THE CO-EVOLUTION OF INDIVIDUAL AND NETWORK

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Individuals simultaneously choose and are affected by their web of connections. This paper explores this co-evolution of individual and network in the context of longitudinal attitudinal and sociometric data collected from a government agency, the Office of Information and Regulatory Affairs. Analysis of these data suggests that networks vary in their elasticity – where the internal network of the agency was rigid, but the extra-organizational network quite fluid. Further, the data suggest that, consistent with theories of socialization, individuals differ in plasticity – how they are affected by the network – where the cross-sectional analysis of the data suggest that individuals were molded by the organization, but that the attitudes of individuals who left were unaffected by the change in milieu.

There is ample evidence that individuals are molded by their networks. There is also ample evidence that people are not passive objects of an exogenous social structure – an individual actively constructs his/her social world. There is thus a co-evolution of network and individual – the network of ties affecting the individual, and the individual, in turn, choosing ties in part based on how s/he has been shaped by the network.

This co-evolution process is important to examine for both methodological and theoretical reasons. First, methodologically it highlights

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the oft-neglected challenges involved in inferring the presence of social influence processes. The strong structuralist approach to studying the impact of social networks asserts that the network is a "given." However, it is clear that social networks evolve, and that some of the factors the networks affect may also affect the path of the network's evolution. It is therefore necessary to understand the formation of the network in order to establish the direction of causation.

Second, it illustrates the systemic implications of varying micro-level processes of attitude/behavior interdependence and affiliation choice. Thus, for example, social systems differ in their network elasticity. Some types of social systems may give individuals relatively great range of choice in whom to interact with; others may give individuals essentially no choice. For example, in the organization studied in this paper, it appears that individuals have relatively little choice in whom to interact with. Such a system is relatively more coercive than one where individuals are totally free to speak with whom they choose. The extra-organizational ties of individuals, however, proved to be quite elastic - where communication patterns dramatically and systematically changed. Similarly, individuals differ in their plasticity - how they are affected by their network of contacts. Thus, while a cross-sectional analysis suggests a dynamic conformity process, a longitudinal analysis suggests an overall stability of attitude; the attitudes of people who left the organization (and thus were exposed to a new milieu) were just as stable as the attitudes of individuals who remained.

This paper examines the complexities of the inter-relationships between attitudes and affiliation choice among members of a government agency, the Office of Information and Regulatory Affairs (OIRA), a division of the Office of Management and Budget (OMB). Two rounds of attitudinal and sociometric data were collected: the first in 1993, the second in 1995.

This paper is organized as follows: the first two sections briefly discuss the literatures on social influence and network formation, respectively. The third section outlines the data collected for this study, and the fourth and fifth sections analyze the cross-sectional data and then the longitudinal data. The conclusion draws out the broader implications for incorporating the co-evolution of individual and network into the study of social systems.

SOCIAL INFLUENCE PROCESSES IN NETWORKS

There is a long tradition within social psychology and sociology whose focus is the interdependence of the attitudes and behaviors of individuals. The general supposition of the following studies is that a linkage between A and B causes A and B to become more similar. Early examples include Newcomb's study of the political attitudes of Bennington students (1943), Festinger et al.'s, study of community attitudes (1950), Festinger's formulation of social comparison theory (1957; also see Suls and Miller, 1977), Asch's study of conformity pressures (1957), and Coleman et al.'s study of the diffusion of the use of tetracycline (1966). Examples from the area of public opinion date from the famous Columbia studies (e.g., Berelson et al., 1954; Putnam, 1966; Huckfeldt and Sprague, 1990).

Within the organizational theory literature, network analysis has conjoined with social-information-processing theory (starting with Salancik and Pfeffer, 1978), which asserts the primacy of the employment-social context in determining the attitudes of its members. Prominent applications include Ibarra and Andrews (1993) and Rice and Aydin (1991).

Closely related, methodologically, is a large literature that has developed on the relationship between inter-organizational linkages and organizational behavior (see Mizruchi and Galaskiewicz, 1993, for a useful review of this literature). For example, interconnectedness as measured by overlapping corporate boards has been found linked to contribution patterns of corporate political action committees (e.g., Mizruchi, 1992; 1993), as well as to corporate acquisition decisions (Haunschild, 1993). Galaskiewicz and Burt (1991) find that communication patterns among the corporate contributions officers of major contributions within Minneapolis are an important determinant of their evaluations of nonprofit organizations. In general, the arguments

1 This is a brief overview of the social network literature on social influence. For extended reviews of this literature, see Erikson (1988) and Marsden and Friedkin (1993). For a review of the more general social network literature, see Wellman (1988); also see Scott (1991) and Wasserman and Faust (1994) for textbook introductions to general network concepts and methods.

2 Note, however, that the other studies mentioned were studying the effects of social pressures under ambiguity, while Asch demonstrated that social pressure can have a dramatic effect even when the "right" answer is unambiguous.
underlying these studies are either (1) organizations go through a process of “vicarious” learning, whereby they imitate the behavior of other organizations, and that they imitate the organizations that they have information about (this is the argument in the Mizruchi and Haunschild studies), or (2) the behaviors of organizations affect the payoffs to other organizations in such a way that imitation is the optimal behavior (this is the argument underlying the Galaskiewicz and Burt study).

Social Cohesion vs. Structural Equivalence

A key thread that runs through all network studies of social influence through the late 1970’s is that A’s influence over B is positively related to B’s awareness of A, which is often operationalized as the frequency of communication of A to B. This approach has been labeled social influence through “cohesion.” More recent applications include Friedkin (1984; 1993; 1998).

In the late 1970s, a new view of the flow of influence emerged, following the rise of tools to study structural equivalence (see White et al., 1976). This view, based on the homogenizing tendencies of competition, was that an individual would tend to imitate another similarly positioned individual in the network, independent of is direct communication between them (see Burt, 1987). Two individuals are structurally equivalent to the extent that they have the same contacts and lack of contacts with other individuals. Thus, for example, if A and B both talk to C and do not talk to D, they are relatively structurally equivalent. Conceptually, the notion is that structural equivalence is a measure of an individual’s status, where individuals are

sensitive to what other individuals of a similar status are doing, believing, etc. (because of “feelings of envy, relative deprivation, and advantage…” Burt, 1987). Further social psychological grounding in the concept of structural equivalence can be found in social comparison theory, which asserts that individuals are disproportionately influenced by similar others, to some extent independent of frequency of communication (Festinger, 1954). To the extent that the structural equivalence construct does capture similarity of status, it captures what might be a very salient dimension of similarity/dis-similarity in a hierarchy (see Erickson, 1988; see discussion below). One key difference between these two approaches, therefore, is that the direct ties between two actors are effectively disregarded by structural equivalence. Applications include a reanalysis of the Coleman data (Burt, 1987), and the “contagion” of philanthropic behavior of businesses in Minneapolis (Galaskiewicz and Burt, 1991).

