual Agreement is a dummy variable coded one if both of the ego's other alters voted for the same candidate as the alter in the dyad. Residual Disagreement is coded one if both of the ego's other alters voted for a different candidate from the alter in the dyad. The reference category is made up of those cases in which the two remaining alters split their votes. The two theories concerning alter expertise ( $H_1$  and  $H_5$ ) are tested using the variables Uninformed Alter and Residual Information. Uninformed Alter is a dummy variable coded one if the alter receive no private information and zero if the alter received any information. Residual Information is the mean information level of the ego's two other alters.  $H_2$  is tested using a dummy variable measuring whether or not the ego does not possess any information. In addition to these variables, the absolute difference between the candidates' true benefits is included as a control.

The only theory that is supported in all three models is the autoregressive influence theory ( $H_4$ ). In all three models, the variables Residual Agreement and Residual Disagreement are statistically significant and in the expected direction. The sizes of these effects are represented in Figure 1. Looking first at the case in which ego and alter are members of the same party, if the residual network votes as the alter votes, then there is a 88% probability that the ego and alter will vote for the same candidate.<sup>15</sup> That probability falls to 52% if the members of the residual network vote differently than the alter. For dyads with an indepen-

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<sup>15</sup>When calculating predicted probabilities for the residual agreement variables, all other variables are held constant at their means.

dent and a partisan, ego and alter will vote for the same candidate with an 81% probability if the residual network agrees and with a 25% probability if the residual network disagrees. If ego and alter are from different parties, then there is only a 16% probability they will vote for the same candidate if the residual network disagrees with the alter. If the residual network agrees with the alter, the probability ego and alter will vote for the same candidate is 73%.

In short, the influence of a single alter is dependent on the beliefs of the other people supplying the ego with information. If they do not support the alter, then the ego is more likely to ignore the alter's messages. These results do suggest that the egos are considering the party of the ego in their decision making. This is especially the case when the alter is the lone voice saying to vote for a particular candidate. When that alter is from another party, then she is ignored to a greater extent than when the alter is from the ego's party.

The models provide no support for Downs' (1957) argument about expertise ( $H_2$ ). Only the model where the dyad members are from different parties supports Richey's (2008) argument ( $H_5$ ). The probability that an alter will influence the ego decreases as the residual network becomes more informed. This suggests that egos are most likely to listen to an alter from another party, if the other people providing information to the ego are poorly informed. This effect is about half the size of the effect of residual network agreement, however.

### **Persuasion as Changing Minds**

The previous results are informative and provide strong support for an autoregressive theory of political influence. They suffer, however, from some of the same flaws as analyses of cross sectional surveys. Influence is a dynamic process and these analyses do not really test whether the alter persuaded the ego in any meaningful way. The models show when ego and alter are most likely to agree, but do not tell us if that agreement was the result of

communication between the ego and alter. For this reason, the model in Table 3 addresses whether the ego likely changed his or her vote following social communication.

The dependent variable in this model is coded using a three step process. First, the ego's initial estimates are used to determine who the ego would have voted for if she followed these initial estimates. Second, this expected vote is compared to the ego's final vote. Third, using this information the dependent variable is coded zero if the ego did not change her vote. If the ego did change, then the dependent variable is coded one if the ego changed to vote for the same candidate as the alter and negative one if the ego changed her mind and voted for the other candidate. The dependent variable, therefore, is an ordered variable indicating that the alter failed to hold a supporter, that there was no change in the ego's vote, or that the alter persuaded the ego to join his side. The large majority of ego's did not change their votes: 77% percent of ego's did not change their vote, while 15% were persuaded by the alter.

Because the dependent variable is comprised of three ordered categories, I could estimate a model using ordered logit. This model, however, assumes that a variable's effect on the probability of moving from category  $j$  to category  $j + 1$  is the same as its effect on moving from category  $j + 1$  to  $j + 2$ . Not all variables in my model meet this proportional odds assumption. So, I estimate a partial-proportional odds model.<sup>16</sup> The partial proportional odds model constrains coefficients that meet the proportional-odds assumption to be the same across all categories while allowing those coefficients that do not meet this assumption to vary. This model will allow me to observe if a variable affects the probability an ego will change in the direction of the alter, but does not affect the likelihood a subject will change away from the alter and vice versa.

