"Estimating the Effects of Attitude Structure in Shaping Public Opinion: The significance of the political value structures underlying data simulations of information effects"

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Political scientists and philosophers have spent centuries studying *how* citizens form preferences. An increasing number of empirical works suggest that knowledge plays a primary role in this process, shaping the preferences that citizens express (Zaller 1992; Bartels 1996; Sniderman et al. 2001), yet classifying citizens as politically knowledgeable would certainly be a mistake. Most citizens lack information about political actors, issues, and institutions (Delli Carpini & Keeter 1996).

Political scientists possess an increasing sense of the importance of political information in the process of preference formation. This sense, coupled with study after study indicating the relative political ignorance of the citizenry, has led to a burgeoning number of studies that estimate the effects of information on expressions of collective preferences, including opinion surveys or electoral outcomes (Althaus 1998; 2003; Bartels 1996; Delli Carpini and Keeter 1996; Gilens 2001).

However, the data simulation method used to estimate the size of information effects makes an important assumption about the relationship between knowledge and value structure. The simulation approach assumes that as citizens become more informed, they acquire the same value structures as held by highly knowledgeable individuals who share their same demographic characteristics. Political scientists have not tested the effects of information on preferences when we relax this assumption.

Given the impact of value structure on preference formation and the stability of individual value structures, exploring the effects of this assumption would make an important theoretical contribution to political knowledge research. This paper uses agent based modeling to explore the effects of the assumption. The results indicate that political knowledge matters. However, political value structures matter, too.

Knowledge, Values, and Political Preferences

Over the past thirty years, a large body of research on political knowledge has accumulated, suggesting that politically knowledgeable citizens differ from less knowledgeable citizens in politically significant ways. Knowledgeable citizens hold more stable opinions (Feldman 1988; Delli Carpini and Keeter 1996), and those opinions are more likely to correspond with their underlying political predispositions (Zaller 1992; Bartels 1996; Sniderman et al. 2001), update those opinions when new and relevant information becomes available (McGraw and Pinney 1991; Zaller 1992), and use those opinions to select candidates that reflect their political predispositions (Delli Carpini and Keeter 1996; Lau and Redlawsk 1992). Even the cognitive shortcuts and heuristics that political scientists believe can stand in for political knowledge require some political knowledge to be properly employed (Kuklinski and Quirk, 2000; Lau and Redlawsk 2001; 2006; Sniderman, Brody, and Tetlock 1991).

Unfortunately, citizens do not tend to possess high levels of political knowledge (Bennett 1988; Burns et al. 2001; Delli Carpini and Keeter 1996; Neuman 1986; Sigelman and Yanarella 1986). The importance of political knowledge and its scarcity among the public leaves scholars with questions about how public ignorance affects the shape of collective preferences.

Studies addressing this question measure information effects, or biases "in the shape of collective opinion caused by the low levels and uneven social distribution of political knowledge in a population" (Althaus 1998: 545). One prominent method of estimating information effects, or the impact of political information on political preferences, uses a data simulation method first employed by Delli Carpini and Keeter (1996) and later modified by Bartels (1996) and Althaus (1998; 2003). Following this method, a logistic regression is run on the entire sample of

respondents for each policy question using a number of independent variables. These include demographic characteristics, political knowledge, and interaction terms between each demographic characteristic and knowledge. The mean of the predicted probabilities provides an aggregate measure of actually expressed political opinion.

The equation for each logistic regression is as follows:

$$prob\ (Y_i = 1) = \ \alpha + \beta_1\ I_i + \sum \beta_k\ D_{ik} + \ \sum \delta_k (I_i * D_{ik}) + e_i,$$

where Y_i represents respondent *i*'s policy preference, I_i that respondent's political information score, D_{ik} the respondent's score on the *k*th demographic characteristic, $I_i * D_{ik}$ the interaction between the demographic characteristic and political knowledge scores, and e_i the error term for the *i*th observation. β_1 is the coefficient for information, β_k the coefficient for the *k*th demographic characteristic, and δ_k the coefficient for the *k*th interaction term.

To create a measure of fully informed political opinion, the political knowledge score of each respondent is changed to reflect the highest possible score. These new knowledge scores replace the actual knowledge scores used in the original logistic regression model, altering the interaction terms. Finally, the mean of the resulting predicted probabilities from this second equation serves as a measure of fully informed collective preference. An information effect is the difference between the mean of the preferences of fully informed respondents and the mean of the preferences actually expressed by respondents during the survey.

This method involves one major advantage for analyses of the effects of political knowledge on collective opinion. It provides a way to measure information's effect on political judgments without altering the underlying demographic characteristics of respondents. This is particularly important since those who possess knowledge tend to be demographically distinct from those who do not. With this simulation method, scholars can isolate knowledge's impact on

political opinions, in addition to knowledge's impact on opinions as it interacts with one's underlying demographic characteristics. This method offers scholars a unique opportunity to study how disparities in the possession of information distort the collective opinions expressed by citizens. More importantly, it remains sensitive to the influences of demographic characteristics on political preferences, and the influences of these characteristics as they interaction with political knowledge.

Empirical studies employing this method find that fully informed citizens would express different collective issue preferences (Althaus 1996a; 1996b; 1998; 2003; Bartels 1996; Delli Carpini and Keeter 1996; Gilens 2001). Some evidence also suggests that information affects electoral outcomes (Althaus 2001; Bartels 1996). These information effects can even change the direction of collective preferences, shifting public opinion from support for an issue or a candidate to opposition for that same object (Althaus 1998; Althaus 2003).

Works using this data simulation method increase our understanding about how the dispersion of political knowledge within the population may distort collective preferences. They also advance our understanding of American political life, since collective preferences shape American politics. Electoral returns determine who possess power and surveyed opinion affects the behavior of political elites (Jacobs and Shapiro 1996).

Nevertheless, assumptions inherent in this data simulation method deserve further attention. This method assumes that more informed citizens will mirror the same value structures as highly knowledgeable individuals that share their same demographic characteristics. Yet the political knowledgeable and the less knowledgeable do not always have the same value structures (Althaus 2003: 169-171). Political scientists have not tested the effects of information on preferences when we relax this assumption. Given the impact of value structure on preference

formation and the stability of individual value structures, exploring the effects of this assumption makes an important theoretical and empirical contribution to political knowledge research.

