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Sociocognitive Analysis of Group Decision Making among Consumers

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A sociocognitive perspective is developed to further the understanding of the relation between cognitive and social processes. The approach combines social network analysis with a cognitive network perspective to enable the researcher to study how social structure influences cognitive structure and how shared cognitive structure influences choice. This perspective is applied to how a group (with several subgroups) makes a consumer decision with consequences for the entire group. The results show that social structure influences cognitive structure, that shared knowledge is related to choice, and that the sociocognitive perspective provides new insights to prior literature on group decision making and the relation between group membership and brand choice.

Beth walked through her store briskly, smiling to herself. As she passed Mike, her assistant store manager, she grinned, "Monday again. Well, at least I have good news. The quarterly results were way above target. I'd like to take the salespeople out this Friday to celebrate. Ask them to decide where to go." That morning, as Mike walked about the large recreational equipment store, he told various salespeople about the good news and asked them to decide where to celebrate.

Mike thus initiated a process of group decision making among the salespeople. During the next several days, salespeople occasionally discussed the decision during slack periods and over lunch. Gradually, informal subgroups existing in the larger group of salespeople came to some agreement over the best place to go. Several young women, two from ski equipment and one from hiking gear, debated several alternatives but soon agreed that Friday's bar and restaurant, a favorite of young professionals, would be a good place to celebrate. Two younger males who also sold hiking equipment disagreed about this choice, called the place a "boring," "yuppie" bar, and suggested a local nightclub known for heavy-metal music, a shared interest of theirs. Some senior salespeople talked about several alternatives, including Friday's, but most preferred a family restaurant. As the week passed, a sporadic debate went on within and between subgroups. By

Thursday evening, some consensus appeared to emerge across subgroups that Friday's pleased most people.

This example illustrates a decision by a social entity other than a household to purchase goods or services consumed by the group as a whole. This phenomenon is pervasive, yet virtually overlooked in the literature. Other examples include friends deciding where to go for a movie, a shopping trip, or a vacation; co-workers deciding on a radio station for background music; and amateur athletes choosing uniforms or equipment for their team. Such collective decisions are especially interesting because they provide a context for the study of the relation between social structure (the network of relationships among the members of a social system) and cognitive structure (the network of associations among concepts in each member's mind), a neglected subject of inquiry.

Our basic thesis is that the analysis of both cognitive and social structure is necessary to understand group decision making. As our example illustrates, when a group decision commences, each individual typically begins with a set of ideas about his or her own goals and the alternative choices. As discussion emerges, individuals share their ideas with others, and in a larger social system, they are especially likely to share their ideas with other members of their subgroup, such as the young women or senior salespeople in the example. Gradually, the sharing of ideas from general patterns of social interaction influences the development of individuals' cognitive representations of the decision problem and the subgroups' and groups' shared representation of the problem.

Such a multilevel perspective, often advocated but rarely implemented (Podsakoff and Dalton 1987), encourages a broader view of how individuals make de-

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cisions than that afforded by traditional studies of information processing. In marketing, studies of consumer decision making have focused on individual cognitive processes and have shown relatively little concern with how others may influence these decisions or with the possibility that decisions should be studied from a group as well as from an individual perspective. Even studies of interpersonal influence (e.g., Bearden and Etzel 1982; Brown and Reingen 1987; Richins 1983) have focused primarily on studying the effects of others on individual, and not group, decisions. But many consumer decisions have micro and macro, cognitive and social, aspects. In the context of group decision making in particular, information is exchanged as a by-product of social interaction, and knowledge may be acquired that might not have occurred to individuals engaged in a solitary mental review. Thus, cognitions may not be solely a consequence of the "isolated individual mulling over his or her thoughts" (Morgan 1986, p. 408) but also may be social in their origin and development (Carley 1986; Forgas 1983).

Beyond acknowledging the influence of social interaction on individuals' cognitive structures, one must further realize that the social structure of a larger group facilitates or restricts interaction among its members. Thus, social structure constrains who has access to what information, affecting the cognitive structure of an individual (Carley 1986). Members of a particularly cohesive subgroup, for example, are likely not only to come to possess similar information as a result of their interaction but also to organize and interpret it in a similar fashion. At the same time, their knowledge structures may differ from those shared by other subgroups. Therefore, in addition to the impact on individuals' cognitive structures, another important cognitive consequence of interaction arising from social structure may be the production of "shared knowledge structures" (Morgan 1986), "collective representations" (Durkheim 1898), or a "group mind" (Sandelands and Stablein 1987). In choosing an alternative with collective consequences, the concepts and connections that group and subgroup members share help make understanding and agreement possible within the group and, in the case of subgroups, may define their differences. Thus, understanding shared knowledge and differences in shared knowledge is essential to understanding group decision making.

Such interdependencies of individual thinking and social reality have been recognized by the classics in sociology (Durkheim 1898; Weber 1968), psychology (Lewin 1951; Wundt 1905), and social psychology (Asch 1953; Heider 1958). In contrast, the more recent study of social cognition, a possible bridge for linking social and cognitive phenomena, has focused much more on the cognitive (Forgas 1983). This has disappointed scholars such as van Dijk (1988, p. 131), who comments that, "what social psychology could have contributed is a more explicit insight into how exactly knowledge, beliefs, or other (social) cognitions are ac-

quired and used, and how mental representations and processes systematically develop and operate as a function of social constraints."

To give the social dimensions of cognition a more balanced emphasis, the intended contribution of the present work is to combine two paradigms that have developed more recently: the information-processing approach to the study of cognition—in particular, its current emphasis on the study of knowledge structures—and the social network approach to the study of social structure. The primary objectives are (1) to develop a sociocognitive approach to the analysis of group decision making, (2) to demonstrate the mutual dependence of social and cognitive processes by applying this perspective to the analysis of a consumer decision by a real social group with an extensive history of previous social interaction and subgroup formation, and (3) to show how this perspective can lead to fresh theoretical and empirical insights.

We first present an overview of our sociocognitive approach. We then review how the sociocognitive perspective encourages deeper and more complete insight into the processes suggested by two bodies of literature particularly germane to this study: group polarization studies in social psychology and marketing (e.g., Isenberg 1986; Lamm and Myers 1978; Loken and Shmanski 1987; Reingen 1977; Whitney and Smith 1983) and studies of brand congruence among group members (e.g., Reingen et al. 1984; Witt 1969). Hypotheses are developed next, followed by the study to test them and the discussion of its results.

OVERVIEW OF SOCIOCOGNITIVE ANALYSIS

Social Analysis: Determining Social Structure

The regular pattern of relations among members of a social system constitutes its social structure. A major purpose of social network analysis is to uncover such a structure by aggregating members into subgroups based on their pattern of relations (for reviews, see Knoke and Kuklinski 1982 and Wasserman and Iacobucci 1990). The analysis uses as input relational data (e.g., who interacts with whom) processed by an algorithm to yield, for example, the number of subgroups and the identity of their members. In the course of a decision by a larger consumer group, social structure guides the communication of information within and between subgroups and the resulting similarities and differences in shared information. Thus, understanding social structure is crucial to understanding how changes in the cognitive representation of a decision arise.

Cognitive Analysis: Representing Evaluative Beliefs

To examine such changes, the sociocognitive approach uses as input each member's evaluation of an alternative represented as a "cognitive map." The structure of the maps is based on the idea that the evaluation of a decision is related to the consumer's connections between the alternatives' attributes (stated and inferred) and the consumer's goals. This structure has theoretical foundations in work on attitude structure, the role of inferences in evaluation, and means-end relations. Thus, each map is an associative network of relations among three types of concepts: attributes, inferences, and goals. In our work, these maps are developed from open-ended responses. To illustrate, suppose that two of the younger female salespeople in the introduction were asked what they were looking for in a place to celebrate and replied that, among other things, they sought a place where they might meet guys and listen to good music. Suppose they were also asked what they liked and disliked about going to the bar featuring heavy-metal music. One might reply, "I don't like heavy-metal music, and I doubt that I'd meet any decent guys in a place with that kind of music." The other might say, "Heavy metal would be cool, but too loud for meeting guys. You can't talk." Using these examples, we next discuss the nature of attributes, inferences, and goals and how they are connected to one another.

Attributes. Attributes are features of an alternative that are noted by a subject in response to like/dislike questions and, in our study, are also features given to the subject in a description of the alternative prior to the questions. Thus, in these examples, "heavy metal" is an attribute, a feature of the alternative already stated in its description. In response to like/dislike questions, attributes almost always have positive or negative valence. The evaluation of attributes is central to multiattribute models of attitude, preference, and choice.

