Information Sharing and Cognitive Centrality

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Running Head: Information Sharing and Cognitive Centrality

Information Sharing, Cognitive Centrality, and Influence among Business Executives during Collective Choice

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Abstract

Laboratory studies have shown that decision-making groups tend to focus on common information at the expense of unique information. In the current study, high level business executives completed a personnel selection task. Access to information about the candidates was not controlled as in a typical study of information sharing, but common, partially shared, and unique information arose naturally from the individual members' information searches. During subsequent discussions, groups mentioned more common than partially shared than unique information. However, the underlying processes seemed to be different from what has been observed in laboratory studies. The popularity of information in the population from which groups were composed predicted both the number of a group's members who accessed an item in their information searches and whether the group discussed the item. However, the number of group members who accessed an item did predict whether information was repeated during discussion, and repetition predicted which items were included on a final written summary. Finally, cognitively central group members were more influential than cognitively peripheral members.

Keywords: Information Sharing, Cognitive Centrality, Group Decision Making, Hidden Profiles, Collective Choice

The reasons for delegating decisions to groups are varied but they often are based on one of two goals (Stasser & Birchmeier, 2003). One goal is identify what is commonly believed or preferred among a set of stakeholders. Another goal is to pool member expertise and informational resources. In pursuit of this latter goal, group discussion is viewed as a mechanism for combining diverse information in order to reach a more informed decision – the group as an information processing body (Larsen and Christensen, 1993; Hinsz, et al, 1997). This information processing function is important when decision tasks are complex and informationally rich. For example, consider a group of fund managers putting their heads together to construct an investment portfolio. On the one hand, they could simply vote on which are the best investments, allocating funds based on the popularity of the investment options among the fund managers. On the other hand, they could discuss the investment options, combining their knowledge in order to identify which options offer the greatest potential for financial growth. Based on this pooled knowledge, each manager may revise her assessments of the options leading to group selections that none of the managers favoured initially. In this paper, we examine this information pooling function in teams of executives completing a personnel selection task.

First, we review the experimental literature on information pooling during discussions of decision-making groups. The theme of this literature is that groups tend to discuss information that is widely known among members before discussion at the expense of considering unique information that members bring to the discussion. This focus is evident in both what is mentioned during discussion and what is repeated after being mentioned (e.g. Stasser, Taylor & Hanna, 1989; Larson, Christensen, Abbott, & Franz, 1996). Similarly, when groups produce written summaries of their discussions, they are more likely to include information that was widely known before discussion than information that only one member knew before discussion (Stewart and Stasser, 1995).

Second, we will identify some relevant differences between the decision task and the participants in this study and those used in the typical laboratory investigation of information pooling. An obvious difference is that much of the laboratory work has used volunteer participants recruited from college courses (for a notable exception see Larson et al., 1996) whereas this paper uses archival data obtained during a simulated hiring exercise completed by high-level executives attending a leadership training course. Another difference is that the decision task completed by the executives was more complex than the typical laboratory decision task. Also, in the typical laboratory study, information access is controlled by the experimenter whereas the executives were allowed free access to an extensive data base containing information about the decision options.

Finally, we will develop hypotheses about the factors that shape the discussion content of these executive teams and the written summaries that they composed at the end of their discussion. Also of interest is how information overlap among members (cognitive centrality, Kameda, Ohtsubo, & Takezawa, 1997) is related to social influence among these executives.

The aforementioned information processing function of group discussion implicitly assumes that groups can in theory make better decisions than their individual members acting alone. Groups have the potential to make better decisions than individuals, if (1) *n* heads know more than one, (2) individuals exchange critical, new information with one another, (3) others accept this information as valid, and (4) the group uses their pooled information to make an informed decision (Hastie, 1986; Stasser, 1992). From an information pooling perspective, information that is known to only one group member is an important commodity that an individual brings to the group decision-making table. Indeed, expertise is often defined by uniquely held information. As such, experts are perceived to have specialized, unique knowledge of a topic, process, or task, and they are often ascribed high status as a testament to the value of holding unique information (e.g., Bottger, 1984). Even non-experts often have uniquely known information that is necessary to identify a good decision and, when this is so, effective information pooling is the key to the group's success. Because groups frequently do not consider the diversity of information available to them, they risk making suboptimal decisions, particularly when unique information is critical to a good decision (Gruenfeld, Mannix, Williams, & Neale, 1996; Hollingshead, 1996; Stasser & Titus, 1985).

Discussion favors Common Information

The experimental evidence strongly supports that conclusion that widely-shared information dominates discussion and uniquely-held information is often omitted from discussion. This advantage to widely-shared or common information can be quite substantial. For example, Stasser et al. (1989) requested that groups spend 15 minutes discussing information about three decision options before trying to reach a decision. Six-person groups who followed this procedure mentioned 70% of the information given to all the members before discussion but only 21% of the information that single individuals knew. There are two reasons for this bias that are suggested by the experimental literature: advocacy and information sampling dynamics.