Value Structures and Preference Formation

Researchers studying the effect of knowledge demonstrate that knowledge remains an important factor in preference formation, largely because knowledge allows individuals to translate their political values into preferences that reflect their beliefs (Delli Carpini & Keeter 1996). These political values reflect "the criteria people use to select and justify actions and to evaluate people (including the self) and events" (Schwartz 1992: 1). Scholars across a wide range of disciplines have theorized about or empirically studied political values (see Rohan 2000). Their work provides evidence about the importance of values in preference formation and evidence of the stability of attitudes over time. It also suggests that the assumption made by scholars using data simulations to estimate information effect may have a significant impact on the results they report.

Values affect policy preferences (Feldman 1988; Peffley & Hurwitz 1985; Zaller 1992). For instance, commitment to equality acts as an important factor in predicting attitudes about social welfare (Feldman 1988). Group-based dominance, reflecting a preference for group inequality, acts as an important factor in predicting attitudes about minority rights (Eagly, et al 2004). Yet studying one particular value captures only a small portion of the relationship between values and political preferences.

Individuals possess multiple values, and individuals order these values within a hierarchical system (Rokeach 1973: 5; Schwartz 1992). These systems create *value priorities*

among the values held by an individual.[1] An individual's answer to any political question likely involves resolving conflicts between values (Tetlock, Peterson, & Lerner 1996). How individuals resolve these conflicts and reconcile competing values affects preference formation (Schwartz 1996). This research indicates that values and value structures are an important aspect of political behavior, which exhibit a surprising level of stability over time.

Scholars studying political attitudes find evidence of value stability over time (Rokeach 1973; Sheng 1995). Rokeach finds a strong correlation between the support for equality, measured at two different times (0.71). Sheng, correcting for measurement error, finds a stability coefficient of 0.81 (1995) for the same value. Not all individual values exhibit such high stability. The correlations for many of the values that Rokeach tested remained in the 0.6 range (1973). Nevertheless, most of these correlations indicate an individual's political values are a stable trait. Value structures exhibit an even greater average stability than individual values (Rokeach 1973). Rokeach (1973), when computing rank-order correlation for eighteen political values, finds relatively high levels of stability among respondents, with median correlations of around 0.7 or 0.8.

The literature on political values indicates that political value structures affect the preferences individuals express. It also provides evidence that political value structures remain stable over time. The impact of political value structures on preferences and the stability of these structures suggest that relaxing an assumption involved in data simulations — that more informed individuals would mirror the value priorities of more knowledge citizens who share their demographic characteristics — may affect the estimates drawn from these models.

[1] Empirical evidence indicates that political values have a unipolar structure, ranging from strong endorsement of a value to indifference (Cacioppo, et al 1984; Eagly & Chaiken 1998).

The empirical analyses undertaken in this paper test the effects of these assumptions using agent based models, an approach well-suited for such tests. Agent based models appear as a particularly effective way of studying the impact of knowledge while accounting for political value structures, because they allow us to hold those structures constant and to examine the effects of studying individuals as embedded within social structures, rather than as atomistic beings.

Agent-Based Modeling

We will use agent-based modeling (ABM) in this paper to investigate whether applying information shocks to people with stable value structures can lead to preference changes. This type of modeling is advantageous as it provides a bridge between micro- and macro-levels of analysis. Following this method, agents programmed with simple behavioral rules change and adapt *in interaction* with other agents, allowing us to observe the large-scale consequences of their interdependent actions over time (Macy and Wiler 2002; Smith and Conrey 2007).

Agent-based modeling is methodologically very flexible, allowing for the modeling of social phenomena that may not otherwise be accommodated by traditional methods. By exceeding the smoothing constraints of formal mathematical modeling, ABM easily accommodates assumptions of nonlinear effects, such as thresholds in "tipping" models (see Schelling 1976), and can more easily simulate scenarios with multiple equilibria or even no equilibrium solutions. Agent-based models are also backward-looking, having "memory." This means that the initial condition of an agent affects the simulation outcome, a characteristic particularly important when some irregular element is present in the distribution of agent traits or behavioral rules.

Agent-based modeling does not make the macro-state entirely predictable. However, repeated "runs" of the simulation yield predictable patterns of behavior, providing guidance to the most 'plausible' among the 'possible' futures among the outcomes (Lustick and Miodownik 2009). This method provides a powerful way to study phenomena that prove too difficult to investigate with other research designs, either because of insufficient data or because these other research designs cannot capture and analyze the desired variations.

In this paper, we use ABM for theory validation. Drawing from literatures in political science and communication, we define behavioral rules for interaction and the individual properties of agents. We then test whether aggregate pattern of behavior match the outcomes predicted by logistic based data simulations of information effects. In this case, we simulate the counterfactual to the key assumption made in these data based simulations by demonstrating what happens when an information shock on collective preferences occurs and people's value structures remain stable.

Experimental Setup

We designed two versions of simulations using NetLogo. Each version specified a different behavioral rule to guide agent interactions when an information shock was applied.

These models simulate agent preferences for two American National Election Studies (ANES) questions found in the 2008 times series survey. The first asks citizens their opinions on the acceptability of abortion when the health, but not the life, of the mother appears in danger. The second question solicits opinions on support for investing social security funds into personal retirement accounts.[2]

[2] See Appendix A for exact question wording.

We create a population of agents on a wrap-around grid of size 33 x 33 (N = 1089). Every space on the grid contains one agent, characterized by a set of socio-economic attributes: Age, education and gender.[3] Leveraging the information available in the ANES, we estimate an ordinary least squares regression model predicting preferences on these two questions based on demographic characteristics that routinely impact preferences.[4] We then allow each agent to acquire initial opinion for these issues based on the resulting OLS equation, which appears as follows:

$$\text{Abortion opinion} = 0.307 + 0.751 * \textit{education} - 0.001 * \textit{age} + 0.031 * \textit{gender} + \varepsilon$$

And

$$\text{Social Security opinion} = 0.772 + 0.008 * \textit{education} - 0.007 * \textit{age} + 0.102 * \textit{gender} + \varepsilon$$

where ε represents a randomly generated error term.[5] The opinion level of each agent is then converted to a binary preference for the policy, 0 for opposition and 1 for support. This method ensures that the initial collective preferences within the ABMs approximate those taken from the general population in 2008.