The model in Table 3 uses all dyads and can, therefore, test all five hypotheses. Con-

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<sup>16</sup>The partial proportional-odds model is estimated using the `gologit2` command in STATA (Williams, 2006).

trary to many game theoretic expectations, egos are mostly likely to change their votes when the alter is from a different party ( $H_3$ ). There is a 16% probability that alters from another party will persuade egos. There is a 9% probability that alters will persuade if the dyad is made up of one independent and a partisan. The probability is only 5% that an alter from the same party will persuade an ego to join his side if both are from the same party.

This result is not wholly surprising as egos and alters are both highly likely to vote for the candidate from their party. When both members of the dyad are from the same party, the ego typically will choose the candidate from her party and the alter will agree, and, as a result, the ego will not change her vote. Hence, it is difficult for an alter from the same party as the ego to persuade given the definition of persuasion in this model. Theory and results presented elsewhere (Ryan, 2009), however, suggest that egos should have ignored information provided by alters from a different party. Alters who were not from the ego's party sent messages biased against the egos interests. Partisan egos who received messages predominantly from supporters of the other party were less likely to vote correctly.

The interaction effect between Uninformed Alter and Residual Network Information is statistically significant suggesting the effect of alter expertise and residual network expertise are conditional on one another ( $H_5$ ).<sup>17</sup> When probabilities are calculated, the only statistically discernable effect is among fully informed alters. When an alter is well informed, she is twice as likely to be influential if the residual network is uninformed than if the residual network is also well informed. In the first situation, the alter's expertise is not redundant and thus egos are going to place greater weight on that alter's information.

Like the models in Table 2, this model best supports an autoregressive influence

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<sup>17</sup>Three alternative measures of alter expertise were considered. First, instead of dividing alters into the informed and the uninformed, the actual count of pieces of information was included in the model. Second, expertise was measured using the accuracy of the alter's final message about the candidate's benefits in the previous round. Third, the model included a dummy variable measuring whether the ego would have voted for the candidate that would provide a higher payoff in the previous round by following the alter's final message. None of these alternative measures of expertise resulted in statistically discernable effects.

model ( $H_4$ ). As Figure 2 shows, there is a 17% probability that alters will persuade egos to vote as they do if the residual network agrees with the alter. If the residual network disagrees, there is only a 7% probability an alter will be influential. Once again, an alter is more persuasive if the messages from the alter are consonant with the messages from the rest of the network. If the alter differs from the other alters, then the messages the alter sends are likely ignored.

The largest effect in this model is not related to a characteristic of the alter or the residual network. Egos are mostly likely to be persuaded by an alter when the ego is uninformed ( $H_2$ ). An uninformed ego is 20 percentage points more likely to be influenced by an alter than an ego with some information.<sup>18</sup> Egos without any information are voting blind without the aid of someone who has some information and are, therefore, more open to persuasion (Mondak, 1995). This provides support for the two-step flow hypothesis (Lazarsfeld, Berelson and Gaudet, 1948) and may be normatively favorable, but only if the alter is providing accurate information. As in the real world, partisan egos in this experiment have a very useful cue if they hope to vote for the candidate that will provide them with the better payoff: the partisanship of the candidate. Alters can mislead an uninformed ego and persuade them to defect away from their party when voting party-line is typically a good idea.

## **Conclusion**

The experimental design in this paper allowed for the analysis of the persuasive effects of social communication without the internal validity concerns that plague the standard observational strategies. Selection effects are controlled because social networks are determined exogenously. The experiment, while abstract, does present subjects with a situation similar to that faced in a real world election. Parties put forth competing candidates who will pro-

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<sup>18</sup>Ego information level, however, does not affect the probability an ego will move away from the alter.

vide voters with benefits, but it is unclear at the outset of the election which candidate will provide the greater benefits. Subjects in the experiment appear to treat it as a real election, going as far as to develop a partisan bias in favor of the candidate from their party.

Theorists who advocate social communication as an information shortcut (e.g., Downs, 1957) place a great deal of emphasis on the qualities of the discussion partner. The results from this experiment, however, suggest that the qualities of a discussion partner have little effect on her influence. The information level of an alter has almost no effect on the alter's influence, though informed alters are more likely to be influential if the other discussion partners are uninformed.