Inferences. Attributes may be the object of further cognitive elaboration. In our scheme, inferences are elaborations about an attribute that are not included in the description of an alternative. Given in response to evaluative questions, such inferences tend to focus on subjects' reasons for liking or disliking an attribute. In the examples, one saleswoman infers that, if a nightclub features heavy-metal music, she would be unlikely to "meet any decent guys" there. The other saleswoman, reacting to the same attribute, infers that such music would make it hard to talk to any of the guys she might meet. The importance of inferences in attitude formation, attitude change, and choice processes is recognized by a substantial literature (e.g., Fishbein and Ajzen 1975; Hastak and Olson 1989; Kardes 1988; Sujan and Dekleva 1987; Walker and Yekovich 1984). During a process of evaluation, in-

ferences tend to reflect further thinking about the consequences of stated attributes. Such cognitive effort tends to focus on attributes of an alternative that are more salient for its evaluation. The resulting inferences may be more important for an alternative's evaluation than its stated attributes (Chattopadhyay and Alba 1988).

Goals. Goals are more abstract ideals relevant to the evaluation of alternatives (e.g., meeting guys, good music). The notion that connections between goals and attributes are relevant to alternative evaluation is supported by theory about means-end chains (Gutman 1982; Olson and Reynolds 1983). This work suggests that a consumer's evaluation of an alternative depends on the relation of its attributes to more abstract, higher-level goals.

Connections. In the maps, inferences are connected to attributes, and attributes are connected to goals. We refer to these connections as beliefs. A belief is labeled as either positive or negative to the extent that an attribute involved in the belief facilitates or hinders goal achievement. Returning to the examples, the saleswomen both perceive the goal of meeting guys to be relevant to evaluating the alternatives. They share the belief that a specific attribute of one of the alternatives, the nightclub's heavy-metal music, hinders achievement of the general goal of meeting guys but because of different inferences prompted by the same attribute. One saleswoman believes that heavy-metal music would not attract decent guys, whereas the other feels that the music would be too loud to allow conversation. In turn, the attribute "heavy-metal music" has a positive connection to the more abstract goal of "good music" for one of the saleswomen, but a negative connection for the other. Thus, we attempt to capture in the maps the valence of beliefs, their content, and their structure.

As previously noted, the maps are developed from open-ended responses to like/dislike questions. Thus, subjects are free to express their personal views, but their comments are likely to include beliefs that vary in salience to the evaluation of the alternatives. We sought to distinguish salient beliefs from nonsalient beliefs in the subjects' maps, consistent with the idea that only salient beliefs should be related to evaluation and choice (Fishbein and Ajzen 1975). During social interaction, in particular, we might expect group members to focus their attention on the more salient aspects of alternatives. Thus, we divided maps into a set of salient concepts and connections that we call "core" maps and a set of nonsalient concepts and connections that we call "peripheral" maps. Details of how the maps were constructed and the criteria used to distinguish core and peripheral maps are discussed in the methodology section.

Our objective for the maps was not to advance theoretical work on the representation of knowledge but rather to create an adequate, theoretically grounded

scheme for examining relations between cognitive and social structures. Graesser (1981, p. 115) notes that work on the representation of cognitive structure is still in a developmental stage, and thus a "great deal of latitude" is still available in attempts to represent cognitive structure. (For other approaches to measuring cognitive structure, see Barsalou and Hutchinson 1987; Carley 1986; Chi and Koeske 1983; Graesser 1981; Hutchinson 1983; Spradley 1987.)

Sociocognitive Analysis: Relating Cognitive to Social Structures

Relations between social and cognitive structures are likely to be better revealed by a research design that includes a group with a social history comprising several subgroups and cognitive maps of decision alternatives collected prior to (T1) and after (T2) a period of social interaction. Given such data, the analysis can focus on exploring how changes in cognitive structure from T1 and T2 relate to subgroup membership and communication patterns.

Our approach to relating cognitive structures to social structure is to compute the average number of positive and negative beliefs that each subgroup member shares with each other member by intersecting the cognitive maps of members.¹ Shared beliefs (positive and negative) have several virtues as indices of the relation of social to cognitive structure. First, the use of positive and negative beliefs and their relation to attitude and choice has precedent in several literatures, including work on attitude models (Fishbein and Ajzen 1975), studies of cognitive response (Fishbein and Ajzen 1981; Hastak and Olson 1989; Petty 1981), and studies of informational influence in groups (Isenberg 1986). Second, the measures take into account the content of beliefs and their structure instead of just focusing on their number, as in traditional cognitive-response analysis (Wright 1980). Measuring the content and structure of shared beliefs avoids the problem of assuming individuals are similar because they have the same number of positive or negative beliefs. For example, three individuals in the same subgroup might prefer the same alternative for entirely different reasons. Merely counting positive and negative beliefs could result in the misleading conclusion that group membership resulted in similar cognitive structures and similar choice. Finally, the measures grow larger as group sharing increases.

¹For alternative approaches of relating cognitive to social structures, see Carley (1986) and Dunn and Ginsberg (1986). Dunn and Ginsberg (1986) used hypothetical data to illustrate an interesting method that employs the dyad as the unit of analysis. Carley (1986) developed various useful analytical tools and then applied them to the exploratory analysis of a tutor selection decision by undergraduates. Our approach differs in several important conceptual and methodological ways from these attempts.

GROUP INFLUENCE: A SOCIOCOGNITIVE PERSPECTIVE

In the present work, the sociocognitive approach is applied to the study of how a group chooses from among a set of alternatives. To provide insight into the potential contributions of the sociocognitive approach to the understanding of group decision making, selected theoretical and methodological approaches to the study of group influence on individual and group decisions are reviewed next.

Group Polarization

The informational and normative perspectives to understanding group influence have received the most attention in the social psychology literature over the past 20 years. These approaches were developed in the context of efforts to explain the phenomenon of group polarization, the tendency of a group to become more extreme in its support of an initially favored alternative as a result of discussion. The informational influence approach attributes such shifts in opinions and choice to discussion among group members who share information with one another. In contrast, the normative approach suggests that group judgment and choice shifts result from members' desires to conform to the expectations of others (Lamm and Myers 1978; Myers and Lamm 1976). In a recent review, Kaplan and Miller (1987, p. 306) conclude that "in general, informational influence produces more frequent and stronger shifts than does normative influence." On the basis of a meta-analysis, Isenberg (1986) supports this conclusion. Thus, we will focus on informational group influence.

The most commonly accepted version of the informational influence approach explains polarization toward an initially favored alternative in the following way (Vinokur and Burnstein 1974). Suppose that prior to discussing whether to purchase alternative A or alternative B, most members of a group individually have more arguments in favor of choosing A than B. Also, assume that many of the arguments are only partially shared by the group members. Now, if the individuals discuss the issue, and each learns and accepts the others' arguments, the individuals should have more reasons to choose alternative A, and the group as a whole should favor alternative A even more than it did prior to discussion. This is a simple example, yet it conveys the essence of informational influence theory (Isenberg 1986; Lamm and Myers 1978; Myers and Lamm 1976).

The experimental paradigm for studying informational influence effects on individual preferences has been relatively invariant (Vinokur and Burnstein 1975). Studies have typically been conducted in a laboratory environment using independent groups of subjects recruited from a subject pool of strangers who are required by experimental fiat to discuss an issue

of little personal relevance. Such a design provides a narrow perspective on phenomena of group shifts, ignoring important aspects of the relation between cognitive and social processes. First, the design does not explicitly consider social structure. In contrast, sociocognitive analysis recognizes that communication in natural groups may result in patterns of influence more complex and more related to social structure than can be observed in independent laboratory "groups." For example, in a larger group with a number of subgroups, patterns of interaction are likely to be related to the larger group's social structure, raising the possibility that information diffusion and thus polarization may occur at different rates (or not at all) in different parts of a social system. Second, discussion is by experimental fiat required of the group members. But in any organization with a social history, discussion among group members or across subgroups may or may not occur, depending to an important degree on informal ties and channels of communication that have emerged over time. Third, the decision is usually not one with actual and significant consequences to the group as a whole. Yet, just this kind of decision is likely to evoke social influence processes in their full power and complexity. These limitations argue that sociocognitive analysis of how naturally occurring groups make decisions with social and individual consequences could contribute to the understanding of group shifts that has been gained so far primarily only in laboratory environments.

In past studies, group shifts in attitude and choice are usually explained by a change in the distribution of discrete and equally weighted support arguments for the alternatives. This approach ignores the potential importance of cognitive structure as well as its interaction with social processes. Some beliefs are likely to be more salient parts of cognitive structures than others and thus are likely to become the focus of social interaction and polarization effects. Also, social interaction may result in beliefs' becoming less salient parts of members' cognitive structures because such beliefs become less relevant as a result of discussion—or they are not discussed at all. Deleted beliefs could be as responsible for change in attitude and choice as added beliefs (Newcomb 1943).