The Origins of Social Networks

There is abundant and persuasive experimental evidence (e.g., Miller and Suls, 1977; Byrne, 1971) and non-experimental evidence (e.g., Newcomb, 1961; Marsden, 1988; Verbrugge, 1977; Huckfeld and Sprague, 1987; Lazarsfeld and Merton, 1954) that people tend to choose individuals similar to themselves for communication and social comparison. Unfortunately for the social scientist studying social influence, the criteria that individuals use in creating their social milieu are thus empirically difficult to distinguish from the impact of the milieu on the individual. The conclusion that people have attitudes similar to those with whom they communicate may be because communications follow attitudes rather than vice versa. Further, independent of homophily, societal forces tend to push together individuals of similar type. If those forces are not controlled for, one might incorrectly infer the presence of

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3 For a prominent study of the process by which organizations learn from each other, see Nelson and Winter (1982). Note, however, that Nelson and Winter argue that there is a process by which the less successful imitate the more successful. This raises the more general points (1) that some actors may be more attentive to the network than others, and (2) that some actors are more likely to be imitated than others, independent of the network. Examination of success, and other determinants of sensitivity to the network, is lacking in all of the network literature discussed here. This may be the result of the strong structuralist paradigm that these researchers are starting from.

For an example of a model where successful actors are imitated, see Axelrod (1984, pp. 145–168), in which actors (1) change their strategy only if there are other actors with whom they interact who are more successful, and (2) then emulate only the most successful actor with whom they interact.

4 This is a slight oversimplification, actually. Using the euclidian measure of proximity, direct ties are irrelevant only in an undirected graph (i.e., where the frequency that i talks to j is equal to the frequency that j talks to i). In a directed graph, asymmetries in direct ties between i and j means that i and j are estimated to be further apart.

5 See Axelrod (1997) for a formal model in which individuals simultaneously choose similar partners with which to communicate, and tend to become more similar to the partners with which they already communicate.
social influence processes. For example, spatial propinquity is one factor underlying communication; factors such as race and class underlie propinquity. If one omits race or class from an examination of social networks and political behavior, it will appear as if the network had an effect on behavior, even in the absence of a causal relationship. The problem of an endogenous social structure, while sometimes acknowledged in the social network literature, is rarely taken seriously (an important exception is Leenders, 1997). In examining the inter-relationship between attitudes and interactions, it is therefore essential to structure the research so as to detect processes that go in both directions.

RESEARCH DESIGN AND DATA

Policy decisions involve what March and Olsen (1976) label an ambiguity of understanding, where “the causal world in which they [the organization(s)] live is obscure. Technologies are unclear; environments are difficult to interpret. It is hard to see the connections between organizational actions and their consequences.” (p. 12) OIRA (as most of the OMB) oversees and coordinates the activities of the executive branch. Its particular responsibilities (discussed below) include regulatory review, and oversight of various information-related policies within the executive branch. Decisions by members of OIRA involve assessing how individuals react to risk; how non-monetary benefits to regulation are weighed against the (usually) monetary costs; what evidence exists that a regulation will have a beneficial impact; in complex regulations, which of the myriad potential issues to focus on; etc. These are all issues of great ambiguity. OIRA is thus a good place to examine whether social comparison processes take place; that is, social comparison theory would suggest that members of OIRA would look in part to other members of OIRA for the position that they should take.

Following the preceding discussion, the key research questions that will be applied to the OIRA data are therefore:

(1) Are the key policy attitudes of these elite civil servants affected by the policy attitudes of their cohorts?
(2) Do these civil servants selectively choose to talk to other individuals with compatible policy attitudes?

In order to examine these issues, two rounds of attitudinal and sociometric data were collected from OIRA. As discussed above, longitudinal data has a particular advantage in studying the dynamics of social influence processes. Further, since a complete census of the organization was done, this data will allow a comparison of the relative validity of the social cohesion and structural equivalence measures of social influence.

The Data

The Office of Information and Regulatory Affairs
At the time the first round of data were collected, OIRA was made up of 6 branches. The majority of OIRA members are desk officers who deal with issues that arise within certain departments and agencies.

OIRA was created by statute in the Paperwork Reduction Act of 1980; all data collections by agencies must be cleared by OIRA. These data collections are closely intertwined with regulations; thus, when Reagan created a process to oversee all regulatory activities of federal agencies, the regulatory review function was located within OIRA. At the time the data was collected, the criteria used by OIRA were outlined by Executive Order 12291 of 1981, which essentially instructs OIRA to enforce benefit-cost criteria on regulations (Clinton has since replaced E.O. 12291 with 12866).

There is significant variation in institutionally-determined roles within OIRA. Of the six branches, three review all regulations proposed by agencies; the remaining three deal with “information policy” – policies involving information systems within the government, and also include efforts to establish and maintain uniform statistical data collection efforts on the part of agencies. Thus, there is variation in the salience of the substantive policy questions to different members of OIRA, which allows one to examine the impact of this salience on policy beliefs. Further, there is variation even within the two sets of

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6 Two of the branches that were especially closely linked at the first round were consolidated into one between the two rounds of the questionnaire.
8 The two branches that were consolidated were two of the information policy branches.
branches in the salience of these questions; e.g., within the regulatory branches, the salience of a question on how well individuals evaluate risk is likely different for an individual who works on the Food and Drug Administration desk as compared to the Interior desk.

The Instrument

The questionnaire that was distributed to OIRA in January, 1993, contained 16 substantive policy items, 15 of which were Likert scales. All but one of the substantive questions had a salience follow up. The questionnaire that was distributed in February, 1995, repeated 13 of these items. Item 1 is typical:

(1) On a scale of 1 to 7, where 1 represents strongly agree, and 7 represents strongly disagree, where would you place yourself with respect to the following statement:

"In many areas of significant risk to the individual the government knows far more about the risks than the average individual knows."

1---------2---------3---------4---------5---------6---------7

strongly agree  weakly neutral  weakly disagree strongly agree  agree  disagree  strongly disagree

From this set of substantive questions was constructed a "market-orientation" scale, which measures the degree of support an individual gives to government intervention in the economy (this was the first factor extracted in a factor analysis of these items — see appendix for factor loadings). Individuals with high scores believe that the market

works relatively efficiently and generally oppose government intervention in the economy.

As discussed above, there is substantial variation in institutional function within OIRA. Institutional function likely has an independent impact on individuals' attitudes, because different roles affect the "incentives" for individuals to gravitate toward particular attitudes. That is, institutional role will push individuals to take certain types of policy positions in opposition to the agencies they deal with. For example, because of OIRA's role in reviewing and critiquing regulations, desk officers are in a better position to be critical of a regulation if their beliefs about the world tend to be pro-market. However, the salience of market-related issues will vary by the formal duties of the individual. Some of the individuals within OIRA are not involved with regulatory review at all; further, even for individuals that are involved, the salience of market-related policies will vary. Institutional function will therefore be examined as an exogenous determinant of individuals' attitudes.