In advocacy, members bias their contributions to discussion to support their initial preferences (Schultz-Hardt, Frey, Luthgens, and Moscovici, 2000**;** Stasser and Titus, 1985; Stasser, 1988). This bias may arise for several reasons. First, information that is consistent with one's preference may be more salient when searching for items to contribute to discussion. Second, members may be prone to defend their initial choices. Because common information has more influence on initial individual preferences than unique information (the common knowledge effect; Gigone and Hastie, 1993, 1996), members' defense of their initial preferences will tend to promote the discussion of common information.

The structural effects of collective information sampling also favor common information over unique information. Even in the absence of advocacy, groups are more likely to mention an item of common information than an equally salient item of unique information. Stasser and Titus's (1987) collective information sampling (CIS) model suggests that one reason common information is discussed more often is due to sampling probabilities. Their model states that the probability that a piece of information will be mentioned is a function of how many people could potentially mention it and the likelihood that any one of those members will mention it. According to this model, common information has a greater probability of being discussed than unique information because of the greater number of people who know common information and can mention it. That is, common information will only fail to be discussed if every member of the group fails to mention it. Conversely, unique information will fail to be discussed if only one member (the member who knows the information) fails to mention it. As Larson, et al. (1996) reasoned, the opportunities for items of common information to enter discussion are multiplied by the number of group members. (See also, Larson, Foster-Fishman, & Keys, 1994, for a similar analysis.)

The advantage to common information extends beyond what is mentioned in discussion. The extension of this advantage has been documented in several ways. Groups are more likely to repeat common, than unique, information later in discussion (Stasser, et al., 1989; Larson et al., 1996). After discussion, members are more likely to correctly remember common, than unique, information that was mentioned during discussion (Stewart and Stasser, 1995). Also, in written summaries of their discussions, groups are more likely to include the common, than the unique, items (Stewart and Stasser, 1995).

This focus on common information does not necessarily imply that groups make bad decisions. What is commonly known may, in fact, support the superior decision option. However, it is also possible that unique information, when pooled, may support options that are not supported by common information. In these cases, discussions that focus on common information will lead to suboptimal decisions. Hidden profiles are a class of decision problems that lead to suboptimal decisions when unique information is omitted or ignored during discussions.

Hidden Profiles

Research using hidden profile tasks illustrates the potential problems faced by groups who fail to mention critical pieces of unique information (Hollingshead, 1996; Stasser, Stewart, & Wittenbaum, 1995; Stasser & Stewart, 1992; Stasser & Titus, 1985). In these studies experimenters distribute information among participants so that common information favors on balance one alternative and unique information favors a different, better alternative. It is only when substantial amounts of unique information are exchanged that the merits of the best alternative become obvious.

One example of research using a hidden profile task is that of Stasser and Titus (1985). In this study, groups chose the best candidate for student council president from among three candidates. One of the three candidates was superior to the others (i.e., had more positive attributes than the other candidates had). Individuals who had access to all of the information selected the superior candidate 67% of the time prior to group discussion, and groups chose the superior candidate 83% of the time. In the hidden profile conditions, where individual group members had access to partial information about the candidates, individuals selected the superior candidate 23% of the time prior to group discussion, and groups selected the superior candidate 18% of time. In both conditions, all of the information was available to groups. However, in the hidden profile condition, some of the information that was critical to making an optimal decision was unshared among group members prior to discussion. Groups discussion needed to pool the unique information to reveal the best alternative.

In the above mentioned study and similar studies (Stasser & Stewart, 1992; Stasser, Stewart, & Wittenbaum, 1995; Hollingshead, 1996; Larson, Christensen, Abbott, & Franz, 1996) experimenters constructed controlled who got what information. Typically, studies on information sharing vary the degree of sharedness of information by distributing information sets among group members so that some information is common and other information is unique (given to only one member). Hence, the experimenters explicitly manipulate the sharedness of information. The current study examines information sharing in groups where the degree of sharedness of information arises more naturally as a result of information search patterns followed by group members. By studying the fate of unique information when the sharedness of information occurs more naturally, we hope to understand more about the social consequences of having and communicating unique information.

Is it too risky to mention unique information?

The CIS model provides one explanation for why groups are less likely to discuss unique information. Another reason may be that mentioning unique information is perceived as more risky. As suggested earlier, there may be some risk associated with bringing up a piece of unique information because there is no other person in the group who can verify its accuracy. This reasoning may account for why, in addition to the sampling bias favoring common information, common information is more likely to be repeated and more likely to impact the group's decision (Stasser, et. al., 1989; Stewart & Stasser, 1995; Kameda, T., Ohtsubo, Y., & Takezawa, M., 1997; Wittenbaum, Hubbell, & Zuckerman, 1999.).