We also assign each agent a value hierarchy. The three values used are egalitarianism, conservatism, and group based dominance. The first represents the importance of equality among individuals, the second the importance of traditional moral values, and the third importance of group based hierarchies in social or political life.

[3]Age is generated in accordance to demographic analysis using data from the ANES. Due to limitations in Netlogo, gender and education levels are generated randomly from uniform distributions.

[4] A number of other demographic characteristics may matter, and be included in this equation. As an initial run, and to maintain relative simplicity in the model, only these three characteristics are used.

[5] We included an error term to adjust the initial distribution of agent preferences to best match the distribution of preferences as found on the ANES (opposed = 52.4% oppose, 47.6% favor)

Since political values have a unipolar structure, ranging from strong endorsement of a value to indifference, whether individuals hold these views remains less important than how they rank them relative to one another (Cacioppo, et al 1984; Eagly & Chaiken 1998). We determine the value ranks of agents by randomly generating numerical weights from 0 to 100. An agent that ranks their values egalitarianism (78), conservatism (63), and group based dominance (20) holds egalitarianism to be more important than the two other values. However, egalitarianism and conservatism remain close in the value structures, far outranking group based dominance

When run, the ABM simulation polls the population to determine the pre-shock opinion level, applies an information shock that prods the agents to reconsider their own opinions, and then polls the opinion level again to determine how many agents changed their opinions in response to the shock.

The model does not force agents to reconsider. When they receive the information shock, agents examine the numerical weights of their first- and second- order preferences. If that distance falls under a specific threshold, then the agent reconsiders his preference according to the decision rules described below. If that distance falls outside of the threshold, the agent holds on to his initial preference. This design allows the user to specify a high threshold that approximates scenarios where agents hold no strong fixed preferences regarding a certain policy or a low threshold that approximates scenarios in which they do hold strong fixed preferences.[6]

In the first version of the ABM we run, an agent reconsidering his opinion looks to eight surrounding agents. These agents represent a neighborhood of potential influencers (Granovetter

[6] The threshold used here are 15 abortion and 45 for social security. These differences reflect the fact that some issues are "easier" for individuals. Abortion is not a new issue in American political life, and individuals may use heuristics based on their party identification or religion to make decisions without information. Considering an individual with equidistant values would have values separated by about 33, 15 appears a rather conservative estimate for reconsideration. Private investment of social security is an issue of more recent emergence and, less tied to institutions like party that may provide individuals with heuristics for decision-making. For this reason, we assume individuals are more likely to respond to new information on this issue, and set the threshold for reconsideration much higher.

1985; Friedkin 1986.) The agent then takes on the majority preference of those in his neighborhood.

In the second version, an agent reconsidering his opinion looks to eight surrounding agents. He will then isolate those neighbors who share the same first-order values. He then takes on the majority preference among this subset of neighbors. If *no* neighbors share his first-order value, then the agent looks to the second-order value of his neighbors. He will take on the majority preference of those neighbors whose second-order value matches his first-order value. If no agent shares his first- or second-order value, the agent retains his initial preference.

In other words, in the first run of the model, the agent interacts with all neighbors equally; but, in the second run, he is motivated only to consider the opinions of those most like him (Taber and Lodge 2006).

Information Shocks and Value Structures

This section compares the results of the logistic data simulation method employed by political scientists to the results emerging from the agent based models described above on a question about abortion and about social security investment. The results indicate interesting differences between these methods, which suggest relaxing a central assumption used in data simulations based on logistic regressions may affect the size of the information effects that emerge from these models.

Abortion

In 2008, 48% if respondents supported abortion when health risks existed for the mother. The data simulation method derived from a logistic regression indicates that if all respondents

possessed the same level of information as the most knowledgeable of their peers, individuals would be more supportive of abortion under these circumstances.[7] Collective opinion would move from 48% approval to 58% approval — an information effect of 10%.

In the first version of the ABM, 433 (40%) of the agents shocked have first- and second-order values close enough to reconsider their preferences and look to their neighbors. Of this 433 who reconsider, 190 (44%) change their preferences and 243 (56%) did not. This moves the collective preferences from 48% to 52%, an information effect of 4%.

[INSERT FIGURES 1 AND 2 ABOUT HERE]

In the second version of the ABM, 412 (38%) of the agents reconsidered their preferences. These 412 agents looked to those in their neighborhood who had value structures similar to their own. 175 (42%) agents changed their initial preferences and 237 (58%) did not. These changes move collective opinion from 49% to 51%, an information effect of only 2%.

[INSERT FIGURES 3 AND 4 ABOUT HERE]

Social Security

Interviewers administering the 2008 ANES time series survey asked respondents about their opinions on investing social security funds in private accounts. 49% expressed support for this investment. The data simulation method that models preferences using logistic regression suggests that more a more knowledgeable electorate would be less supportive of investing social

[7] Appendix B and C outline the method and operationalization of variables in detail.

security funds into private accounts. Collective approval decreases from 49% to 31%, an information effect of 18%.

The direction of simulated collective preferences differs in the first version of the ABM. 49% initially approve of investing social security in private accounts. 723 (66%) of individuals have first- and second-order preferences close enough that the information shock causes them to reconsider their preferences. These individuals look to the preferences of their neighbors. 284 (39%) changed their preferences, and 439 (61%) kept their original preferences. These changes increase approval on this policy from 49% to 66%, an information effect of 17% in the opposition direction.

[INSERT FIGURES 5 AND 6 ABOUT HERE]

The second version of the ABM model shows a similar pattern. 47% of agents initially approve of private accounts. 893 (82%) have first- and second-order preferences close enough that they look to their neighbors when they receive the information shock. These individuals look to their neighbors and isolate those who closely mirror their value structures. 339 (38%) change their preferences, 554 (62%) do not. These opinion changes increase approval from 47% to 59%, an information effect of 12%.

[INSERT FIGURES 7 AND 8 ABOUT HERE]

Information effects estimated by manipulations of logistic regressions and those estimated by ABMs differ. The latter method treats value structures as static and individuals as

social beings, rather than atomistic beings. These changes, derived from political communication and political science literature, reveal smaller information effects on the issue of abortion and information effects in different directions on private investment of social security funds. Our results suggest that the assumption about the static nature of value structures inherent in the logistic regression models affects their estimates of information effects.