In order to measure institutional function, every substantive item had a "salience" follow-up. Item 2, the follow-up to item 1, is typical of these follow-ups:

(2) How salient to your work are the issues touched on by question 1?

1----------------------------------------4

very salient  somewhat salient  not at all salient

The salience follow-ups thus measure the extent that individuals work on broad policy issues that relate to government intervention in the economy. These follow-ups were therefore used to construct an "institutional function" scale (the first factor extracted in a factor analysis of these items), which measures how salient these questions about government intervention were for the particular individual, and therefore, in a sense, measures what the individual does. As discussed above, institutional function may be related to how pro-market

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9 The scales were derived using the factor analysis algorithm in SPSS. The scales for the first round are standardized. For the longitudinal analysis here, the factor loadings derived from the factor analyses of the first round of the data were used to aggregate the second round of data into the two scales. For the cross-sectional analysis of the first round, all 15 substantive items contained in the first questionnaire were used to derive the scale, which should result in a slightly more reliable construct. For the longitudinal analysis, just the 13 items that were in both rounds were used. For the first version, the scale accounted for 38% of the variance of the items; the second version, 40%. Similarly, two versions of the institutional-function scale were constructed using the salience follow-ups to these substantive items; the first version, using all of the salience items from the first round, accounted for 63% of the variance, and the second, using only the items that were in both rounds, 61% of the variance. Additional scales from the data were considered. However, none had the clear substantive interpretation that the market-orientation scale had, when comparing the relationship of the scales to the particular items they were related to.

10 Cognitive dissonance (Festinger, 1957), self perception (Bem, 1970), and role theory (Lieberman, 1956), all suggest that this would be the case, although for somewhat different psychological reasons.
individuals are. Further, because individuals with similar functions are more likely to interact with each other, it is important to control for institutional function when examining network effects.

The instrument also measured how often each respondent spoke with each of the other individuals. Each respondent was presented with a list of every individual in OIRA and asked how often they spoke with each one, on a scale from “daily” to “never”:

On average, do you have substantive policy discussions with each of the following individuals daily, a couple times a week, once a week, every couple of weeks, every month, every couple of months, a couple times a year, or never?

[Name of branch 1]

John Doe

1-2-3-4-5-6-7-8
daily a couple once every every every a couple never times a week couple month couple times week of weeks of a year months etc.

Table 1 summarizes the density of communications between different sets of individuals within OIRA. Density is defined as the proportion of the maximum possible communications that could possibly exist between two sets of existing actors. The highest possible value for the interactions between two actors is “daily”; thus, if every actor in set A communicated with every actor in set B daily, the density of communications would be 1. Every response for each dyad is averaged in as a proportion of this maximum value, e.g., “a couple times a week” is averaged in as .5, “once a week” as .25, etc.

The final section of the instrument asked about individual specific variables, such as age, length of tenure at OIRA, highest educational degree achieved.

The questionnaire was distributed to every member of OIRA in early January, 1993. Because of the social interaction sections, returned questionnaires while confidential, were not anonymous. Thirty-three responses were received out of the population of 43 (77%). From one
branch only one response out of a possible five was received (that response was therefore omitted from some of the following analyses); from the remaining 5 branches 32 responses were received out of a possible 37 (86%). A response was not received from the administrator.

There were 24 individuals who had responded to the first round who were still present at OIRA by the second round of the questionnaire (72% of the original respondents). Of these, 19 responded to the second round of the questionnaire (79%). Seven questionnaires were also received from the nine respondents who responded in the first round who left OIRA before the second round. Only three of the nine respondents who left OIRA were replaced, and responses from the successors to these individuals were received.\footnote{Responses were also received from 2 individuals who had declined to respond to the first round of the questionnaire, and 1 person who succeeded an individual who did not reply in the first round.}

**CROSS SECTIONAL ANALYSIS OF FIRST ROUND OF DATA**

Social comparison processes within a population will result in distinct patterns in the relationship amongst individuals' communication patterns and attitudes. This section will examine whether the cross-section of the attitudes of OIRA members in 1993 is consistent with a process of social conformity.

The cross-sectional data allow examination of the relative impact of social influence through social cohesion as compared to structural equivalence. Such studies of a formal organization are rare, and have usually involved attitudes toward relatively tangible workplace issues (e.g., Rice and Aydin, 1991; Ibarra and Andrews, 1993). There have been no such studies involving more general orientations (e.g., the efficacy of the market), nor any studies involving a group of policy-makers.

**Interdependence of attitudes**

This section empirically examines the relationship between respondents' attitudes and those of other members of OIRA. As the analysis above highlighted, in order to have confidence that a positive result is caused by social influence, it is important to also control for the causes of communications among individuals. The analysis does this in part by controlling for hiring effects and institutional function.

Because A influences B at the same time B influences A, using OLS to examine the relationship between an individual's attitudes and the average of the attitudes of the individuals that person interacts with would result in an estimate of social influence that would be biased upwards. However, powerful statistical techniques have been developed in recent years to study spatial inter-dependencies, from the study of geographically connected processes, that effectively controls for these reciprocal effects (e.g., see Anselin, 1988; Cliff and Ord, 1981; Dorelian, 1980).

Specifically, it is possible to estimate the following relationship (for derivation of log-likelihood function, see Anselin, 1988):

\[ Y_t = \rho W_t Y_t + X\beta + \epsilon, \]

where \( W_t \) is a matrix of the social interactions within the system, where the rows sum to 1, and the \( ij \)-th entry (\( \geq 0 \)) is the weight of \( j \)'s influence on \( i \) (the diagonal entries are assumed to equal 0). \( Y_t \) is a vector of the attitudes of all the members of the system at time \( t \).\footnote{It is also possible to re-parameterize \( W \) so as to examine other factors which might affect social influence, such as authority patterns.} \( X \) is an \( n \times p \) matrix of the exogenous influences on individuals' attitudes, \( \beta \) is a \( p \)-element column vector of the regression coefficients of each of these influences.\footnote{Where the first column of \( X \) is assumed to be all 1's, and the first element of \( \beta \) equal to \( \beta_0 \).} \( \rho \), a scalar, is the effect of a change in the average response of the people any individual speaks to on that individual's response (the conformity effect). \( \epsilon \) is an \( n \)-element vector of stochastic errors, usually assumed to be normally distributed with a covariance matrix, \( \Omega_\epsilon \), equal to \( \sigma_\epsilon^2 I \).

First, it would be useful to examine the pure endogenous model for both the structural equivalence and cohesion operationalizations of social influence, i.e. estimating
TABLE 2
Pure Endogenous Model for Social Cohesion and Structural Equivalence Measures of Social Influence

<table>
<thead>
<tr>
<th></th>
<th>β0 (SE)</th>
<th>ρ (SE)</th>
<th>σ² (SE)</th>
<th>log-likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social cohesion</td>
<td>-.04</td>
<td>.77****</td>
<td>.55****</td>
<td>-8.22</td>
</tr>
<tr>
<td>Structural</td>
<td>.03</td>
<td>.82****</td>
<td>.75****</td>
<td>-12.27</td>
</tr>
<tr>
<td>equivalence¹⁴</td>
<td>.15</td>
<td>.19</td>
<td>.19</td>
<td></td>
</tr>
</tbody>
</table>

N = 32; **** p < .0001, one-tailed significance test.