Furthermore, the focus on support arguments ignores the possibility that negative beliefs may be more influential than positive beliefs in determining attitude and choice due to the salience of negative beliefs and the importance of avoiding negative outcomes (e.g., Kanouse 1984). Finally, as previously argued, a focus on shared beliefs may provide more insight on how information diffusion helps make choice agreement possible within a group than does a focus on individuals' arguments.

Brand Congruence Studies

The sociocognitive approach also has the potential to contribute to the study of brand congruence in con-

sumer behavior. Brand-congruence studies have shown that membership in small, informal groups of consumers affects individuals' brand choices. However, earlier studies (e.g., Witt 1969) were criticized by Reingen et al. (1984) because they defined group membership simply by asking subjects to nominate others as group members. This procedure overlooked the possibility that the nominees might not have been in bona fide social relationships with each other. Reingen et al. (1984) employed social network analysis to identify groups in a sorority and found some evidence of brand-congruence effects. The sociocognitive approach extends previous work on brand congruence by linking cognitive structure and changes therein to social structure and choice.

HYPOTHESES

Our overall objective is to demonstrate the effect of social structure and interaction on the sharing of beliefs using cognitive maps of decision alternatives. As a context for this demonstration, we performed a field study of how an organization with several subgroups made a decision with collective consequences for the members. We collected data on the organization's social structure and also data used to construct cognitive maps of each member's representation of the decision alternatives both before (T1) and after (T2) a period of social interaction about the decision. Our expectations about these data are discussed.

Core versus Peripheral Beliefs

The cognitive maps were divided into sets of core (i.e., salient) beliefs and peripheral (i.e., less salient or nonsalient) beliefs. A variety of theoretical perspectives predict that salient beliefs are more likely to be the focus of an individual's attention during a decision (e.g., Fishbein and Ajzen 1975). We extend this expectation by suggesting that salient beliefs are more likely to be the focus of social attention (i.e., more likely to be mentioned, discussed, and debated in social situations). Thus, we expected the effects of social interaction to be strongest on the core beliefs.

Group Hypotheses

First, consider the group as a single collectivity. Interaction between members of different subgroups should allow information to diffuse throughout the group. If one alternative is initially most preferred, our approach makes two predictions. The first is that there will be polarization of shared beliefs in core maps from T1 to T2 in favor of the initially more preferred and against less preferred alternatives. The second is that there will be polarization in alternative choices from T1 to T2 mirroring the expected pattern in shared beliefs. These predictions at the group level are similar to the typical group influence studies in social psy-

chology, but unlike previous studies, we analyze changes from T1 to T2 by examining both positive and negative shared beliefs in core maps. Prior polarization studies suggest an increase in positive beliefs for the initially more preferred alternative but offer little guidance regarding the effects of negative belief sharing on group polarization.

Subgroup Hypotheses

First, we expected to find differences among subgroups in their shared beliefs about the alternatives. This prediction was prompted by several lines of reasoning. Work in social psychology suggests that members of a group (or subgroup) tend to develop an "intergroup bias" and seek to differentiate themselves from the members of other groups (Wilder 1981). Sherif and Sherif (1964, p. 166) observed that "as members interact in joint activities . . . , they develop . . . common evaluations and shared tastes in addition to those which brought them together." Furthermore, exploratory work done prior to our study suggested that our group would include subgroups and provided some insight into their character. Using this insight as a guide, we constructed the choice alternatives so they would differ in their expected appeal to various subgroups.

Second, we also expected that patterns of relations within and between subgroups would influence the direction and magnitude of change in shared beliefs. In other words, understanding social structure and its influence on interaction patterns is necessary to fully understand group shift phenomena. However, precise predictions are difficult because the amount and direction of change are likely to be mediated by a complex set of contingencies and interacting factors that cannot all be predicted in advance for an in situ field study. These factors include the relative amount of intersubgroup to intrasubgroup communication and the initial distribution of positive and negative beliefs in each subgroup. For example, the greater the relative amount of intersubgroup to intrasubgroup communication, the more a subgroup's pattern of shared beliefs and thus alternative choices might be influenced by members outside the subgroup instead of those exclusively inside the subgroup. This reasoning also suggests that a cohesive subgroup's shared beliefs and choice might be mediated largely by the pattern of beliefs initially observed within the subgroup itself.

METHODOLOGY

In the present work, we chose to study how a sorority, Alpha House, selected one of three different theme parties to be given on its behalf. The organization and the decision problem had several desirable characteristics: a sizable system of individuals with a shared social history, a high probability of subgroups existing in the sorority, extensive social interaction, and a

group consumption problem that had substantial personal as well as collective significance. Our 39 subjects lived on one of the floors of a dormitory building. Of the sisters, one failed to participate in a scheduled interview and one was not at the university at the time the study was conducted, leaving 37 subjects for which complete data were obtained.

As a cover story, the sorority members were told that a catering firm, Party Concepts, Inc., was considering relocating and had hired the researchers as consultants to test the appeal of several party concepts to young people in a different part of the country. The officers and other members of the sorority readily accepted this explanation. As an incentive, the sorority members were told they would be given the party that received the most votes, and the vote would be taken at the conclusion of the research. (The sorority was compensated by funds sufficient to throw one of the theme parties, and each member who completed the interviews was given \$10.)

Stimuli Development

We chose a party theme decision because the consumption of a party is a shared experience with important consequences to the sorority as a whole as well as to its members. A sorority is a social organization, and organizing parties for the members is one of a sorority's principal functions. To virtually every member of Alpha House, major parties were the year's most important social occasions; both social prestige and social harmony were at risk during these events. Usually, these parties had a theme chosen from several alternatives on the basis of a chapter-wide vote.

Prior to stimulus development, we conducted exploratory interviews with members of several other sororities. In the exploratory interviews, we asked sorority sisters what they sought in a party, that is, their ideals for parties. We then performed a content analysis of their responses, resulting in a set of goals that sorority members sought to fulfill. We found that some goals were shared by virtually all respondents (e.g., a nice location for the party) and that some differed among sorority members, depending on such factors as their age, length of time in the sorority, and life-style. For example, the data suggested that some younger sorority members tended to prefer wilder, more casual parties that provided opportunities to meet boys, whereas some older members, who were often more serious about school and more likely to have steady boyfriends, tended to prefer more formal parties suitable for taking their date.

Guided by these insights, we constructed three narrative descriptions of parties, each beginning with the title of the party's theme and filling approximately three-fourths of a single-spaced, typewritten page. The "murder mystery party" was described as a black-tie, formal dress party at which the sisters and their dates would attempt to solve the murder mystery of "Pro-

fessor Whip” by interviewing each other for clues all evening. For the “pool blow-out crush party,” the sisters were encouraged to provide the names of three boys they “had a crush on.” These “crushes” would be invited to a pool bash that, as the description suggested, “usually gets pretty wild.” The “lawn party” was designed to be a compromise in terms of degree of organization and formality between the other two. The major idea was “two parties in one party” that changed in character from afternoon to evening. This party was described as a casual outdoor lawn party that started in the afternoon with croquet and other games, and then changed in the evening to a more formal dance under a striped tent. Since we wanted each party initially to be a positive alternative, and no party to be an obvious reject, all three parties included attributes that were derived from commonly held goals (e.g., a nice location for a party, good participation, good catering, and activities at the party).

Data Collection

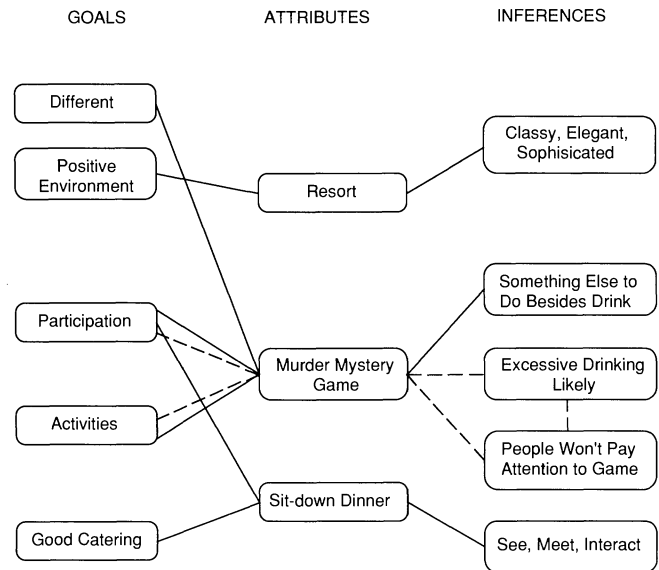
The members of Alpha House were interviewed twice. At T1, each member was scheduled for a one-hour interview. Interviews were conducted by six females in separate rooms and were tape-recorded with the permission of the subjects.