Conclusions

Political knowledge remains a popular area of study in political science. Many of the most innovative works that attempt to measure knowledge's effects outside a laboratory setting use a data simulation based on manipulations of a logistic regression equation (Althaus 1998; 2003; Bartels 1996; Delli Carpini and Keeter 1996; Gilens 2001). This method advanced political knowledge research, suggesting the importance of political knowledge in preference formation and revealing some of the problems inherent in the uneven distribution of knowledge. Their work also indicates that the uneven distribution of political knowledge affects collective political preferences, sometimes even changing the direction of these preferences (Althaus 1998; 2003; Gilens 2001). However, their methodology involves an important assumption — that as the politically ignorant become more knowledgeable, they acquire the value structures of the most knowledgeable. This paper uses a new method, agent based modeling, to explore the effects of relaxing this assumption. Our findings suggest that even when holding value structures constant, political knowledge can change collective opinions. Yet these findings also reveal important differences between the predictions derived from these two methods, which indicate the importance of the assumptions made by those using data simulations based on logistic regression.

Agent based models predict smaller information effects, particularly when individuals look to those most like themselves in response to an information shock. These results indicate that knowledge matters, but does not alone determine whether individuals change their mind. Individuals shocked by a factor may reconsider their opinions. Or they may not. Only when individuals hold values that may conflict, they will re-evaluate their previously held opinions. Clearly, political value structures play a role in the nature of their response.

Agent based models also predict that information effects may differ in directions. This suggests the importance of our methodological choices. While we cannot say why simulations of opinion on social security moved in different directions, this difference may well be related to the initial distribution of the opinion within the population. Attention to these distributional issues may change our understanding of how knowledge affects political judgments, providing a fruitful area of political science research.

As important, the agent based model captures many of the complexities of political knowledge other methods do not. The agent based model used here incorporates findings from a number of literatures, which examine how individuals interact and behave politically within they space they inhabit. This research suggests that political values shape opinion (Feldman 1988; Peffley & Hurwitz 1985; Zaller 1992), that political value structures are stable (Rokeach 1973; Sheng 1995), that individual's interact with other individuals, and that individuals display a propensity to assign greater weight to those most similar to themselves (Kelman 1958). We incorporate the findings from this research into our methods of estimating information effects. Infusing this research into the study of information effects better captures the information flows that surround individuals. Results suggest that, when we conceptualize human beings in this

way, pre-existing value structures may affect how individual opinions change in response to a shock, like a new piece of information.

The agent based model that reveals these findings also provides a way to capture aspects of political knowledge not emphasized in previous methods of estimating information effects. Political knowledge simulations used in many prior works capture the relative effects of political knowledge. Political knowledge has a relative dimension — some people have more than others (Grönlund and Milner 2006). However, this model captures another fundamental reality of political knowledge. Political knowledge is not a finite resource (Delli Carpini and Keeter 1996). Even those most knowledgeable can learn more, and must as new issues emerge. The agent based model used above allows individuals of all knowledge levels to reconsider their opinions, not just those with lower levels of information. While previous methods reveal a great deal about the effects of knowledge as a relative measure, this model reveals the effects of knowledge as an infinite resources. Consequently, this measure demonstrates that shocks to one's knowledge level may affect anyone.

This model captures another important aspect of political behavior, the interconnectedness of human beings. Not all individuals who reconsider their opinions, regardless of their knowledge levels, will change their minds. The agents that surround individuals influence whether individuals do so (Friedkin and Johnsen 1990). By allowing individuals to interact with those around them who share their values, the agent based model captures a fundamental reality of human life. Human beings are not atomistic. They remain embedded within their environment. This environment affects how they respond to shocks and resolve political uncertainty, like that involved in receiving a new piece of information.

The empirical work in this paper suggests that incorporating value structures and social environments into our study of information effects may yield different results than more traditional methods. This finding does not demonstrate that the data simulations used in previous work are inaccurate measures of information effects. However, these results do suggest that such data simulations conceptualize values structures as malleable, individuals as atomistic, and knowledge as finite. These assumptions shape their results. Agent based modeling allows scholars to relax these assumptions, providing a fruitful way to capture the complexities inherent in studies estimating the impact of political knowledge on collective opinion.

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Appendix A: Dependent Variable Wording

V085092 Do you FAVOR, OPPOSE, or NEITHER FAVOR NOR OPPOSE abortion being LEGAL if: staying pregnant would hurt the woman's health but is very unlikely to cause her to die? (Neither coded as missing)

V085104 A proposal has been made that would allow people to put portion of their Social Security payroll taxes into personal retirement accounts that would be invested in stocks and bonds. Do you FAVOR this idea, OPPOSE it, or NEITHER FAVOR NOR OPPOSE it? (Neither coded as missing)

Appendix B: Simulation Method

The equation for each logistic regression is:

$$prob\ (Y_i = 1) = \ \alpha + \beta_1\ I_i + \sum \beta_k\ D_{ik} + \ \sum \delta_k (I_i * D_{ik}) + e_i$$

Y_i is respondent *i*'s policy preference, I_i is that respondent's political information score, D_{ik} is the respondent's score on the *k*th demographic characteristic, $I_i * D_{ik}$ is the interaction between the demographic characteristic and political information scores, and e_i is the error term for the *i*th observation. β_1 is the coefficient for information, β_k is the coefficient for the *k*th demographic characteristic, and δ_k is the coefficient for the *k*th interaction term.

This technique ensures that the simulation of fully informed preference accounts for the effects of relevant demographic variables, in addition to the interaction between these variables and political information. Those respondents that still responded "don't know" after being prompted are not dropped using this method. Instead, the preferences expected given their demographic characteristics under conditions of complete information are simulated.

The following is an example of the estimates from this model.