Y = β₀ + ρW₁Y + ε,

where ε is an n-element vector of stochastic errors, assumed to be normally distributed with a covariance matrix, Ωε, assumed to be equal to σ²I · β₀ is an n-element vector of the constant term. Y, in this and following equations, is the n-element vector of attitudes (market orientation).

For both the cohesion and structural equivalence measures of social influence, W₁ is based on self-reports of substantive policy discussions of the respondent with other individuals. For the social cohesion measure, the i-th entry of W₁ is the proportion of i's substantive policy discussions that are with j. Table 2 summarizes the results of a pure endogenous analysis for both social influence constructs.

The strong positive statistical relationship for both the social cohesion and structural equivalence (p < .0001) measures is confirmed by a visual inspection of the plots of Y against W₁Y in Figures 1 and 2, respectively.

Note that both figures suggest a "clustering" of OIRA into two relatively pro- and anti-government intervention groups, the former in the lower left corner of both figures, the latter in the upper right. Some

¹⁴ The Euclidian distance is calculated as follows: dᵢⱼ = [Σₖₜᵢⱼ (zᵢᵏ - zⱼᵏ)²]¹/₂ or, if there are missing data, dᵢⱼ = [Nᵢⱼ (Nᵢⱼ - Nᵢⱼk)Σₖₜᵢⱼ (zᵢᵏ - zⱼᵏ)²]¹/₂ · zᵢᵏ is the frequency with which i and k communicate. Because the interaction data are in principle undirected, i's report and k's report of zᵢⱼ are averaged. The Euclidian distances are then normalized as follows: wᵢⱼ = (dmaxₑ - dᵢⱼ)² / ∑ₖₜᵢⱼ (dmaxₑ - dᵢⱼ)². The figures in Table 1 are calculated based on r = 1. Similarly, in the analyses below in which structural equivalence is included, r is set to 1 (other values of r did not substantively change the results).
clustering along these lines is to be expected, since communications are disproportionately intra-branch, and if there are distinct differences among branches, one would expect members of the same branch to "cluster" together, as in Figures 1 and 2. In fact, the cluster in the upper right corresponds to a particularly cohesive and pro-market branch.

This clustering raises the possibility that there are different selection processes for different branches, which combined with the fact that interactions are disproportionately intra-branch, might yield the positive network auto-correlation observed above.

In order to test whether the relationship is due to a branch-based selection process, an alternative assumption about the error term will be made:

\[ \varepsilon = \lambda W_2 \varepsilon + \mu, \]

where \( \mu \) is an \( n \)-element vector of stochastic errors, which is usually assumed to be normally distributed with a covariance matrix, \( \Omega_{\mu} \), equal to \( \sigma^2_I \). Such a specification is appropriate where processes "such as ecological influence or environmental molding, that do not involve direct effects of actors on one another" may be at work (Marsden and Friedkin, 1993, p. 138). For example, in the OIRA case, a plausible explanation for differences among individuals is that members of different branches are hired through different processes; it is therefore possible that because of this selection mechanism, members of the same branch are more similar to each other than to members of other branches.\(^{15}\) Note that the causation does not run directly from one member of a branch to other members of the same branch, as it does in a model of social influence. Instead, the basic idea is that members of different branches are being "drawn" independently from distributions with systematically different means. Thus, this specification of the error term is appropriate in studying the hypothesis that there are significant hiring effects in determining the attitudes of members of OIRA. If hiring effects explain the relationships in Figures 1 and 2, \( \lambda \) will be significant (and \( \rho \) not), and if conformity effects explain these relationships, \( \rho \) will be significant.

In addition to a selection process, it is possible that a third factor is related to networks and attitudes. As suggested in this section, it is likely that institutional function has a significant relationship with attitudes; specifically, it is hypothesized that the more market-related issues an OIRA member evaluates, the more pro-market that member of OIRA will be.\(^{16}\) Table 3 summarizes the results of an analysis based on:

\[ Y_i = \rho W_i Y_i + X \beta + \varepsilon, \quad \text{where} \quad \varepsilon = \lambda W_B \varepsilon + \mu, \]

where \( W_B \) is based on branch membership, and \( \mu \) is an \( n \)-element vector of stochastic errors, which are assumed to be normally distributed with a covariance matrix, \( \Omega_{\mu} \), equal to \( \sigma^2_P \cdot X \). In this and the following regressions, is an \( n \)-element vector of the institutional functions of the members of OIRA.

\(^{15}\) Some branch effects may be direct, in that individuals in different branches may go through systematically different socialization processes. For example, a new desk officer may judge other members of his/her branch as the only suitable alters for social comparison, and disregard the views of other members of the organization with whom s/he speaks. If one replicates the analysis in Table 2 with a weight matrix based on branch membership, there are similarly significant results. Due to collinearity and the small \( n \), it is not possible to distinguish between direct effects based on branch membership and direct effects based on communication frequency.

\(^{16}\) Note that it might be argued that causation between market orientation and institutional function runs the opposite direction – the more pro-market an individual, the more salient market-related issues seem to the individual. However, salience really should be just as high for those who are anti-market – e.g. considering the first item in Appendix, whether the government knows more than individuals regarding risks should be just as important to those who are anti-market – those who are anti-market on this scale would not say that this issue was less relevant, just that the government often knows more than individuals do.
The above relationship was estimated twice for the same data: once for a $W$ matrix based on social cohesion, and once for a $W$ matrix based on structural equivalence.

For $W_B$, $w_{ij} = 0$ if $i$ and $j$ are in different branches, and $1/(N_{B})$ if $i$ and $j$ are in the same branch, where $N_{B}$ is the number of individuals in $i$’s branch.

Social influence, as measured by either social cohesion or structural equivalence, was highly significant in the pure endogenous model (Table 2). With the inclusion of controls for institutional function and branch membership, social influence, as measured with the structural equivalence construct, disappears. The systematic differences among branches, as modeled through the error term, offer a better fit for the variation in attitudes ($\lambda$ is significant at $p < .001$). In contrast, social influence measured with the social cohesion construct is far more closely related to the market orientation of individuals ($\rho$ is significant at $p < .05$), while a branch-based explanation is neither.\(^{17}\) That is, social influence, as measured by social cohesion, offers a better explanation for variation at the individual level than any explanation based purely on differences among branches, such as hiring. Taking these two results together suggests that differences among branches emerge because of a social conformity process based on social cohesion. The structural equivalence construct, however, does not appear to add anything over branch membership, which is why $\lambda$ appears so significant in the structural equivalence analysis (see below).