If both members of a discussion dyad are from the same party, they are more likely to vote for the same candidate. Individuals, however, are often persuaded by alters from the other party despite theoretical reasons to be very skeptical of the information they provide. This willingness to follow information from members of the other party resulted in negative consequences for subjects. Analyses not shown in this paper demonstrate that subjects were less likely to vote for a candidate that would provide them with the larger benefit if they receive information from members of the other party (see Ryan, 2009).

The largest effect on whether or not an alter will be influential are factors that are external to the alter. In support of an autoregressive influence theory, alters are most influential when the messages they send are consonant with the messages other discussion partners send. There is evidence that in certain instances the influence of an alters is conditional on the expertise of the other discussion partners. The influence of an alter does appear to depend on the expertise of the ego. Egos who lack information are the most susceptible to influence because they do not have their own information which allows them to counterargue the messages from their discussion network.

To what extent are these results externally valid and to what extent are they driven by experimental design? There are elements of the design that do not accurately reflect real

world behavior. One of the most important examples is that all subjects in this experiment provided equal amounts of social information. In the real world, however, better informed individuals discuss politics with much greater frequency. Even with this abstraction from reality, the results in this paper are informative. Survey studies that find that expert discussion partners are more influential cannot separate out the reasons for this influence. Are experts more influential because of their greater expertise or are they more influential because they discuss politics more frequently and thus provide more information than anyone else? Expert alters in this experiment were not more influential suggesting that expert discussion partners are more influential because they provide more information not because they provide better information.

These results suggest that individuals do not strictly adhere to the Downsian criteria for selecting information sources. Individuals, however, do appear to operate in very sensible ways. They are persuaded to vote for a candidate when the message they receive is unanimous in favor of that candidate. If they possess private information that they know to be unbiased, they tend to trust that information over potentially biased social information. The messages alters provide is biased, but it also reflects reality – alters do not send strong positive signals about lousy candidates. Social communication, therefore, does not operate exactly as Downs would hope, but it appears that very few individuals are being led astray by their discussion partners.



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## **Appendix: Instructions to Experimental Subjects**

Thank you for participating in today's experiment. I will be reading from a script to ensure that every session of this experiment receives the same instruction. Feel free to ask questions if you require clarification. This instruction explains the nature of today's experiment as well as how to navigate the computer interface you will be working with. We ask that you please refrain from talking or looking at the monitors of other participants during the experiment. If you have a question or problem please raise your hand and one of us will come to you.

In the instructions that follow, all earnings are denominated in Experimental Currency Units or ECUs. At the end of the experiment, your earnings in ECUs will be translated into dollars at the rate of 1 ECU equals one cent. So, if you end with a balance of 1,500 ECUs, you would be paid \$15 plus the \$10 show up fee for a total of \$25. We will pay you in cash at the end of the experiment.

Today's experiment consists of up to 12 periods. Each period consists of a contest between two candidates, Adams and Bates. If elected, each candidate will provide a benefit to all participants. Your goal is to use private information and information from your fellow participants as you figure out the benefits and then elect the candidate that will earn you more money. Each candidate's benefit is randomly drawn. The smallest benefit is 20 ECUs and the largest is 100 ECUs.

Additionally, some participants are assigned to a party called A or B while some participants are independents. If you are in party A, you receive a bonus if Adams wins and receive a penalty if Bates wins. If you are in party B, you receive a bonus if Bates wins and a penalty if Adams wins. If you are an independent, you do not receive a bonus or a penalty regardless of the election outcome. For those participants in party A or B, your party bonus or penalty ranges from 10 ECUs to 20 ECUs.

Please turn to your computer screens. We have prepared several demonstration screens to help you get familiar with the actual screens you will see during the experiment.

*Screen One* This is the first screen you will see in each period. The top of each screen displays the period and the time remaining for this screen. We suggest that you make your decisions for a screen within the time limit, but you will not be forced to make decisions in that time.

In the upper left hand corner, you will see your participant number, your party, and the bonus or penalty you will receive depending on the outcome of the election. Remember, for members of party A, this is a bonus if Adams wins and a penalty if Bates wins. For members of party B, this is a bonus if Bates wins and penalty if Adams wins. This information will be in the upper left hand corner on every screen.