During the T1 interviews, each party description was read to the subjects (order was systematically rotated across subjects). The interviewer then asked, “What would you like about this party and why?” When a subject completed her response, the interviewer asked, “Anything else?” The interviewer then asked, “What would you dislike about the party and why?” When the subject completed her response, the interviewer once again asked, “Anything else?” After the subject had responded to descriptions of all three parties, the subject was asked to indicate her most and least preferred parties (the formal vote was taken at T2). Subject background data and responses to other measures, including ideals for a party, were also obtained. At the conclusion of the T1 interview, the subject was admonished not to discuss the party descriptions with other sorority members until all T1 interviews were completed.²

After T1 interviews were all completed, the sorority members were told at their next chapter meeting (mandatory attendance) that they were free to discuss the parties, and furthermore, in 10 days, the interviewers would return to ask each member to vote for the party she would like Party Concepts to give the sorority. The members were told that a plurality would decide the vote.

²Most interviews were conducted within two days. Discussion among sorority sisters regarding the content of the interview session prior to their participation in the study would have suppressed the magnitude of differences observed between T1 and T2.

FIGURE 1
SUSAN'S COGNITIVE MAP FOR THE MURDER MYSTERY PARTY



Ten days later, at T2, the interviewers returned to complete the data gathering. The T2 interviews repeated the protocol-elicitation procedure described earlier for each party. Afterward, the subjects were asked to vote for their most preferred party. Since the votes were taken individually and confidentially, the possibility that choice agreement among subjects would be heightened because of normative pressures or the presence of outside observers was minimized. After the vote, subjects were asked to respond to a set of measures, including sociometric measures described later.

Cognitive Maps

The goal of the coding of the open-ended responses was to develop cognitive maps that represent the concepts and connections among concepts relevant to each subject’s evaluation of the three decision alternatives. Each map is a network of relations among three types of concepts: a subject’s goals, the attributes she noted from the descriptions of the parties, and the inferences she made from these attributes. To illustrate, Figure 1 shows Susan’s cognitive map of the murder mystery party. To the left, the map shows the goals that Susan evoked as relevant to evaluating the party (e.g., that participation in group activities at a sorority party is desirable). Moving to the right, the map shows the party attributes she mentioned in her evaluation (e.g., the murder mystery game). Further to the right, it shows inferences (e.g., that the game will provide something else to do besides drinking) Susan made about the consequences of having a murder mystery game at the party. The connections show how Susan’s

inferences relate to her perceptions of the party's attributes and how the attributes relate to her goals. For example, focusing on Susan's inferences about the murder mystery game, she likes (solid line) the possibility that the game will provide the opportunity to do something else besides drinking. However, she dislikes (dotted lines) the possibility that the sorority sisters and their dates would drink excessively and not be able to participate in the game.

To create these maps, coding proceeded in the following steps in both the trial and final stages. First, the open-ended responses were broken into units expressing a single idea at the level of a "stated idea" (Cacioppo and Petty 1981) or, roughly, a "proposition" (Kintsch et al. 1975). Once the text was broken into units, the coders performed a content analysis to create a detailed list of concepts that classified each concept as an inference, attribute, or goal. The initial development of the coding—in particular, ideas about subjects' goals—was aided by the insights we gained in the exploratory interviews used to create the parties. If a coder encountered a new concept, a proposed definition was written and, upon mutual agreement, included in the list.

After parsing a response into goals, attributes, and inferences, the positive or negative connections among the concepts were determined. Connections were positive (negative) if the concepts were evoked in a subject's responses to like (dislike) questions. To decrease any subjectivity, we created a detailed set of rules specifying usual relations among specific inferences, attributes, and goals.³

³To illustrate the coding scheme, we focus on several concepts relevant to the evaluation of the crush party: the attribute of "three crushes for every sister" and the inferences "sisters in control" and "jealousy/rivalry among the sisters possible." The attribute of "three crushes for every sister" was defined in our coding guidelines as a playback of the fact mentioned in the crush party description that three men would be invited to the party for every woman. Examples of passages that prompted the coding of this concept include "you get to invite three guys" and "you'd have three guys there to one girl." The inferences were elaborations on the part of subjects about the perceived positive and negative consequences of the attribute "three crushes for every sister." The inference "sisters in control" was defined as a comment suggesting that sisters could choose to ignore one or more of the three crushes invited to the party for them. Examples of comments that evoked this concept are: "if you don't like a guy, you can just beam him" ("beam" suggests "ignore" or "make him disappear" as in "Star Trek"), and "you don't have to meet him if you decide that you don't want to." The inference "jealousy/rivalry among the sisters possible" was defined as a comment suggesting that jealousy or rivalry among the sisters over the men invited to the party might occur. Examples of passages representing this concept are: "a lot of girls in our sorority like the same guys . . . so there might be a little rivalry and a little . . . confrontation there," and "some sisters might invite the same boys . . . and sort of . . . fight over boys." For these examples, the inferences "sisters in control" and "jealousy/rivalry among the sisters possible" are connected to the attribute "three crushes for every sister," forming a positive or negative belief, respectively. In turn, the attribute "three crushes for every sister" was either positively or negatively connected to the goal "romance," depending on a

Two types of statements were not coded. Statements that were not related to the evaluation of the parties were not coded. However, since subjects responded to questions about why they liked or disliked the parties, almost all of their statements were directly related to the evaluation of the parties. Global attitude statements about the party as a whole (e.g., "I really like this party") were also not coded to avoid artificial inflation of the relation between the beliefs and the preference data (Wright 1980).

The responses were coded independently by the authors, who were blind to the subgroup identity of the subjects and their preferences. Final intercoder agreement for concepts was 87 percent. For the more difficult task of connecting concepts, intercoder agreement was 76 percent. Disagreements about either classification or connection of concepts were resolved by discussion.

Core and Peripheral Maps

As previously discussed, we wished to distinguish between sets of beliefs more and less salient to the evaluation of the parties. Thus, maps were divided into two sets of concepts and connections. Concepts and connections anticipated to be more salient were assigned to "core" maps and all others to "peripheral" maps. The assignment to core and peripheral maps is supported by literature on schematic processing, cognitive representation of narrative stories, and elaborations.

We anticipated that evaluation and choice of the parties would focus on the parties' major differences. The major differences in the parties were suggested by their titles—the murder mystery party, the crush party, and the (two-in-one) lawn party—which encapsulated the major attribute associated with each party (e.g., the game for the murder mystery party, "three crushes for every sister" for the crush party). Several studies have shown that a thematic cue given prior to reading a passage encourages the memory of material congruent with the cue (Bransford and Johnson 1972; Fiske and Taylor 1984). Consistent with this literature, the parties' titles were expected to encourage subjects to focus on and to better recall theme-related attributes. Thus, beliefs in core maps were determined to be those involving the attributes encapsulated by the themes. All other beliefs were classified as peripheral.

Supporting this distinction, one would expect that the attributes captured by the parties' titles would have greater structural centrality in subjects' cognitive maps (i.e., have more linkages to goals and inferences in

subject's likes or dislikes. The more abstract goal of "romance" for a party was commonly expressed by the pretest and study subjects. For example, one sister began her comments about the crush party by saying, "boys, that's the first thing on my list, to meet them." All of these concepts were later classified as core concepts about the crush party because they relate directly to its central idea of a party to which three "crushes" are invited for every sister.

particular than the parties' other attributes), would be better remembered and recalled, and thus would be more likely to be the focus of discussion in social discourse. Studies of the representation of narrative stories have found that theme-related story elements tend to be structurally more central concepts that are rated by subjects as more important and are more frequently recalled (Omanson 1982; Yekovich and Walker 1986). Literature on memory also suggests that inputs that receive more "elaborative processing" are better recalled (Anderson and Reder 1979).

Returning to Susan's map (Fig. 1), one sees that the party's attribute "murder mystery game" has the greatest number of associative connections to other concepts. This is not surprising since the game is more central to the overall theme than, for example, the sit-down dinner. Thus, the beliefs associated with the game form the core map; all other beliefs comprise the peripheral map (e.g., the belief that having the murder mystery party at a resort is classy). In general, then, core maps comprise the set of goals, attributes, and inferences that were likely to be most salient and pertinent to evaluation, choice, and social influence.