In principle, social influence may flow through paths based on social cohesion and structural equivalence simultaneously. Since the influences an individual is exposed to by these two measures are likely related, it is important to concurrently estimate the impact of both. It is possible to do so, by estimating the following equation (see Doreian, 1989; Marsden and Friedkin, 1993):

\[
Y_t = (\rho_1 W_1 + \rho_2 W_2) Y_{t-1} + X\beta + \epsilon,
\]

where $W_1$ is the weight matrix derived from the social cohesion construct, and $W_2$ is the weight matrix derived from the structural equivalence construct.

Table 4 summarizes the results for the “two-regime” analysis, again incorporating the model of hiring effects.

$\rho_1$ captures the impact of social influence based on the social cohesion weight matrix, and $\rho_2$ the impact based on the structural equivalence matrix.

The two regime model results are consistent with the results derived from examining the social cohesion and structural equivalence models separately. $\rho_1$ (social cohesion) is estimated to be substantively and statistically significant ($p < .05$), and $\rho_2$ (structural equivalence) is neither.\(^{18}\)

The above results are consistent with a conformity process through cohesion at OIRA. Respondents tend to be similar to the people with whom they communicate most. When social influence is operationalized with a structural equivalence measure, there also appears to be a strong positive relationship between each individual’s market orientation and that of structurally equivalent other individuals. This result appears spurious: where individuals who are in the same branch tend to be structurally equivalent and similar to each other. When branch membership was effectively controlled for, the apparent impact

\(^{17}\) The main effect of including the $\lambda$ parameter in the analysis of the social cohesion construct is to increase the standard error of the estimate of $\rho$. That is, if there is social influence taking place, one would expect systematic differences among branches to emerge; thus, if $\rho$ were constrained to 0, $\lambda$ would absorb some of the social influence effects, and would thus appear significant (as is the case for the analysis with the structural equivalence construct). As a result, by including $\lambda$ in the analysis, the standard error of $\rho$ increases.

\(^{18}\) The estimate of the marginal impact of the social cohesion measure of social influence, $\rho_1$, actually appears larger than when the structural equivalence measure was excluded. This does not appear to be of substantive importance; simply that the structural equivalence and social cohesion measures of social influence are correlated. In the two regime case, $\rho_2$ is estimated to be negative, inflating $\rho_1$. 

---

**TABLE 4**

<table>
<thead>
<tr>
<th>$\beta_0$ (SE)</th>
<th>$\beta_2$ (SE)</th>
<th>$\rho_1$ (cohesion) (SE)</th>
<th>$\rho_2$ (structural equivalence) (SE)</th>
<th>$\lambda$ (SE)</th>
<th>$\sigma^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>- .06</td>
<td>- .32**</td>
<td>.78*</td>
<td>- .68</td>
<td>.38</td>
<td>.48****</td>
</tr>
<tr>
<td>(13)</td>
<td>(14)</td>
<td>(39)</td>
<td>(89)</td>
<td>(30)</td>
<td>(12)</td>
</tr>
</tbody>
</table>

$N = 32$; log-likelihood = -5.36; *$p < .05$, one-tailed significance test; **$p < .025$, one-tailed significance test; ***$p < .01$, one-tailed significance test; ****$p < .001$, one-tailed significance test.
of social influence operationalized with structural equivalence disappeared. Social influence, as calculated by a cohesion measure, remained after controlling for branch membership, which indicates that this pattern is not simply a result of a branch-based selection process. The relative success of the cohesion measure is also consistent with Rice and Aydin’s findings (1991), one of the few other studies that simultaneously examined social cohesion and structural equivalence within a formal organization.

Longitudinal data will be used below to examine changes in attitudes and interactions over time, with a focus on whether communications between similar individuals increase, and/or whether individuals who interact frequently with each at the first round become more similar.

ATTITUDES AND AFFILIATIONS OVER TIME

The longitudinal data allows one to examine the change in attitudes and affiliations in the period January, 1993 to February, 1995. As discussed above, longitudinal data has the advantage that it allows examination of the causal order of attitudes and affiliations. Longitudinal data on the attitudes and affiliations of members of a formal organization is especially rare, and of policy-makers, essentially non-existent.

Analysis of Changes in Affiliations and Attitudes

The following intra-organizational dynamics are studied:

(1) Did pairs of individuals with similar attitudes tend to gravitate towards higher levels of interactions than pairs with dis-similar attitudes?

(2) Did individuals change their attitudes to be consistent with the attitudes of the individuals they communicated with?

Affiliation Change

First, if there were homophily with respect to attitudes towards government intervention, one would expect pairs of similar individuals to gravitate to a higher level of interactions than dis-similar individuals. Table 5 summarizes the results of an OLS estimation of the impact of dyadic similarity of attitudes in 1993 on frequency of dyadic interactions measured in 1995, controlling for frequency of interaction in 1993. 19

Analysis includes the interactions of all dyads in which both members responded in both 1993 and 1995 (19 x (19 – 1)/2 = 171). For each dyad the responses of the two members are averaged to derive one interaction score (as measured with the 8 point scale described above). Dis-similarity is measured by the negative of the absolute difference of the attitudes of i and j in 1993,

\[-|Y_{1993,i} - Y_{1993,j}|.\]

The sign of the estimate for the coefficient for the dis-similarity of the two members of each dyad is in the direction consistent with homophily (negative); however, it is non-significant.

The stability of dyadic interactions is notable (p < .001), especially given the noise inherent in sociometric data (Killworth and Bernard, 1976; 1979; Bernard, Killworth and Sailer, 1979), and the fact that some desk officer assignments were changed in the interim. Figure 3 plots the dyadic interactions from 1995 against the interactions of the same dyads in 1993.

Examination of each individual’s interactions indicates that while continuity was significant, there was substantial variation between individuals in the stability of their interactions. Table 6 summarizes the bivariate relationship between interactions in 1995 and interactions in 1993 for all 19 repeat respondents. 20

In 18 out of 19 cases, there was a highly significant relationship between 1995 interactions and 1993 interactions (p < .0025 or less). The relationship in the nineteenth case (individual #4) is neither statistically nor substantively significant.

Individual #4 also happens to be the single individual who shifted branches during this time. He took the portfolio of an individual from another branch who had left, while retaining some of his old responsibilities. Table 7 summarizes a regression of this individual’s 1995

---

19Note that the assumption of dyadic independence is likely violated, so that the standard errors are biased downwards.

20The regression in Table 9 uses each individual’s own responses to the sociometric items.
interactions on his 1993 interactions and the 1993 interactions of the previous incumbent in his/her new branch.

The regression in Table 7 reveals that the interaction pattern of individual #4 was closely related to the interaction of the individual he replaced. Further, once one controls for the interactions of the individual he replaced, his own 1993 interactions are significantly related to his 1995 interactions (although much attenuated compared to other individuals). The strength of this relationship is on the order of other regressions summarized in Table 6.

21 Note that a small stochastic factor was added to the observations for Figure 3; since the sociometric responses were on a 1 to 8 scale, there was a tendency for data points to "pile up." The small stochastic element allows one to observe, for example, how many dyad-interactions had values of exactly daily (= 1) in 1993 and in 1995 again.