On this screen, you will receive private information about the candidates. The amount of private information you receive is randomly assigned. You may receive no information or as many as four pieces of information. Regardless of how much information you are assigned, this displays what it would look like if you were assigned three pieces of information. On average private information accurately represents the candidates' true benefit, but any single piece of information could be inaccurate.

Each piece of information is a number randomly drawn from an interval centered on the candidate's true benefit and extending 25 ECUs above and below that true position. So, while the candidate's proposals are bound between 20 and 100, the information you receive can fall outside of those bounds. There are examples on the handout. If the candidate proposes 20 ECUs, then the information can range from -5 and 45. If the candidate proposes, 50 ECUs the information can range from 25 to 75.

Based on the information you see, you are asked to estimate the candidate's proposals. Enter estimates for the two candidates and click OK.

*Screen Two* You will also provide information to three other participants. You are accurately told the other participants' number and party as well as the amount of private information the other participant received on the previous screen.

You do not need to provide identical information to each of the participants. You are reminded of the private information you received on the previous screen. Enter the information about the candidates that you want to provide to the other participants and then click OK.

*Screen Three* On this screen, you receive information from three other participants. These participants may be different from the participants that you provided with information. You are accurately told the other participants' number and party as well as the amount of private information the other participant received on the first screen. Once again, you are asked to estimate the candidate's benefit. You are reminded of your previous estimate. Enter estimates for the two candidates and click OK.

*Screen Four* You will again provide information to three other participants. You are reminded of the information you received from the other participants on the previous screen. Enter the information about the candidates that you want to provide to the other participants and then click OK.

*Screen Five/Six* On this screen, you receive information from three other participants. Once again, you are asked to estimate the candidate's benefit. You are reminded of your previous estimate. After entering your estimates, you will be asked to vote. You should vote for the candidate that will provide you with the better payoff. Your payoff is calculated by adding the candidate's benefit to the bonus or penalty you receive from that candidate winning. There is an example on the handout. In the example a member of party A has a party bonus



of 15 ECUs. Adams has a benefit of 50 and Bates has a benefit of 75 ECUs. In this case the participant should vote for Adams even though Adams' proposal is much lower. The participant will receive a payoff of 65 from Adams and only 60 from Bates once the party bonus or penalty is considered. However, if there is a large enough difference between the candidate proposals, you may want to vote for a candidate that isn't a member of your party. Enter estimates for the two candidates and click OK. Then vote for one of the two candidates and click OK.

*Screen Seven* This is the final screen. The two candidate's benefits are revealed as is the outcome of the election. You will also learn the number of ECUs you earned in this period as well as the number of ECUs you have earned up to this point in the experiment.

The experiment will consist of 12 periods like this one. At the end of these 12 periods, you will be asked a couple of questions about the experiment, asked to provide some demographic information, and a couple of questions about your general political leanings. All of your responses are anonymous. This concludes the demonstration screens. We are now ready to begin the actual experiment. We ask that you follow the rules of the experiment. Anyone who violates the rules may be asked to leave the experiment with only the \$10 show up fee. Are there any questions before we start?

Table 1: Subject Information Levels and Discussion Networks

**A. Subject Information Levels**

<i>Treatment</i>	<i>Egos</i>								
	A1	A2	A3	I4	I5	I6	B7	B8	B9
#1	1	0	0	2	1	3	4	3	2
#2	4	0	3	2	3	1	1	2	0
#3	0	4	1	3	1	2	2	0	3
#4	1	3	3	0	4	0	2	1	2
#5	3	2	2	4	0	0	1	3	1

**B. Subject Discussion Networks**

<i>Network</i>	<i>Egos</i>								
	A1	A2	A3	I4	I5	I6	B7	B8	B9
Alter 1	A2	A1	I6	A2	I6	A1	I4	A1	A2
Alter 2	I4	A3	B7	A3	B7	I4	B8	A3	I6
Alter 3	B9	I5	B8	I5	B9	B8	B9	I5	B7

Table 2: Vote agreement between ego and alter by the partisan relationship between dyad members.