The adequacy of the distinction between core and peripheral maps can be shown in several ways. First, our primary reason for collecting the data on party choice at T1 and T2 was to provide a measure for validating the relation of the maps to preference. These data, presented in the results section, show that beliefs in the core, but not the peripheral, cognitive maps were strongly related to party choice. Second, other data suggest that the beliefs assigned to peripheral maps were less likely the focus of social interaction. Third, as a further check on the core versus peripheral distinction, recall that we expected more inferences about the attribute that was most related to the theme of each party: the game for the murder mystery party, "three crushes for every girl" for the crush party, and "two parties in one" for the lawn party. In support, the average number of subjects' inferences about these attributes ranged from 2.78 (lawn party at T1) to 4.14 (crush party at T2), whereas subjects' inferences on all other attributes of each party in their cognitive maps only averaged from .27 (crush party at T2) to .95 (lawn party at T2). All comparisons were significant ($p < .01$).

Determination of Shared Beliefs

To determine shared beliefs, let A be a beliefs-by-members matrix for a subgroup where the i, j th cell has a 1 if the j th member has the i th belief in her cognitive map, 0 otherwise. Then $A^T A$ gives the number of shared beliefs among the members of a subgroup paired with each other. Summing the off-diagonal elements in the resulting matrix across rows (or columns) and dividing the sum by $n - 1$ (n = subgroup size) yields the average number of beliefs that each subgroup member shares with the other members. This analysis

is performed for positive and negative beliefs separately in core as well as peripheral maps.

ANALYSIS AND RESULTS

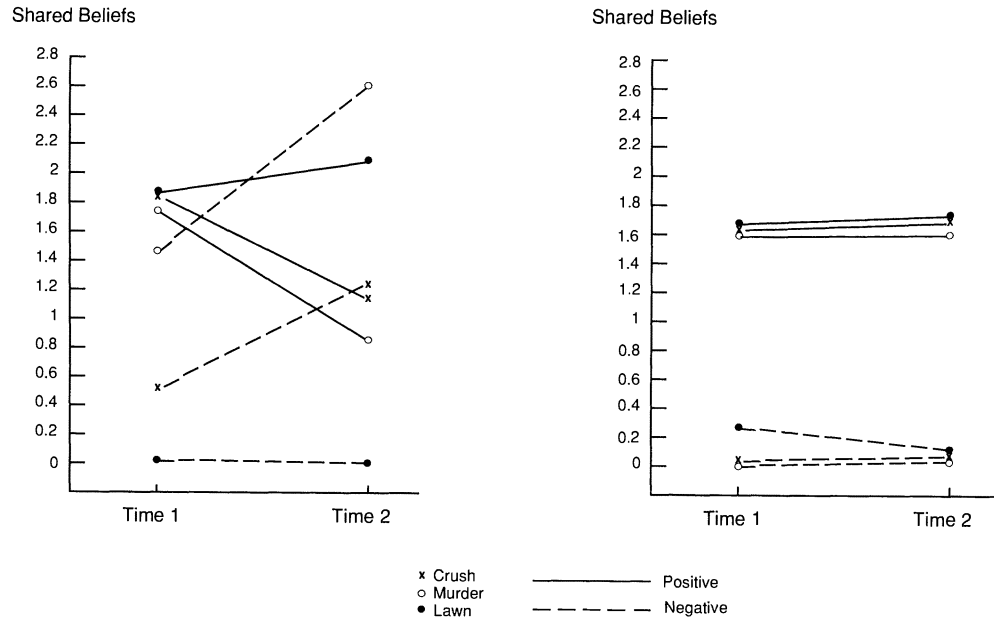
The description of the results of the sociocognitive analysis follows a multilevel perspective. First, the results for the sorority as a group will be presented. Second, the social network analysis for determining the sorority's subgroup structure will be discussed and linked to the analysis of shared beliefs at the subgroup level. Before proceeding, we argued earlier that the effects of social interaction would be strongest on the core maps. Examining Figure 2, which collapses results across subgroups, one sees that changes in shared beliefs from T1 to T2 appear much greater for core than peripheral maps. Indeed, a repeated-measures ANOVA shows that the interaction effect of party (lawn, crush, murder mystery) by time (T1, T2) by valence (positive beliefs, negative beliefs) on shared beliefs in core maps is significant ($F = 25.69, p < .001$; see Table 1), whereas for peripheral maps this interaction ($F = 1.35$) as well as all two-way interactions (F 's < 1) are insignificant (p 's $> .10$). Furthermore, the party choice data, which will be presented in detail later, show that the pattern of core results, but not the pattern of peripheral results, is related to choice. Thus, our earlier expectations were confirmed, and all the following analyses will focus on the results obtained for core maps.

The Group

We predicted that the analysis of the changes in shared beliefs in core maps would reveal polarization toward the initially more favored alternative and away from the less favored ones. In a fan-shaped pattern of data characteristic of polarization, Figure 2 shows that shared negative beliefs increased and shared positive beliefs decreased for the initially less favored alternatives—the murder mystery and crush parties. Statistical support for this conclusion comes from an analysis of simple effects. Examining the simple interaction effect of time by valence at each level of party shows that this interaction is significant for the crush and murder mystery parties ($F = 28.88, p < .001$ and $F = 35.33, p < .001$, respectively) and insignificant for the lawn party ($F = 1.24, p > .10$). Further analysis of the simple main effects of time reveals significant results for shared positive as well as shared negative beliefs for both the crush and murder mystery parties (crush/positives $F = 17.45$, crush/negatives $F = 18.89$, murder mystery/positives $F = 14.68$, murder mystery/negatives $F = 19.00$; p 's $< .001$).

Turning to the party choice data (subjects' choice of their most favored alternative), we expected for the group as a whole a pattern of polarization in choices mirroring the pattern for shared beliefs. Hierarchical log-linear analysis showed that the effect of the interaction of party by time on individuals' choices is sig-

FIGURE 2
EFFECTS OF PARTY AND TIME ON SHARED BELIEFS
CORE MAPS PERIPHERAL MAPS



nificant (likelihood ratio $\chi^2 = 12.89, p < .003$). Choices in favor of the lawn party increased from 17 at T1 to 31 at T2, whereas choices decreased for the crush party (from 13 to five) and murder mystery party (from seven to one). Thus, choices for the initially favored alternative increased, and those for the initially less favored alternatives decreased. In sum, both the shared beliefs and choices of the group as a whole reveal an overall pattern consistent with expectations. However, the data add the insight that polarization in this study was driven by additions of shared negative and deletions of shared positive beliefs for the initially less favored alternatives, rather than by additions in shared positive beliefs for the initially more favored alternative.

The next sections provide deeper insight into this pattern of group shift by (1) discussing an analysis of the subgroup structure of the sorority; (2) examining patterns of intrasubgroup and intersubgroup strong ties, communication, and influence; and (3) relating these findings to shifts in shared beliefs and choice at the subgroup level.

Subgroup Determination and Characteristics

Social Structure Analysis. The analysis of the sorority's social structure focused on defining subgroups in the sorority by the analysis of responses to three sociometric questions. First, subjects were asked to list the names of close friends in the sorority. Second, they

were requested to list the names of the sisters with whom they go out or party. Third, the subjects rated on a six-point scale the frequency of their general interaction with each study participant (very rarely/very often). The frequency data were dichotomized for the social structure analysis (score $\geq 5 = 1$, 0 otherwise). Groups of close friends who interact frequently and party together should be significant aspects of a sorority's social structure, particularly with respect to a party choice decision.

The social structure analysis proceeded as follows. The sociometric measures were employed to generate three 37×37 adjacency matrices (one for each measure, where the i, j th cell in each matrix has a 1 if both persons i and j nominate each other as, say, close friends, 0 otherwise). Next, QAP analysis was performed on the matrices. This analysis computes concordances and discrepancies between two matrices and then estimates the probability that they are related (Hubert and Baker 1976). Based on this analysis, all three matrices were found to be related to one another ($p < .001$). Coefficients of identity, which measure the degree to which two matrices are identical (Zegers and ten Berge 1985), were as follows: "close friend" and "party/go out with" = .77, "party/go out with" and "general interaction frequency" = .60, "close friend" and "general interaction frequency" = .69. Thus, subgroup results would be robust across these relations.