Figure A-1 Coefficients for Approval of Abortion (percent approving)

N = 744 Psuedo R^2 = 0.1391

Variable	Main Effects	Interactions
Knowledge	-0.2411	
Education	-0.4508^	0.0864*
Parental Status	-0.9150	0.0800
Income	-0.0028	0.0007
Age	-0.0161	0.0009
Sex	1.0628*	-0.1338*
Marital Status	-0.4515	-0.0129
Republican	0.5871	-0.1880*
Democrat	-0.3861	0.0771
White	1.0301	-0.0035
African-American	0.1935	0.0812
Protestant	-0.6827	-0.0062
Catholic	-0.1229	-0.0853
Union Membership	2.1934*	-0.2247*
Home Ownership	-0.2109	0.0122
East	-0.7746	0.1829
West	-0.4127	0.1092
South	-0.3661	0.0819

Note: ^p < .10, *p < .05, **p < .005, ***p< .001

Appendix C: Variables and Coding

Demographic Variables

The demographic variables included in the simulation models are age, education, income, religion, race, union membership, marital status, and parental status, and party identification.[8] These variables represent a combination of those that previous researchers have used in their analyses of information effects (Bartels 1996; Althaus 1998).[9]

The party identification variables, *democrat* and *republican,* are dichotomous, coded as 1 if the respondent identifies with or leans toward either the Democratic or Republican Party, and 0 otherwise, and created from a general party identification question asked of respondents. Independents are the reference category for the party identification measures.

Sex is a dichotomous variable coded 1 for men and 0 for women. *Age* is a continuous variable. E*ducation* is transformed into categorical variable that ranges from 1 to 5. Respondents who did not finish high school are coded as 1, those who have a high school diploma or the equivalent are coded as 2, those who have some college or vocational training but no college degree are coded as 3, those who have either a two- or four-year college degree are coded as 4, and those who attended or completed graduate or professional school are coded as 5. *Income* is coded as a percentile. U*nion membership* is a dichotomous variable coded as 1 if the respondent or any member of their household is in a labor union and 0 otherwise. *Homeowner* is coded as 0 if the respondent owns their home, 0 if they do not. The variable *parent* is a continuous measure of the number of children under 18 living in the household of the respondent, while *married* is coded as 1 if the respondent identifies their marital status as married and 0 if they do not. Respondent's classification of their race is used to create a variable to identify African-Americans. *Black* and *white* are again a dichotomous measure, coded as 1 if a respondent identifies as a member of either race and 0 if they identify as a member of any other race.

Variables are also created to identify Protestant or Catholic respondents from respondent classification of their religious beliefs. *Protestant* is coded as 1 if a respondent identifies as protestant and 0 if they do not. *Catholic* is coded as 1 if a respondent identifies as catholic, and 0 if they do not. Respondents who identify as members of any other religions, as atheist, as agnostic, or as non-denominational serve as the reference category for these religious variables.

Finally, dummy variables are also included for a respondent's location. These include *east, west,* and *south,* with respondents living in Midwestern states serving as the reference category.

Political Knowledge Variable

The p*olitical knowledge* variable is a combination of responses to factual knowledge questions and the interviewer's rating of the respondent's knowledge.

[8] Party identification may be better characterized as a cognitive shortcut than a demographic factor. However, its inclusion here minimizes the possibility that the effect of political knowledge on policy preferences will be artificially inflated, and its relative stability overtime makes it comparable to other demographic variables (Althaus 1998).

[9] There are three demographic characteristics commonly included in studies of political opinion that are absent here. The first is a measure of urban/rural location, which is not available in this survey. The second is measure of occupational status, not yet coded by those compiling ANES data. The third is a subjective measure of the respondent's financial situation relative to their situation a year before.

The factual questions include questions about the political environment, the relative positions of parties/candidates, and the identities of political actors. Respondents were asked to identify which party controls the House of Representatives, which party controls the Senate, and which party is more conservative on national issues. Other questions about the political environment asked respondents to identify the rate of unemployment, inflation, and the size of the income gap relative to the size of that gap in previous years.

Interviewers also asked respondents about the relative ideological positions of the two major political parties and presidential candidates. Respondents were also asked about the relative positions of each party on prominent national issues, including health insurance, defense spending, and regulating carbon emissions. Finally, interviewers asked respondents to identify those holding the following officers: Speaker of the House, Vice-President, Prime Minister of England, and Chief Justice.

Correct answers to the above questions were assigned a 1, and incorrect answers a zero. Interviewers assessments of respondent knowledge are reverse coded, with those interviewers identify as most knowledgeable being assigned a 1 and the least a 0.

Answers to the factual questions and the interview assessments are summed, yielding a political information measure with a maximum value of 15 and a minimum value of 0. The average political knowledge score for women in this sample drawn from the 2008 American National Election Survey is approximately 11, with a standard deviation of approximately 4. The index created by adding the interview knowledge rating to this measure has a Cronbach's alpha of 0.7276.

Figures

Legend: Blue indicates approval; White disapproval; Red reconsideration and a change of preference (in either direction); Green reconsideration without any change in preference

Figure 1: Pre-information shock when actors weight neighbors equally (re: abortion)