These results highlight the changes that occurred in the interaction patterns of individual #4 because of dyadic or individual factors—that the collection of dyadic changes occurred as a package.
TABLE 7
Case of a Shift in Branch and Portfolios

<table>
<thead>
<tr>
<th>Constant (SE)</th>
<th>Interactions, 1993 (SE)</th>
<th>Interactions of previous incumbent, 1993 (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2.07</td>
<td>0.33*</td>
<td>0.86****</td>
</tr>
<tr>
<td>(1.90)</td>
<td>(0.14)</td>
<td>(0.20)</td>
</tr>
</tbody>
</table>

\( N = 30; R^2 = .43; ^* p < .025, \) one-tailed test; \( **** p < .0001, \) one-tailed test.

TABLE 8
New Person Regressed on Previous Incumbent’s Interactions

<table>
<thead>
<tr>
<th>Constant (SE)</th>
<th>Interactions of previous incumbent, 1993 (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.06</td>
<td>0.52****</td>
</tr>
<tr>
<td>(0.66)</td>
<td>(0.11)</td>
</tr>
</tbody>
</table>

\( N = 30; R^2 = .44; **** p < .0001, \) one-tailed test.

Finally, it is useful to examine the relationship of the interactions of new individuals in OIRA and compare them to the individuals that they are replacing. Nine individuals who responded to the first round left OIRA before the second; however only three new individuals were hired, and in two cases the responsibilities of the new individuals were substantially different from any of the nine who left. Table 8 summarizes the single case where a new individual clearly filled the position of someone who had left the organization.

Table 8 indicates that the new person’s interactions were closely related to the previous incumbent’s interactions; the closeness of the relationship is similar to that of the repeat respondents in Table 7.

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22 The estimate of this coefficient, and the \( R^2 \) of this regression are biased downward relative to the other regressions summarized in Table 9. That is, there may be several types of measurement error contained in the sociometric data: (1) a purely stochastic component, which may vary from individual to individual (i.e., the reliability of the measure may vary from individual to individual), (2) a constant systematic component, where some individuals systematically “recall” higher or lower levels of interactions than other individuals, (3) a variable systematic component, where different individuals interpret, or construct the sociometric item in different fashions and/or are otherwise subject to biases on responses to particular sociometric items. In this third case, “errors” (not necessarily inaccuracies, however) in responses by a particular individual from one round will be correlated with errors in the second round. However, since the regression in Table 10 (and Table 11) is on the responses of a different person from the previous round, those errors will not be correlated, and the estimate of the coefficient will be biased downward.

The fact that new people in old positions essentially had the same interactions as the previous incumbents strongly suggests that the network of relationships within OIRA is exogenous.

Interactions Outside of the Organization

OIRA is located in the larger organizational milieu of the Executive Office of the President (EOP). Respondents were asked how often they communicated with non-OMB members of the EOP – the largely political layer of the Executive Office (as compared to the civil servants that dominate the OMB). These personnel had almost entirely changed due to the change of party in the White House in 1993. How did these relationships change? If this set of relationships were inelastic, then one might expect that the same people spoke with the same frequency to members of the Clinton administration as compared to the Bush administration. However, members of the Clinton administration likely had systematically different policy orientations, on average, than members of the Bush administration, so one might expect substantial changes in communication patterns. Table 9 summarizes an OLS analysis of the relationship of respondent communications with the EOP in 1995 against interactions in 1993.

In stark contrast to intra-OIRA relationships, there was no significant relationship between respondents’ EOP interactions in 1995 as compared to 1993. These changes were not simply stochastic, however. If one plots the change in interactions of each repeat respondent with the EOP against the score of the respondent on the market orientation scale from the first round (where a point increase corresponds to a doubling of interactions), a clear pattern emerges: Pro-market individuals experienced a drop in interactions with the EOP, and anti-market individuals experienced an increase in interactions. OLS confirms this pattern (Table 10).

TABLE 9
1995 Interactions Regressed on 1993 Interactions

<table>
<thead>
<tr>
<th>Constant</th>
<th>EOP interactions in 1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.69*</td>
<td>0.20</td>
</tr>
<tr>
<td>(1.03)</td>
<td>(0.26)</td>
</tr>
</tbody>
</table>

\( N = 16; R^2 = .04; ^* p < .01. \)
Because of the small sample size, standard errors were estimated with MacKinnon-White (1985) estimator.

The change in communication patterns is dramatic ($p < .02$); for example, individuals with a score of 1 on the market-orientation scale had their expected interactions with the EOP drop by 57% ($= 1 - 2^{-1.21}$). Conversely, individuals with a score of −1 had an expected increase in their interactions with the EOP to over 3 ($2^{1.69} = 3.22$) times their original level.

The EOP interactions are thus a stark contrast to intra-OIRA interactions. Whereas OIRA interactions are apparently rigid, the set of external relationships with the EOP are quite fluid and clearly endogenous. This fluidity stands in contrast to the attitudes of OIRA members, which were quite stable over time.

**TABLE 10**

<table>
<thead>
<tr>
<th>Change in EOP Interactions Regressed on Market Orientation</th>
<th>Market Orientation score, 1993 to 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>EOP interactions in 1993</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>0.24</td>
<td>-1.45**</td>
</tr>
<tr>
<td>(0.44)</td>
<td>(0.48)</td>
</tr>
</tbody>
</table>

$N = 16; R^2 = .46; **p < .02$, two-tailed test.

Attitude Change

If attitudes were not in an equilibrium, one would expect respondents to shift their attitudes towards the mean of the individuals that they were exposed to. Additionally, one might expect an overall shift away from a pro-market orientation, because of the relatively pro-government orientation of the new administration. A scatterplot of the difference between each respondent’s score on the market orientation scale and the mean they were exposed to ($\bar{WY}_{1993} - Y_{1993}$) against the change in that score from round 1 to round 2 ($Y_{1995} - Y_{1993}$) does not reveal such a pattern (Figure 5).

It is also possible that for exogenous reasons (e.g., reorganization of responsibilities) the social milieu of individuals changed over time, and that attitudinal change followed. Figure 6 plots the change in the average attitudes that individuals were exposed to against the change in their own attitudes.

Figure 6 also does not reveal any relationship between the change in social influences and change in market orientation. Table 11 summarizes a regression analysis of this relationship.$^{23}$

The statistical analysis confirms the lack of relationship between the change in milieu and change in attitude. Further, the average individual’s position became more pro-market, not less.

$^{23}$I also examined whether prior tenure was related to attitudinal stability; there appears to be no relationship between tenure and stability.
Attitude Stability of Exiters

An additional test of the impact of social ties on policy attitudes is to examine whether the attitudes of individuals who left OIRA were less stable than individuals who remained at OIRA. That is, while no measures were taken of the new social environments that individuals who left OIRA were exposed to, it is certain that the network of these individuals changed more than the network of individuals who remained. Thus, if attitudes have a substantial social component, one would expect more “noise” in the relationship between 1995 attitudes and 1993 attitudes for individuals who left OIRA. Figure 7 is a scatterplot of the scores of repeat respondents on the market-orientation scale, where individuals who left OIRA are highlighted.