Next, all three matrices were input to a network analysis of social structure. The purpose of this analysis

TABLE 1
SUMMARY OF ANOVA FOR SHARED CORE BELIEFS

Source of variation	df	F	p
Time	1,33	2.89	.099
Valence	1,33	47.62	.001
Party	2,66	31.78	.001
Time by party	2,66	<1	
Time by valence	1,33	76.40	.001
Party by valence	2,66	65.01	.001
Time by party by valence	2,66	25.69	.001
Subgroups	3,33	2.83	.059
Subgroups by time	3,33	3.66	.022
Subgroups by valence	3,33	8.49	.001
Subgroups by party	6,66	15.30	.001
Subgroups by time by party	6,66	5.92	.001
Subgroups by time by valence	3,33	11.66	.001
Subgroups by party by valence	6,66	6.02	.001
Subgroups by time by party by valence	6,66	9.01	.001

is to aggregate actors into subgroups that exist within the larger social system. Two general criteria are available for subgroup determination: social cohesion and structural equivalence (Burt 1983). With social cohesion as the criterion, actors are aggregated into a clique to the extent that all are connected directly to each other by strong interpersonal ties. The disadvantage of social cohesion, given the theoretical questions we pose, is that this criterion identifies subgroups that have little or no variation in their patterns of relations. Thus, effects of differences in relations within and between subgroups on belief sharing are more difficult to study with this criterion.

Structural equivalence focuses on the patterns of social relations in which individuals are involved and aggregates actors with similar patterns into subgroups. In contrast to social cohesion, structural equivalence does not impose the requirement that members in a subgroup are connected to each other by cohesive bonds. For example, if sorority sister A and sorority sister B each are in strong relations with the same set of other sorority sisters, structural equivalence would group them together, though A and B may not be in a strong-tie relation. However, they are likely to be in such a relation since they socialize with the same set of sorority sisters. Thus, the criterion of structural equivalence may also yield cohesive subgroups. Structural equivalence may in addition reveal subgroups that are undetected by the criterion of social cohesion (e.g., a subgroup of sorority sisters who share fewer relationships among themselves and the other sisters). Thus, applying the criterion of structural equivalence to aggregating the sorority sisters into subgroups was more likely to enable us to explore how variation in intra- and intersubgroup relations affects patterns in shared beliefs, and their change.

CONCOR (Breiger, Boorman, and Arabie 1975), the hierarchical clustering algorithm most widely used for

partitioning multiple network matrices to produce structurally equivalent subgroups, suggested the existence of four subgroups. To verify the adequacy of the four-subgroups outcome, an additional analysis was performed. Two social informants (officers in Alpha House) were asked to informally cluster the sorority sisters into subgroups of sisters who are friends with one another, party together, and so forth. To check the results of this additional analysis against the CONCOR outcome, the informants' informal clustering was used to generate a 37×37 adjacency matrix, in which a 1 denoted that subjects i and j belong to the same subgroup, 0 otherwise. Again, based on QAP, the matrix was found to be significantly related to the subgroup matrix based on the CONCOR results ($p < .001$; coefficient of identity = .74). Overall, then, there is considerable evidence that the four-subgroup social structure of Alpha House appears socially valid, as suggested by informants' data.⁴

Results of Social Structure Analysis. Based on questionnaire data and information provided by the two social informants just noted, the characteristics of the subgroups produced by CONCOR are as follows.

The Old Guard ($n = 9$) were described by informants as "old-guard" leaders, more mature, and more serious about school. This group included the current president of Alpha House, and virtually all members were or are senior officers in the sorority. Most of the members of this subgroup are third-year students and, on the average, have been living the longest in Alpha House.

The Young Leaders ($n = 10$) were characterized as "up-and-coming" leaders who tended to be driven, competitive "doers." Most were officers (e.g., social chair, assistant social chair) but did not yet occupy top leadership positions. They were described as the organizers of activities such as parties, games, and charity drives. Almost everyone in this group was a sophomore.

The Cheerleaders ($n = 8$) were described by informants as "cheerleaders," not serious about school, "bubbly," "giggly," wild, out of control, and as devoting much of their time to meeting boys. This subgroup consisted of a mix of sophomores and juniors who did not hold official leadership positions.

⁴For each image matrix of the CONCOR results (cutoff value specific to the matrix), all diagonal values = 1 and all off-diagonal values = 0. The social informants also identified four subgroups. Sororities, in particular, may be likely to have a well-defined social structure because new sisters are recruited in pledge classes of similar size. Members of the same pledge class tend to develop social relationships with one another and have similar statuses (often based on class rank) and roles relative to the other sisters. Thus, cohesion and structural equivalence yield quite similar structural results for Alpha House. The major difference in structural findings concerns the Cheerleaders (as explained by the following results), who would not be identified as a subgroup based on the criterion of social cohesion.

TABLE 2
STRONG TIES, INFLUENCE, AND
COMMUNICATION FREQUENCY

Subgroups	Mean proportions of strong ties to:		F	p
	Members of the same subgroup	Members of other subgroups		
Old Guard	.53	.03	36.46	.001
Young Leaders	.53	.00	36.00	.001
Cheerleaders	.14	.01	8.37	.023
Intragroupers	.42	.01	25.09	.001
Mean proportions of influence by:				
Subgroups	Mean proportions of influence by:		F	p
	Members of the same subgroup	Members of other subgroups		
Old Guard	.37	.04	43.58	.001
Young Leaders	.42	.01	24.58	.001
Cheerleaders	.19	.02	13.42	.008
Intragroupers	.27	.01	20.65	.001
Mean frequencies of communication with:				
Subgroups	Mean frequencies of communication with:		F	p
	Members of the same subgroup	Members of other subgroups		
Old Guard	5.19	2.58	44.25	.001
Young Leaders	5.04	1.82	110.99	.001
Cheerleaders	3.50	1.97	13.85	.008
Intragroupers	4.04	1.96	30.27	.001

The Intragroupers ($n = 10$) were juniors described as being "into their own thing" rather than Alpha House activities, more secure with members of their own group, and not really serious about school. A number of these members had steady boyfriends and were described as in the process of disengaging from sorority life. Virtually none had a formal leadership position in the sorority.

Patterns of Strong Ties, Communication, and Influence. Subgroup differences were also observed regarding patterns of strong ties, communication involving the parties, and influence. A "strong tie" was defined as two members of the sorority nominating each other as recipients of all three types of relationships (friendship, party together, general interaction) described earlier. For each individual, the proportion of the number of strong ties to the number of members of the same subgroup (for within subgroups) or the number of members of other subgroups (for between

subgroups) was computed. Proportional measures were similarly constructed for the number of sorority sisters that were mentioned by an individual as having influenced her T2 preference. A six-point scale administered with the other sociometric measures (did not talk/talked a lot with person X about the parties) served as the measure for party-related communication frequency.

Several patterns are apparent in the means provided in Table 2. First, means of strong ties, influence, and party-related communication frequency are all significantly greater within subgroups. Second, though these findings hold for each subgroup, differences among the subgroups are also apparent (strong ties $F = 4.94$, $p < .01$; influence $F = 2.48$, $p < .08$; party-related communication $F = 7.70$, $p < .001$). There is a consistent tendency for the Cheerleaders to have the lowest means. Thus, the Cheerleaders shared fewer strong-tie relationships. As tie strength has been found to be related to social influence and communication (Brown and Reingen 1987; Weimann 1983), the Cheerleaders' relative lack of strong-tie relationships apparently led to less influence and party-related communications among them. In contrast, each of the other subgroups represent rather cohesive clusters of sorority sisters (especially considering the stringent criterion applied to the determination of strong ties), thus resulting in greater communication frequency and influence in these subgroups as compared to the Cheerleaders. Third, focusing on between-subgroup communication, there is a significant difference among the subgroups in their party-related communication frequency with members of other subgroups ($F = 3.15$, $p < .03$). This difference is accounted for by members of the Old Guard, who reported the highest degree of communication involving the parties with members of other subgroups.