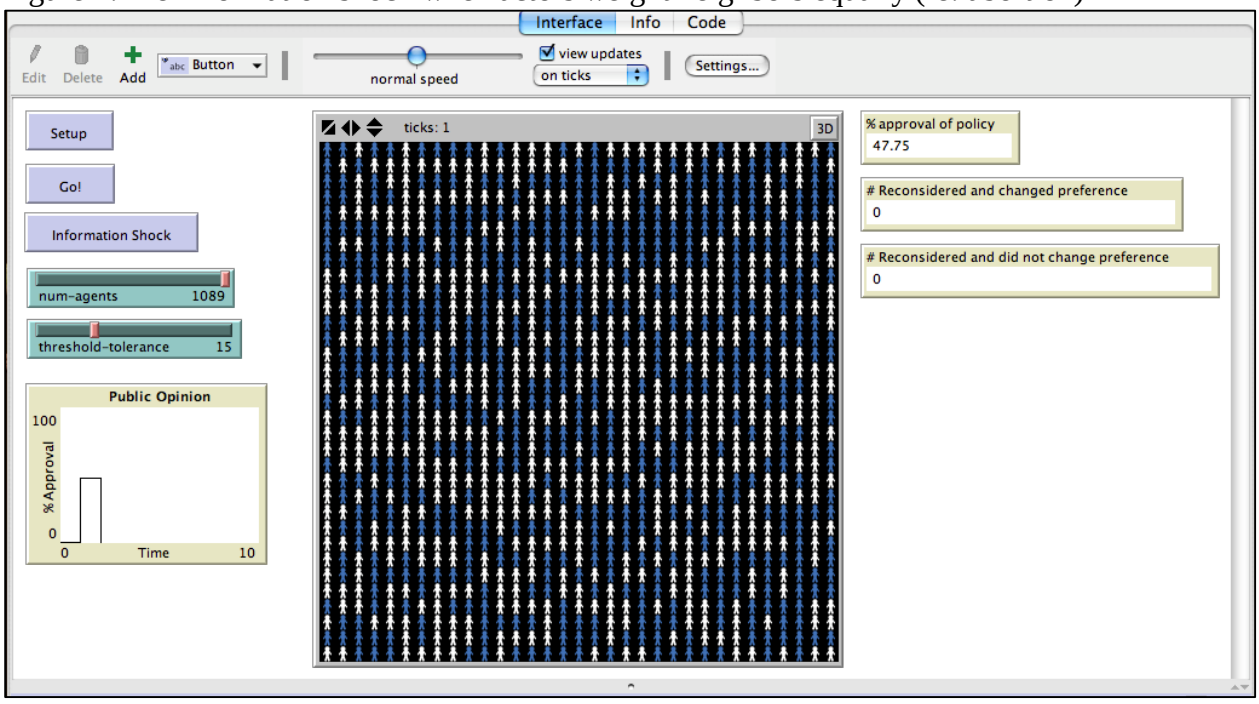

Figure 2: Post-information shock when actors weight neighbors equally (re: abortion)

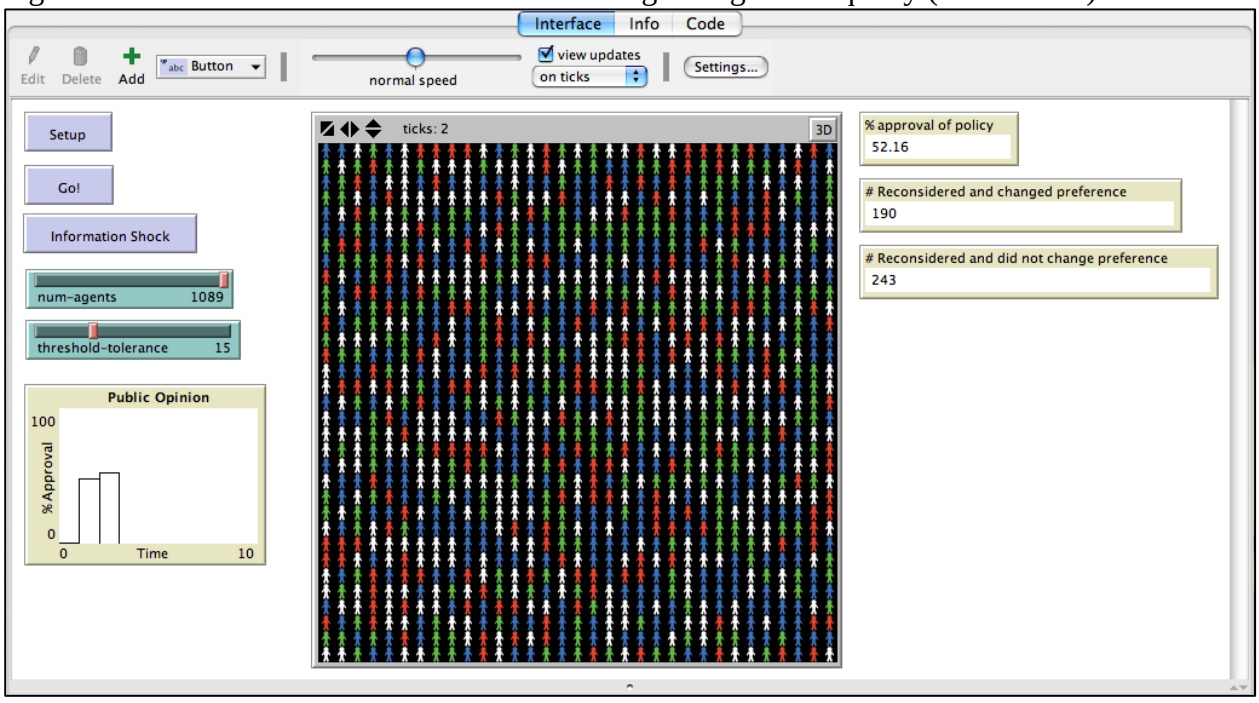

Figure 3: Pre-information shock with weighted consideration of neighbors' value structure (re: abortion)

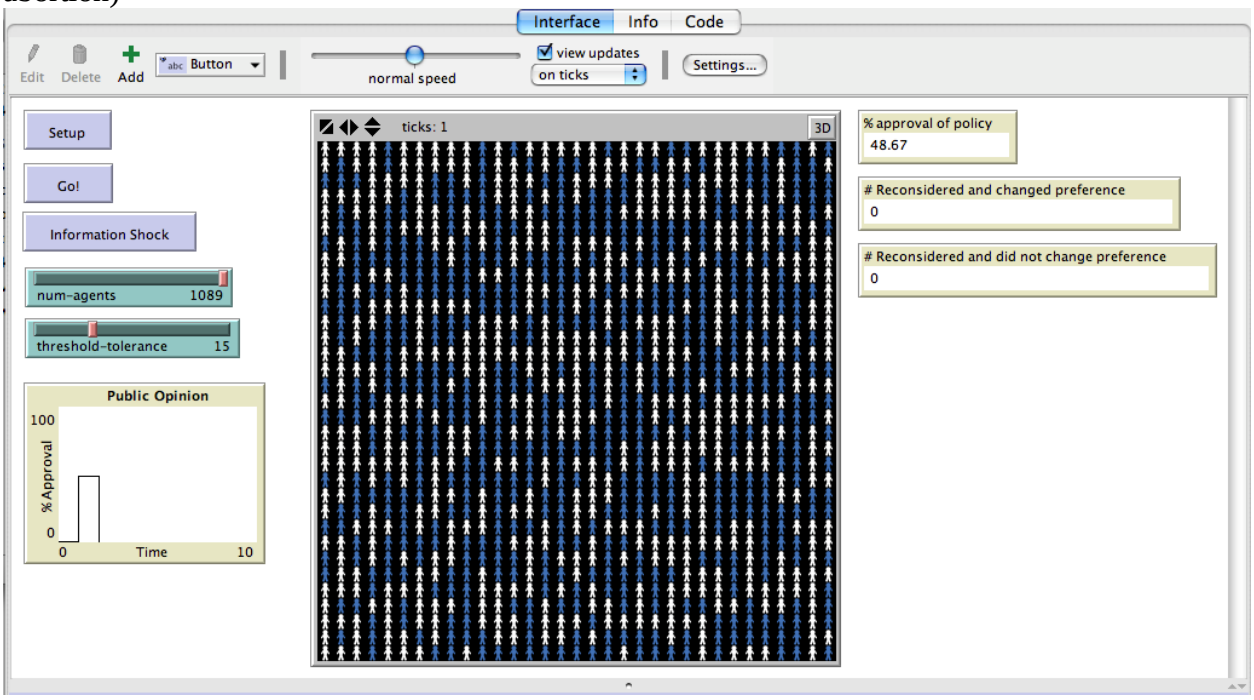

Figure 4: Pre-information shock with weighted consideration of neighbors' value structure (re: abortion)