Figure 7 indicates (as clearly as a small sample can) that the attitudes of individuals who left OIRA were just as stable as the attitudes of individuals who remained at OIRA.24

24 In another examination of exit patterns, I found that non-conformists were no more likely to leave than reformists. However, I did find one strong pattern in exits. The people who left, without exception, were young (< 40 of age) and had lost political support in the new administration (Lazer, 2000).
In short, in a snapshot of the relationships of attitudes and interactions, there is a powerful relationship between what each individual believes and who s/he talks to. However, in examining the co-evolution of individual and network at OIRA, between 1993 and 1995 there appears to have been a non-evolution of both. How, then, to reconcile these apparently contradictory findings?

The non-change in attitude is, in retrospect, unsurprising for two reasons. First, in models of conformity where there is a mix of endogenous and exogenous determinants of attitudes, one would expect individuals, over the long term, to reach an equilibrium where their attitudes are essentially some average of endogenous and exogenous factors (e.g., Friedkin and Johnsen, 1990). As of 1993, all of OIRA members had been there for at least a year; most for significantly longer. Over the course of just one year, according to the sociometric data collected, each desk officer will have engaged in approximately 1000 "substantive policy discussions," likely enough to have gained a clear fix on the surrounding social milieu. Thus, if the model is an individual influenced over time by his network's prevalent opinions, it is unsurprising that attitudes did not change; the two years between the two rounds did not significantly add to the individual's prior knowledge of the prevailing network opinions. Further, the socialization literature suggests that opinion change should occur relatively early in a career (Jennings and Niemi, 1981). That is, individuals evolve less as they get older – thus the stability of the attitudes of the people who left OIRA. That is, people differ in their "plasticity" – how they are affected by their social milieu.

The rigidity of the network is more notable than the stability of attitudes. Even though one might expect interactions, like attitudes, to reach an equilibrium, interactions are clearly determined by position within the organization. The density of intra-branch interactions for a desk officer (the majority of respondents) is 10 times that of inter-branch interactions. In short, you have to talk to the people within your branch, for reasons in part due to physical proximity, and in part due to functional interdependence. This also explains the strong relationship between interactions of new people in old positions and the interactions of previous incumbents. The network within OIRA, in short, is largely institutionally determined.

The picture painted of the "co-evolution" of network and individual within OIRA is that the individual was molded by a rigid network. As discussed in the conclusion, this particular pattern is not a necessary characteristic of the co-evolution process.

The above analysis also highlights a number of research design concerns in network-individual co-evolution. The first is an issue of timing. In the above analysis, particular dyads of communication and attitudes of individuals remained remarkably stable. This stasis does not necessarily mean that there were no interesting co-evolutionary dynamics in the system, but that the two snapshots of the system were poorly timed to capture dynamics. The most telling results in this paper were of entry into and exit out of the system: entry of new individuals into OIRA and new Executive Office personnel, and exit from OIRA. This also highlights that the "birth" of a system (e.g., Newcomb, 1961), as well as a re-organization of a system would be excellent circumstances under which to study co-evolution.

The second issue is one of instrument sensitivity. As noted earlier, sociometric data are inherently noisy. In studying system dynamics, this noise becomes particularly problematic, since the signal to noise ratio deteriorates when examining change. If one is attempting to discern subtle co-evolutionary dynamics, one can compensate for this by using exceptionally reliable instruments to measure interactions, and by studying a large social system.

CONCLUSION

Social comparison theory suggests that individuals seek to minimize feelings of ambiguity by (1) seeking out like-minded individuals with whom to interact (homophily), and (2) changing their attitudes to match the attitudes of conversion partners (conformity). There is thus a co-evolution of individual and network. This paper examines the implications of social comparison theory in political networks, focusing on networks within a particular organization – the Office of Information and Regulatory Affairs (OIRA), a division of the Office of Management and Budget (OMB). Two rounds of attitudinal and sociometric data were collected from OIRA: the first at the very end of the Bush administration, the second two years into the Clinton administration. Since the objective of the paper is also two-fold,
one-part methodological, one-part theoretical, let me categorize my conclusions to match.

The findings indicate that within OIRA, the network was largely institutionally determined—the network was inelastic and thus particularly coercive. The oft-cited observation that "where you stand depends on where you sit" is not just a reflection of institutional interest (as it is often interpreted) but a social structural phenomenon. Where you sit strongly determines who you talk to, which, in turn, affects where you stand.

This network inelasticity is not a necessary feature of social systems, as is sometimes assumed. Thus, for example, Newcomb (1961) found that interactions followed attitudes. However, one would expect that the social system that he studied, a college dormitory hall, would place few constraints on affiliation choice—that is, the network was elastic and not particularly coercive. The dormitory setting is the diametric opposite of the standard bureaucratic setting. In fact, different social systems vary enormously in the constraints they place on their members' affiliations and attitudes.

Similarly, in the above analysis, the interactions of OIRA members with the political layer of the Executive Office were quite elastic. That very elasticity was a product of the institutional setting in two ways. First, this layer underwent a complete and largely simultaneous turnover between the two rounds of data collection. This turnover made it impossible to transmit expectations as to patterns of communication. Second, if there is a norm about communication within the Executive Office, it is a norm of fluidity—that every White House produces a very different pattern of communications within its political level.25

As noted above, these diverging micro-level rules will sometimes have dramatically different systemic level implications. It would therefore be useful to study how social systems vary in their micro-level dynamics, and what the systemic consequences of these variations might be. Above I have discussed the implications of the micro-level rules typical of government bureaucracy, and in the body of the paper drawn extensively from examples of public opinion. Other systems will have quite different dynamics. Below are potential applications of this study to community conflict, legislative processes, and political socialization.

Community Conflict

Coleman (1957), in his insightful monograph on community conflict, observed that "one of the sources of community conflict in growing suburban towns...is that] people's opinions receive continual reinforcement from fellow-workers—that is, from people outside the community. At home, divergent views are not forced to conform to those of others in the community; when some incident occurs, this divergence manifests itself in irreconcilable views. If suburbanites had to work day-by-day in the same small community, much of the reconciliation would have taken place over a long period of time, before the incident occurred." (p. 22) Suburban communities may be contrasted to housing communities where proximity forces greater interaction, resulting in greater reconciliation of viewpoints over time (e.g., see Festinger et al., 1950).

Communities tend to place fewer constraints on interactions of members than many decision-making institutions; thus, for example, a controversy at one point in time can cause a long-lasting cleavage in the community that appears in future conflicts (Coleman, 1957, pp. 6–7). Further, where cleavages exist, e.g., along class or ethnic lines, conflicts on issues seemingly unrelated to those cleavages develop along those pre-existing divisions in society (Coleman, 1957, p. 22; also see Abelson, 1979). Academic departments, which place relatively few constraints on the interactions of their members, are notorious as a setting where feedback processes cause cleavages, which then shape future conflicts.