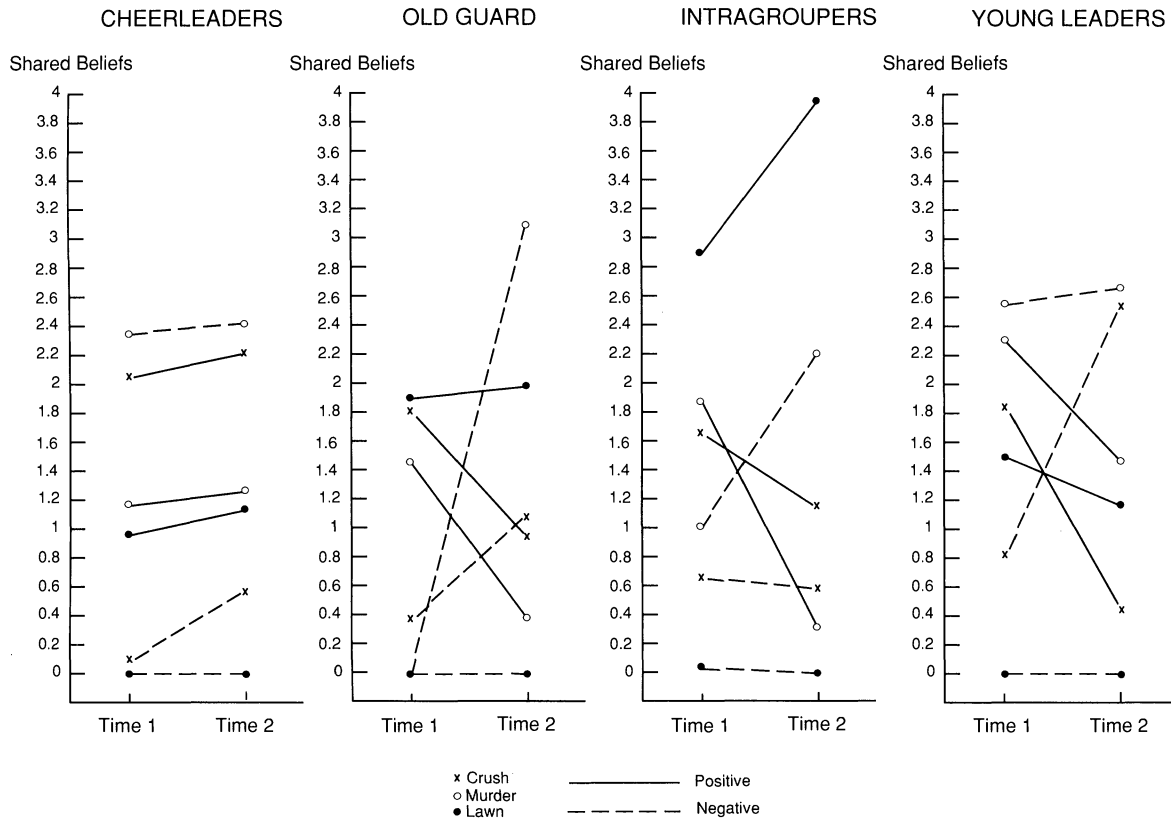
Polarization, Social Structure, and Shared Beliefs

Next we address our subgroup hypotheses by relating the findings about the subgroups and their different patterns of strong ties, communication, and influence to changes in shared beliefs (computed as noted earlier) at the subgroup level. The four-way interaction effect of subgroup (between-subjects factor) by time by party by valence (within-subjects factors) on shared beliefs was significant (see Table 1). Examining simple effects reveals that (1) consistent with our first subgroup expectation, subgroup differences existed in shared beliefs and (2) consistent with our second subgroup expectation, the subgroups differed in their shifts related to differences in their structural characteristics.

Cheerleaders. Their shared beliefs and preferences differed across parties at T1, a pattern suitable for polarization to occur. The simple main effect of party at T1 on belief sharing is significant for negative beliefs

FIGURE 3

EFFECTS OF PARTY, TIME, AND SUBGROUP ON SHARED BELIEFS IN CORE MAPS



($F = 23.34, p < .001$). For positive beliefs, differences in sharing across parties are also significant ($F = 3.16, p < .06$). The Cheerleaders, described by informants as boy crazy and less mature, shared beliefs at T1 that were most positive to the crush party and most negative to the murder mystery party (see Fig. 3). Consistent with this pattern in shared beliefs, five of the eight Cheerleaders chose the crush party as their most preferred party, and only one selected the murder mystery party. Clearly, the Cheerleaders initially favored the crush party.

However, despite these initial differences, the Cheerleaders showed no significant tendency to polarize over time. The party by time by valence, time by party, and time by valence interactions are all insignificant for the Cheerleaders (F 's < 1). The Cheerleaders' insignificant changes in shared beliefs over time are consistent with their low degrees of cohesiveness, influence, and party-related communication.

Old Guard. A striking contrast to the Cheerleaders is provided by the members of the Old Guard. As shown in Figure 3, there was a tendency for the Old Guard, described by informants as more mature, to share more negative beliefs about the crush party than the murder mystery party. In contrast to the Cheerleaders, however, no clear initial tendencies in shared

beliefs are evident. At T1, the simple main effect of party is insignificant for shared positive beliefs ($F < 1$) and only marginally significant for shared negative beliefs ($F = 2.70, p < .09$). This is paralleled by the party choice data, which show that exactly three of the nine Old Guard chose each of the three parties as their most preferred one at T1. These conditions would not usually favor the occurrence of polarization.

However, shared beliefs among the Old Guard changed dramatically from T1 to T2. The party by time by valence simple interaction effect is significant ($F = 20.60, p < .001$). Examining the simple interaction of time by valence for each party shows that this interaction is insignificant for the lawn party ($F < 1$) but significant for the other parties (crush $F = 11.56, p < .002$; murder mystery $F = 86.57, p < .001$). Furthermore, the simple main effects of time are significant for shared positive and negative beliefs toward the crush and murder mystery parties (crush/positive $F = 8.77, p < .006$; crush/negative $F = 7.38, p < .02$; murder mystery/positive $F = 16.80, p < .001$; murder mystery/negative $F = 83.84, p < .001$). As shown in Figure 3, shared negative beliefs increased and shared positive beliefs decreased for those parties. Consistent with the changes in shared beliefs are the changes in party choice. Whereas the distribution was uniform at

T1, most of the Old Guard (six of nine) preferred the lawn party at T2.

Despite their lack of significant initial differences across parties, the changes in shared beliefs among the Old Guard were strong and clearly converge with those of the sorority as a whole. The origins of their shifts seem to lie in between-group communication, not usually a focus of study in the group-shift literature. As shown earlier, the Old Guard, perhaps motivated by their role as senior leaders, communicated more about the parties with members of other subgroups. Furthermore, they apparently were cohesive enough to share new information imported from their interactions with members of the other subgroups.

Intragroupers. Turning now to the Intragroupers, similar to the Cheerleaders, they favored one alternative over another at T1, a precondition for polarization to occur. Their simple main effects of party at T1 are significant for shared positive and shared negative beliefs ($F = 3.41, p < .05$ and $F = 13.51, p < .001$, respectively). Unlike the Cheerleaders, the Intragroupers shared beliefs that clearly favored the lawn party (see Fig. 3). Again, the shared beliefs are consistent with choice at T1: seven of the 10 Intragroupers chose the lawn party as their most preferred party. Perhaps this party provided the Intragroupers, described by informants as liking to keep to themselves and their steady boyfriends, with a situation both more appropriate to taking a date than the crush party and yet more likely to let couples "do their own thing" than the activity of the murder mystery game, which entailed more interaction with others.

From T1 to T2, the Intragroupers changed to become even more in favor of the lawn party and against the other parties in a pattern quite consistent with polarization. The party by time by valence simple interaction effect is significant ($F = 18.72, p < .001$). The simple interaction of time by valence is insignificant for the crush party but significant for the lawn and murder mystery parties ($F = 1.03, p > .10$; $F = 8.32, p < .007$; $F = 41.95, p < .001$, respectively). Simple main effects of time are significant for shared positive beliefs for the lawn and murder mystery party (lawn, $F = 7.75, p < .01$; murder mystery, $F = 39.20, p < .001$) and for shared negative beliefs for the murder mystery party ($F = 13.88, p < .001$). Figure 3 shows that, for the murder mystery party, shared positive beliefs decreased and shared negative beliefs increased from T1 to T2. In contrast, shared positive beliefs increased for the initially favored alternative, the lawn party. And, at T2, all of the 10 Intragroupers chose the lawn party as their most preferred alternative. The Intragroupers represent a more conventional case of polarization because their initial tendencies favored one alternative, and the subsequent diffusion of shared beliefs is consistent with these tendencies.

Young Leaders. Their pattern of change from T1 to T2 is also consistent with polarization in parts of

the data. The simple main effect of party at T1 is significant for shared negative beliefs ($F = 50.31, p < .001$) but insignificant for shared positive beliefs ($F = 1.34, p > .10$). As shown in Figure 3, the Young Leaders shared fewer negative beliefs about the lawn party. Like the Intragroupers, they tended to favor the lawn party as their most preferred choice at T1 (five of 10 Young Leaders). Furthermore, the party by time by valence simple interaction is also significant ($F = 12.14, p < .001$). The time by valence simple interaction at each level of party is significant for the crush and murder mystery parties and insignificant for the lawn party ($F = 50.47, p < .001$; $F = 4.99, p < .04$; $F = 1.26, p > .10$, respectively). Simple main effects of time are significant for shared negative and shared positive beliefs for the crush party ($F = 50.21, p < .001$ and $F = 24.66, p < .001$, respectively) and significant for shared positive beliefs for the murder mystery party ($F = 11.35, p < .002$). As shown in Figure 3, in a pattern resembling polarization, shared positive beliefs decreased for the crush and murder mystery parties, and shared negative beliefs increased for the crush party. Consistent with the changes in shared beliefs, at T2 all of the 10 Young Leaders chose the lawn party. Their initial tendency to favor the lawn party seems to have been reinforced by their relatively high degrees of within-subgroup cohesiveness, influence, and party-related communication.