	<b>Same Party</b>		<b>Partisan-Independent</b>		<b>Different Parties</b>	
	Coef.	Z-Value	Coef.	Z-Value	Coef.	Z-Value
Uninformed Alter	-0.249	-1.2	-0.054	-0.28	0.120	0.39
Uninformed Ego	-0.298	-1.32	-0.023	-0.13	0.691	2.36
Residual Network Information Level	-0.018	-0.19	-0.002	-0.03	-0.325	-2.44
Residual Agreement	1.134	4.37	1.274	5.73	1.130	3.78
Residual Disagreement	-0.806	-3.22	-1.297	-5.45	-1.537	-3.96
True Candidate Payoff Difference	0.004	0.70	0.018	4.72	0.008	1.19
Constant	0.951	3.71	0.210	0.97	0.335	0.87

N (Subjects)	918 (105)	1224 (135)	612 (60)
AIC	947.252	1269.88	704.3086

Logit estimates with standard errors corrected for clustering on subjects. Dependent variable coded 1 if ego and alter vote for the same candidate and 0 if ego and alter vote for different candidates.

Table 3: When do alters persuade egos to change their votes?

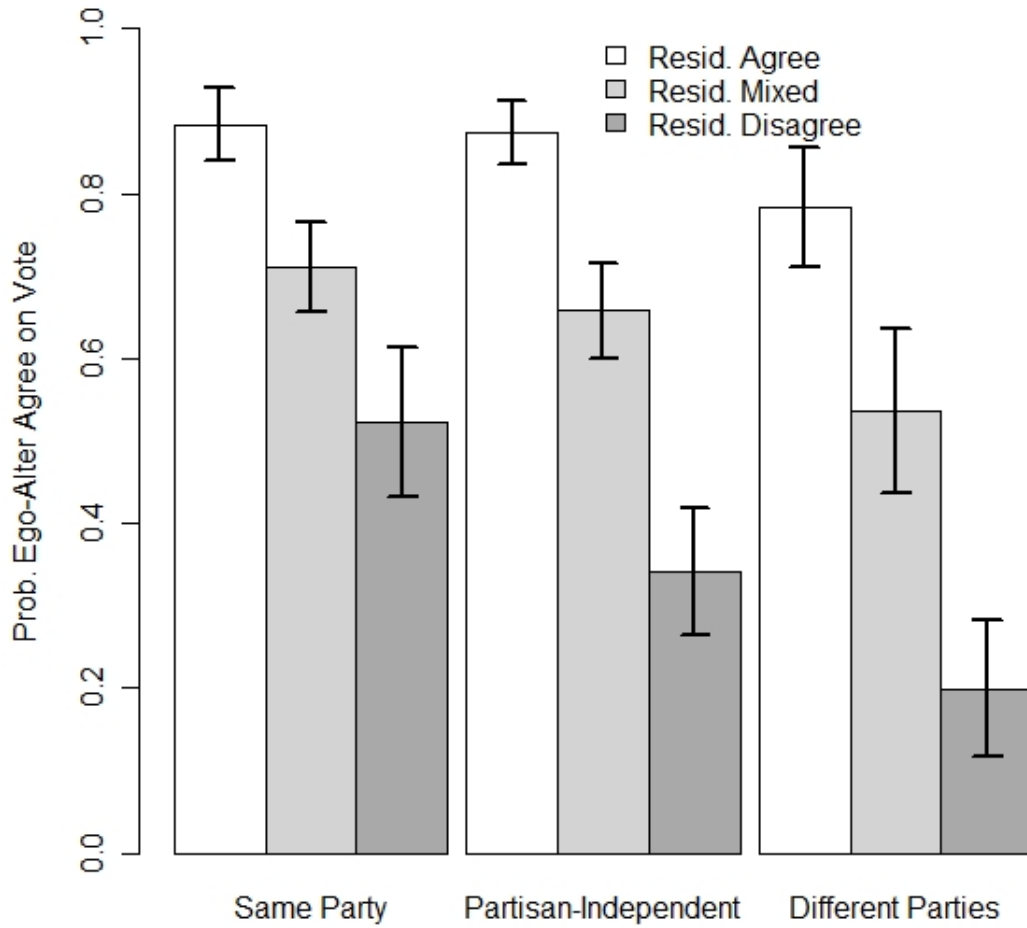
	Change Away		No Change	
	Coef.	Z-Value	Coef.	Z-Value
Uninformed Ego	-0.087	-0.37	1.301	5.00
Uninformed Alter	-0.457	-1.95	-0.457	-1.95
Ego & Alter Same Party	-0.041	-0.25	-0.516	-3.61
Ego & Alter Different Parties	0.596	4.29	0.596	4.29
Residual Network Information	-0.171	-2.45	-0.171	-2.45
Residual Agreement	0.502	2.55	0.502	2.55
Residual Disagreement	-0.479	-1.68	-0.479	-1.68
Uninformed Alter * Residual Information	0.279	2.00	0.279	2.00
Constant	2.595	12.63	-2.014	-9.48