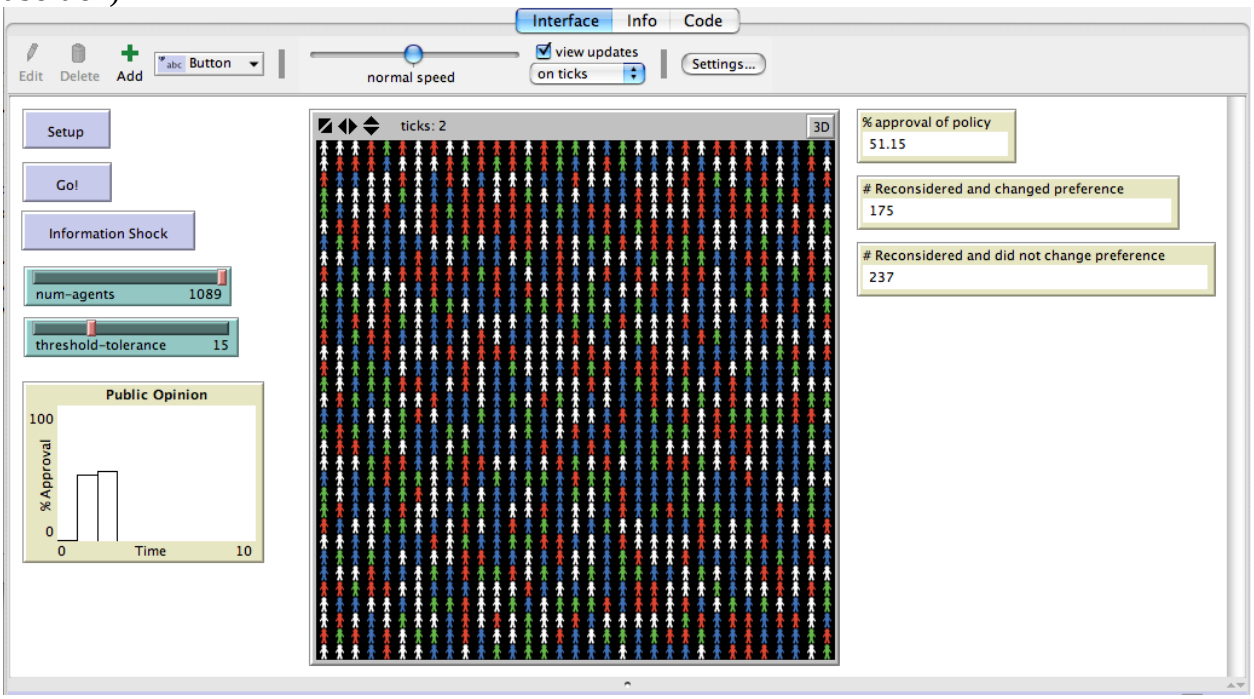

Figure 5: Pre-information shock when actors weight neighbors equally (re: Social Security)

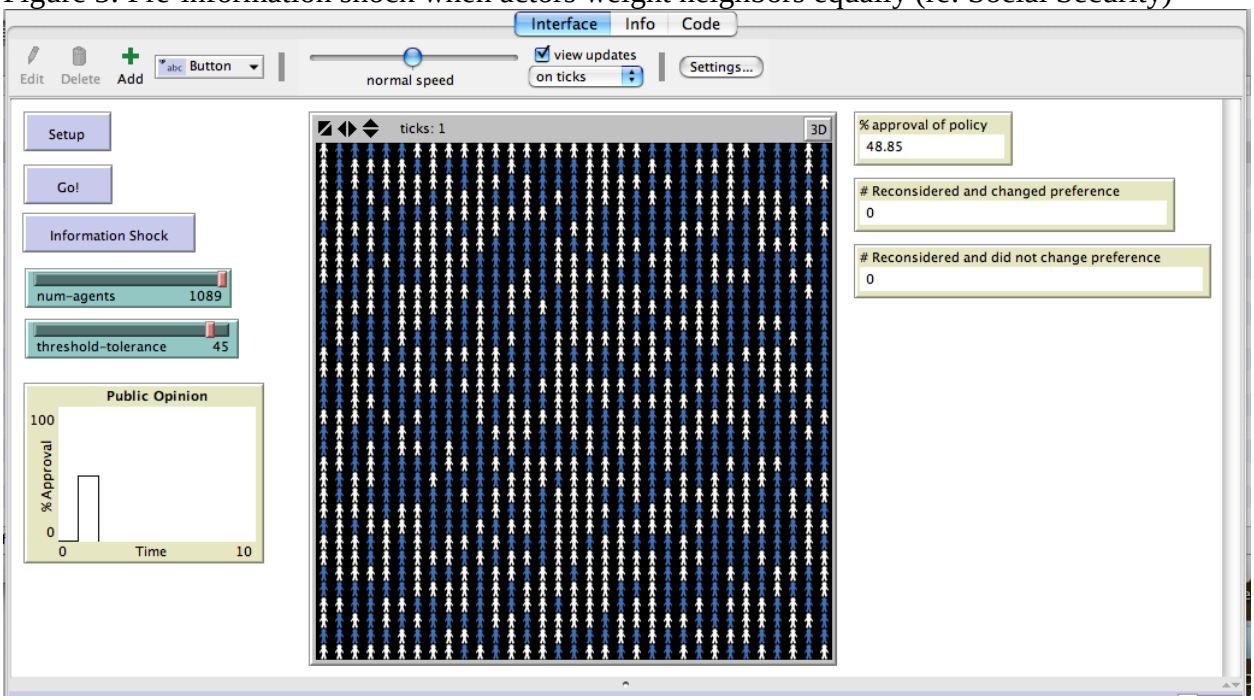

Figure 6: Pre-information shock when actors weight neighbors equally (re: Social Security)