Legislative Processes

Legislative processes place particular constraints on the affiliation choices of individuals. Thus, for example, in the legislative context, extremist parties desiring to be members of a ruling coalition must seek out centrist partners (see Axelrod, 1970). Log-rolling is another example: "A log-rolling coalition is not one forged of conflict, compromise and tangential interest, but, on the contrary, one composed of

25 These expectations about who to interact with, of course, are almost certainly endogenous. Certainly norms about heterophilous communication—along dimensions of race, religion, gender, age, etc., have varied over time in U.S. society.
members who have absolutely nothing in common; and this is possible because the 'pork-barrel' is a container for unrelated items. This is the typical form of relationship in the distributive arena.” (Lowi, 1966, p. 30). Other factors that are important in determining affiliations in legislatures are the relative importance of committees in the decision-process; the resources of the parties; the proximity and similarity of districts; and the proximity of offices and of seats on the floor (e.g., see Little, 1994; Hedlund, 1984; Patterson, 1972). These processes guarantee a certain level of exposure to individuals with different outlooks, which might lead to some convergence in attitudes.

The dependence of legislators on other legislators for information is limited to the extent that a legislator has communications outside the legislature (e.g., with individuals from the district – see Fenno, 1978), and to the extent that the legislator has clear-cut interests dictated by the district (see Kingdon, 1981).

Political Socialization

Extensive research has been done on the development of political attitudes over a lifetime. Political orientations have been shown to become increasingly stable over the lifespan (e.g., Jennings and Niemi, 1981). This may be because of the greater experience base of older individuals. Note, however, that while homogeneity of political environment is uncorrelated with age (Alwyn et al., 1991), it is likely that individuals' social environment tends to stabilize with age. Further, it has been shown that the stability of social environment is directly related to stability of attitudes (Miller and Sears, 1986). Thus, for example, individuals who go to college (associated with a large change in social environment) undergo greater change in political attitudes than individuals who do not (Jennings, 1993; also see Newcomb, 1943). Further, spouses are often the dominant member of the social environment of a married individual. Spouses have been shown to play an important role in determining political attitudes (Alwyn et al., 1991) and political participation (Stoker and Jennings, 1995). Since education and marriage (as well as geographic movement) occur disproportionately early in life, it is likely that one reason that attitude stability is greater later in life is that the social environment is more stable as well.

Wrapping things up

It is essential to simultaneously examine the creation and the impact of our social setting. The message is two-fold: first, the social structure that emerges from a micro-level process may be difficult to distinguish from the impact of the social structure; second, simultaneously examining the impact of the social network, the formation of the social network, and the impact of individual-level factors, will yield insights into group and societal change that focusing on any one process can not possibly illuminate.

Acknowledgments

I would like to thank Robert Axelrod, Lars Erik Cederman, Michael Cohen, Miguel Guilarle, Kent Jennings, Frans Stokman, and an anonymous reviewer for constructive comments, criticisms, and compliments that greatly improved this paper. Any errors contained herein, of course, are mine alone.

REFERENCES


APPENDIX

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>“The federal government is incapable of achieving a great consistency</td>
<td>.47222</td>
</tr>
<tr>
<td>in benefits across programs and regulations and the costs of those</td>
<td></td>
</tr>
<tr>
<td>programs and regulations.” (Agree–Disagree seven point scale)</td>
<td></td>
</tr>
<tr>
<td>“It is sometimes desirable for the government to reduce the options</td>
<td>.62989</td>
</tr>
<tr>
<td>available to consumers in order to reduce the difficulty of making a</td>
<td></td>
</tr>
<tr>
<td>choice. For example, standardization of product sizes can make</td>
<td></td>
</tr>
<tr>
<td>comparison of competing products easier.” (Agree–Disagree seven</td>
<td></td>
</tr>
<tr>
<td>point scale)</td>
<td></td>
</tr>
<tr>
<td>“Excluding cases where there are externalities (i.e., where one</td>
<td>-.79998</td>
</tr>
<tr>
<td>person’s actions affect another), the government should not require</td>
<td></td>
</tr>
<tr>
<td>companies to incorporate safety devices into their products, because</td>
<td></td>
</tr>
<tr>
<td>consumers should be allowed to evaluate whether the increased safety</td>
<td></td>
</tr>
<tr>
<td>is worth the additional cost.” (Agree–Disagree seven point scale)</td>
<td></td>
</tr>
</tbody>
</table>
to evaluate the overall impact of the program or regulation, it is equally important to consider the distribution of the benefits of the program or regulation. That is, for example, a program or regulation that especially helps individuals who are less well off may be more desirable than a program or regulation which has larger net benefits.”

and 7 represents the position:

“In evaluating a particular government program or regulation, the only thing to consider are the overall net benefits of that program or regulation.”

where would you place yourself?

*30) On a scale of 1 to 7, where 1 represents very effective, and 7 represents very ineffective, how effective is the marketplace at providing the information that people need to assess risks? (Agree–Disagree seven point scale)

On a scale of 1 to 7, where 1 represents the position: .31115

“The government is effective, or at least potentially effective, at objectively analyzing risks in the environment, workplace, etc.”

and 7 represents the position:

“The government is incapable of objectively analyzing risks in the environment, workplace, etc.”

where would you place yourself?

“Producers/employers/etc. often successfully hide from consumers/employees/etc. the risks that they are taking.” (Agree–Disagree seven point scale)

“In many areas of significant risk to the individual the government knows far more about the risks than the average individual knows.” (Agree–Disagree seven point scale)

Factor Loadings for Market-Orientation Scale

MIMETIC TRUST AND INTRA-ORGANIZATIONAL NETWORK DYNAMICS

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Dynamic network models based on the homophily principle are criticized for neglecting organizational context conditions and the impact of role structures on the evolution of intra-organizational trust networks. Using a neo-institutional framework it is argued that individuals in competitive environments will attempt to reduce uncertainty about the trustworthiness of potential trustees by imitating the sociometric choice behavior of persons in similar network positions. Three hypotheses are developed. The positional trust hypothesis predicts that individuals tend to!trust other actors who occupy a similar network position as themselves. The mimetic trust hypothesis argues that individuals trust actors who are trusted by persons in their own network position. Finally, the advisory trust hypothesis claims that individuals prefer to maintain trust relations to persons occupying a position of third party intermediary than to persons in other positions. An exploratory empirical test of the hypotheses is carried out by reanalyzing a longitudinal network study of the relationships among 25 salesmen in the furniture department of a North American retail sales store during the 1950s. Blockmodelling procedures are used to identify structural positions in the networks, and log-linear analysis is applied to determine stability of choices within and between structural positions. The results support the mimetic trust and the advisory trust hypothesis.

INTRODUCTION

During the past two decades, social network analysis made considerable progress in the study of conditions contributing to the emergence, change, and dissolution of social relationships. Also thanks to a