N (Subjects)	2622 (135)
AIC	3373.279

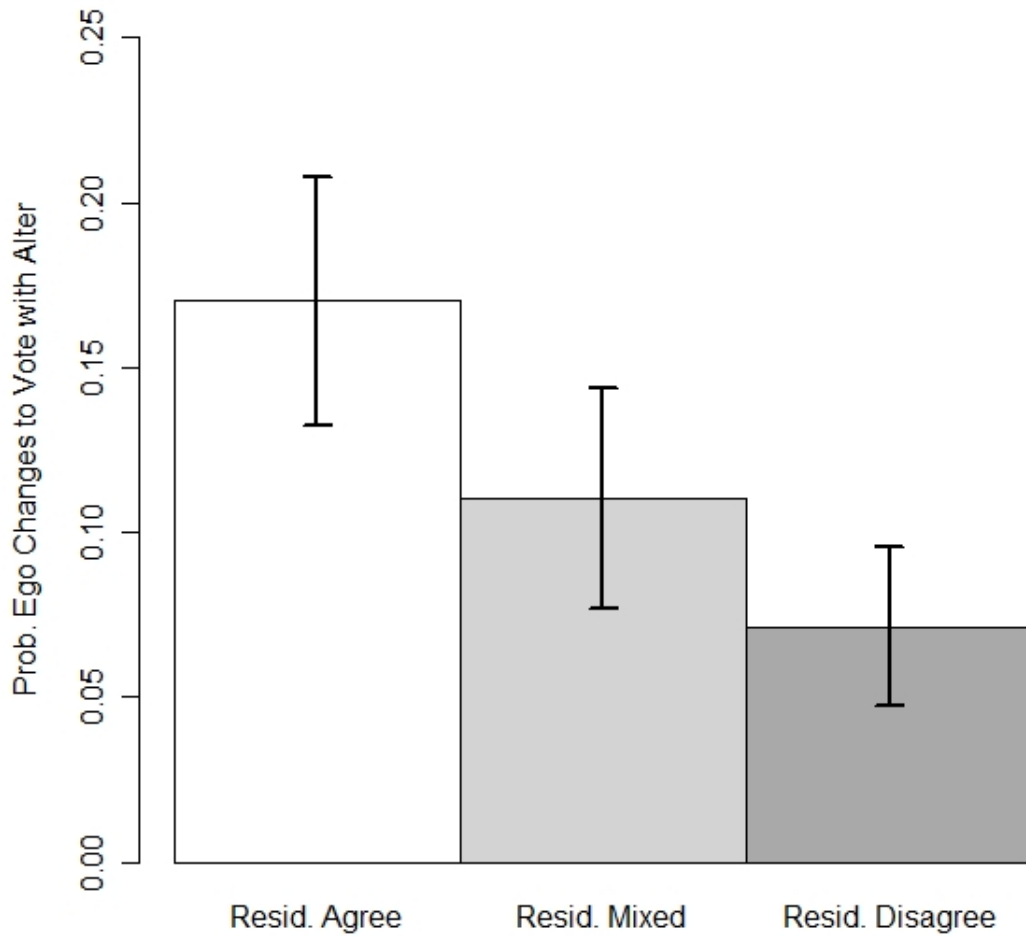
Estimates from partial-proportional odds model with standard errors corrected for clustering on subjects. Coefficients for variables that meet proportional odds assumption constrained to be the same. Dependent variable is coded -1 if the ego switched her vote away from alter's vote, 0 if ego did not switch her vote, 1 if ego switched her vote to alter's vote.

Figure 1: The effects of the residual network agreeing with the alter on the probability ego and alter agree on their vote choice.



Probabilities calculated using estimates from the models in Table 2. Error bars show 95% confidence intervals.

Figure 2: The effect of the residual network agreeing with the alter on the probability an alter persuaded an ego to switch to alter's vote choice.



Probabilities calculated using estimates from the models in Table 3. Error bars show 95% confidence intervals.