DISCUSSION

Our study represents an initial effort to develop and apply sociocognitive analysis to further the understanding of the interdependence of social and cognitive processes. The approach combines social network analysis with a cognitive network perspective on knowledge structure to enable the researcher to study how social structure influences shared knowledge and how shared knowledge influences choice. The application of the approach to a group consumption decision demonstrated its ability to contribute to the understanding of how group shifts in beliefs and choice occur.

Social Structure, Cognitive Structure, and Polarization

In this application, the findings supported the hypotheses. When analysis was conducted at the group level, where subgroup structure is ignored, polarization effects were found in shared beliefs for core, but not peripheral, cognitive maps of the decision alternatives. When the analysis was conducted at the subgroup level, where the effects of subgroup social structure and patterns of communication were present, an interesting pattern of results emerged. The subgroup findings provided strong support to the general notion that social structure affects interaction patterns that in turn influence shared knowledge structures. More specifically,

results showed subgroup differences in shared beliefs in members' core maps for alternatives. These findings extend past studies of brand congruence by showing that shared beliefs in cognitive structures underlie similarity in brand choice. The findings further suggest that a subgroup's degree of inter- and intrasubgroup communication patterns, its cohesiveness, and its initial distribution of beliefs in core maps affect the direction and extent of subgroup shifts in shared beliefs over time. For example, the Old Guard showed no significant initial preference for one party over another, a circumstance not conventionally thought to be conducive to polarization (Myers and Lamm 1976). However, because of the Old Guard's intergroup communication ties and perhaps their roles as senior leaders, their beliefs and preferences nevertheless polarized in a pattern consistent with that of the group as a whole. In contrast, the Cheerleaders showed significant differences in shared beliefs at T1 but failed to polarize over time, apparently because of their relative lack of both intragroup and intergroup ties.

These findings contribute to the understanding of how group shifts occur and illustrate the possible value of applying the sociocognitive approach to topics previously investigated primarily by more traditional experimental approaches to the study of social cognition. For example, the approach encourages a more social approach to cognitive phenomena. Unlike past studies of group shift, which have virtually all focused on independent groups created in the laboratory (Isenberg 1986; Lamm and Myers 1978; Myers and Lamm 1976; for exceptions, see Vinokur and Burnstein 1978 and Whitney and Smith 1983), the present study examined a system with a social history and multiple subgroups, which in turn led to the insight that an overall pattern of polarization may be the sum of more complex processes at the subgroup level.

Besides its emphasis on social structure, the approach also focuses greater attention on cognitive structure than the typical study of group shift in social psychology. Such studies rarely consider how the content of beliefs, their relations to one another, and their relative salience affect polarization phenomena. We found that the beliefs relevant to the more salient core maps of the sorority sisters were the focus of polarization effects. These beliefs changed most because of social interaction and were most related to party preferences. The emphasis on core beliefs is not only consistent with multiattribute attitude theory but also with a "cognitive miser," or in this case "social attention miser," perspective in which people tend to focus the limited time they have for interacting with others on the more crucial aspects of a decision.

The sociocognitive approach, in conjunction with other methods such as coding positive and negative beliefs separately, revealed other phenomena that are worth noting. These include the tendency of positive beliefs to be dropped from cognitive maps from T1 to

T2 and the tendency of negative beliefs to be added for the initially less favored alternatives.⁵

Dropping of Positive Beliefs and Adding of Negative Beliefs

From T1 to T2, subjects tended to drop positive beliefs about the murder mystery and crush parties. At the same time, they added negative beliefs about these parties. One explanation for the failure to note positive beliefs they previously mentioned is the possibility that subjects felt their mention once again would be redundant. However, this explanation seems inadequate for two reasons. First, previously mentioned negative beliefs were not dropped as a general tendency. Second, change in the party-preference data was closely related to changes in the relative number of positive and negative beliefs. This possibility aside, a reasonable conclusion is that the positive beliefs were dropped because they were either no longer salient or no longer thought to be true.

Dropping and adding beliefs is an aspect of attitude change that has not been an important focus of research. Although Fishbein and Ajzen (1975) have noted that an individual's set of salient beliefs may change over time, most studies using a multiattribute approach to measuring attitude change have asked subjects to rate sets of attributes that do not change between T1 and T2. Our study shows that attribute sets may change as a result of the social processes that unfold through time. Social interaction among the members of Alpha House seems to have caused some positive beliefs to become socially irrelevant and other negative beliefs to become socially relevant. Thus, social processes may reinforce the strength of some beliefs (through repetition, if nothing else) and weaken others through neglect and interference from new learning. Of course, we do not have direct evidence of such social effects on memory processes, but their mediation seems reasonable and might be an interesting focus of future research.

Apparently, the group's discussion about the murder mystery and crush parties focused on their potential disadvantages (and these were largely social in character, including concerns about lack of participation and social disharmony) and not their advantages. In contrast, the lawn party initially evoked few negatives. The possibility that social interaction focused more on the negatives than the positives, and thus increased

⁵The previous analyses were repeated using the individuals' number of beliefs in core maps as the dependent variable (rather than the number of beliefs they shared with other subgroup members). At the group level of analysis, the identical pattern of significant results was obtained. At the subgroup level of analysis, the results were also highly consistent. Thus, the effects of social structure also extend to individually held beliefs. However, belief sharing as the dependent variable resulted in a more sensitive analysis. Contact the second author for a complete report on this additional analysis.

the likelihood that positives would be dropped from the subjects' core maps, is strengthened by three related lines of reasoning.

First, the party choices, as noted earlier, were written to present different but initially desirable alternatives to the subjects. Thus, the descriptions were written in positive terms. Since sorority members tend to view their parties in general as having more positive than negative attributes, negative aspects of parties should have tended to be relatively salient. Second, from a theoretical perspective, studies of information integration have found that negative or extreme attributes have a disproportionate influence on individuals' judgments (Fiske 1980; Kanouse 1984; Skowronski and Carlston 1987). This effect is often explained by suggesting that negative information is usually more novel (i.e., less frequently encountered) and more distinctive (i.e., more likely to facilitate distinctions between objects; Kanouse 1984). These characteristics cause negative information to capture more attention, be better recalled, and have more weight in judgments than positive information (Carlston 1980; Fiske 1980; Lutz 1975). The present study suggests that these effects of negative information extend to and also are likely to be magnified by social processes. Third, individuals are limited by their information-processing capacity. In particular, Fishbein and Ajzen (1975) suggest that individuals' sets of salient beliefs are subject to memory limits, and thus if previously unconsidered or nonsalient beliefs become more salient, others are likely to be dropped.⁶

CONCLUSIONS

In summary, sociocognitive analysis has shown promise in the present study in several ways. First, sociocognitive analysis produced an enhanced understanding of a complex phenomenon, namely, how a group comprising several subgroups arrives at a consumer decision that has collective and individual consequences. Second, its application demonstrated that cognitions not only are the product of the individual's cognitive activities occurring in a social vacuum but also are strongly affected by structured systems of social interaction. Third, inspired by an appreciation of the mutual relevance of various disciplines, theoretical perspectives, and methodologies, the approach appears capable of producing new, more truly interdisciplinary insights.

With further methodological changes and refinements, sociocognitive analysis could be adapted to the study of other issues for which understanding the re-

lations of individual thought, social structure, and social processes at subgroup and group levels is important. The approach may be a useful method for studying organizational decision making viewed as what Sandelands and Stablein (1987, p. 152) characterize as a "holistic process" in which decisions "surface from ongoing interactions, bubbling up from the soup of activity simmering below." The need for the approach is reinforced by Podsakoff and Dalton's (1987) recent review of organizational studies, which found that the vast majority focus on the individual level of analysis, and few focus on either the subgroup level, the overall group level, or more than one level at once. In particular, the analysis seems also well suited to the study of organizational buying and strategic marketing decision making because of the insight it fosters into how social structure and communication flows affect these processes at different levels of analysis.

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⁶Support for this conjecture comes from an analysis comparing the T1 and T2 total number of beliefs (i.e., positive and negative beliefs added) in subjects' core maps. The main effect of time as well as all interaction effects involving time were insignificant (p 's > .10). However, task demands may have contributed to these results.

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