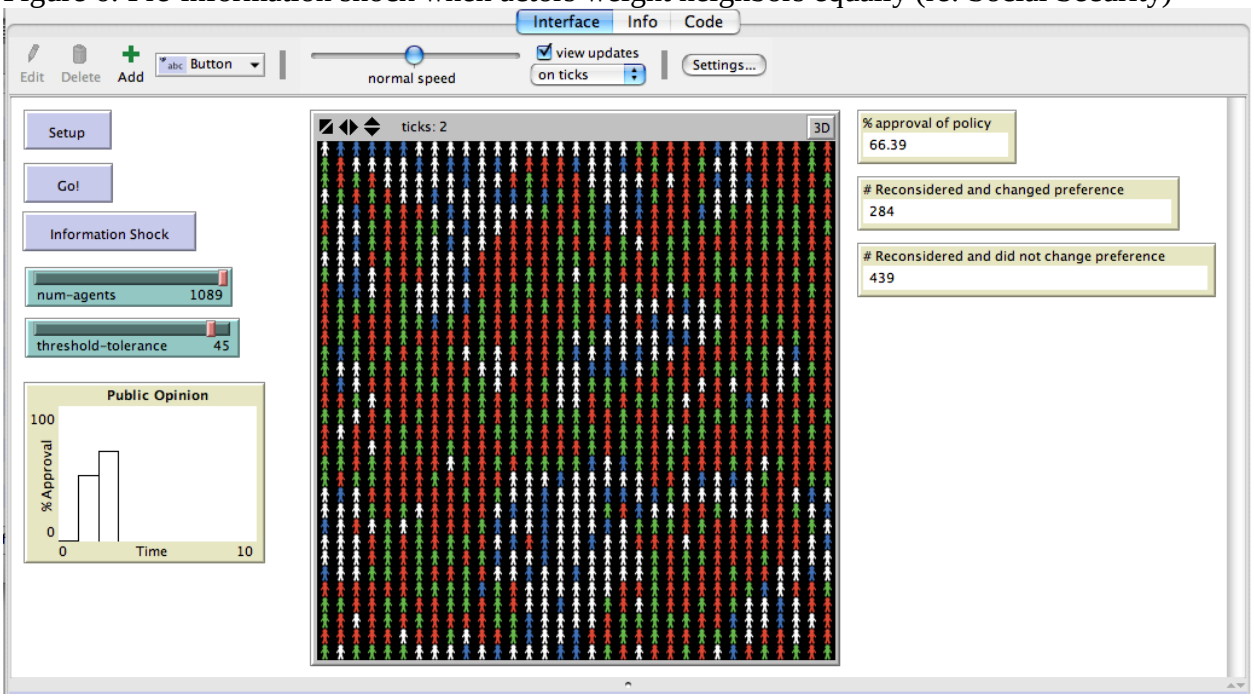

Figure 7: Pre-information shock with weighted consideration of neighbors' value structure (re: Social Security)

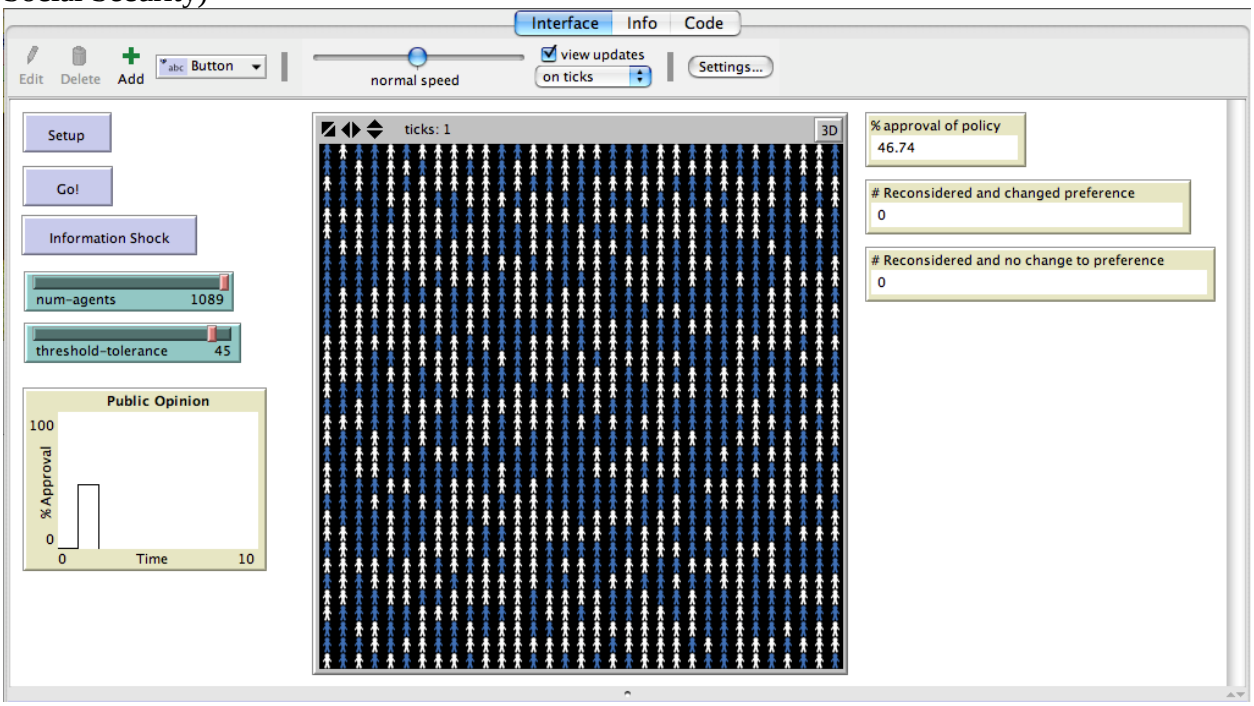

Figure 8: Pre-information shock with weighted consideration of neighbors' value structure (re: Social Security)