Of course, information is only useful to the group if it is reliable and accurate. Hence, there should be an implicit understanding among group members that information must be recalled accurately. One of the easiest ways to insure accuracy is to rely on multiple group members' agreement about the veracity of a recalled item. When an item is unique, the individual who mentions the information stands alone in attesting to the item's accuracy.

In support of this line of reasoning, Parks and Cowlin (1996) found that unique information was more likely to be mentioned in groups when the databases of information were available during the decision-making process and, thus, the accuracy of the information could be checked. In this case, mentioning and repeating unique information was less risky, because there was an objective way of verifying the information.

Can we infer to what is going on in board meetings from what is going on in the lab?

These insights into why groups can be reluctant to talk about and use unique information are largely based on experimental research. The question that we want to address is whether these processes are also evident in the teams that more representative of decision-makers in organizational contexts.

As already noted, one feature of the experimental studies is that the sharedness of information is determined externally by the experimenter. Some information is withheld from certain members whereas other information is presented to all members. That is, information access is clearly and obviously controlled by the experimenter. The laboratory studies often justify this procedure to participants by suggesting that the distribution of information is controlled in this way in an attempt to simulate the diversity of information known by individuals in task groups outside of the laboratory. However, in organizational contexts, information is often available to all members of a decision making team. Information is unevenly distributed in these groups due to variability in access to information as a result of their jobs, areas of expertise, proximity to information sources, and time constraints for accessing information. Of interest is whether or not the same bias for common information will be observed in groups where the experimenter or another external agent does not directly control access to information.

Current Study

The current study offers an opportunity to study information sharing in groups where access to information was not directly restricted by the experimenter. We analyzed archival data that was collected at the Center for Creative Leadership. These data were collected from groups of high-level, business executives working on a group decision making task. These executives reviewed information about four candidates for president of a division of a hypothetical company. Before they met as a group, executives worked individually at computer stations and accessed information via a computer menu. The information was presented to them on a menu where they could move freely from one piece of information to another and from one candidate to another. The menu presented choices for information on the candidates' resumes, interviews, human resources files, others' opinions, and an external search firm report. Within each of these categories there were sub-categories of information (e.g., job experience and education). Within each sub-category, participants were presented with specific information about a candidate (e.g., BA in business communication). A day after the individual searches, participants met as a group to discuss and rank the candidates and develop, as a group, a list of the strengths and weaknesses for each candidate.

In the current study, all of the information was available to each of the participants. However, due to time constraints and the large volume of information, members could not access all of the information. The sharedness of the information among members of a group varied to the degree to which individuals selected the same or different categories of information about the candidates. In this way, sets of common, partially shared, and unique information emerged due to different search strategies used by members. Of importance is that all of the information was available to every participant. Consequently, participants could select the types and items of information that they wanted to view.

This situation suggests some interesting possibilities for the fate of unique information. Traditionally, unique information was arbitrarily denied to some individuals in the group by the experimenter. There was usually no a priori reason why one member should have access to the information and not others or why one piece of information was common while another was not. In the typical laboratory study, the sharedness of the information did not necessarily reveal something about the information – its importance, relevance or salience. However, because the sharedness of information reflected actions taken by members in the current study, the sharedness could have indicated the perceived value or usefulness of the information among group members. Thus, common information may have been particularly impactful in these groups. Conversely, unique information may have been valued due to a sense of ownership or personal investment that members felt for their uniquely held items. The participants in this study were high-level executives who presumably had experience making hiring decisions comparable to the one they made during the current simulation. Participants may have viewed revelations about unique information as a way of underscoring their own expertise in this type of decision making task. Moreover, participants may have been more likely to discuss and repeat unique information than previous research would predict, due to their familiarity with the task. Parks and Cowlin (1996) showed that when a task is familiar to participants, unverifiable facts mentioned by one participant were more likely to be accepted than when the topic was unfamiliar. Similarly, Wittenbaum (1998) found that members who had experience doing a task were more likely, than inexperienced members, to repeat unique information once it was mentioned during discussion. Thus, participants in the current study, who had a high degree of familiarity with the decision-making task, may have been more proactive in promoting the dissemination and consideration of unique information.

However, it is also possible that the bias for common information was enhanced in these groups. That is, whether information was common or unique may have had more social consequences when sharedness was a byproduct of personal choices than in contexts where an external agent controlled access to information. These participants may have viewed unique information as revealing their idiosyncratic information preferences and been more reluctant to promote the consideration of their uniquely-held items within the group. In short, the social risk of promoting unique information may have been enhanced in this context.

Information Sampling

Information Sampling Hypothesis: Consistent with previous research, individuals are expected to mention more common information than unique information during group discussion.

In the current study there could be two possible mechanisms for the proposed effect that common information will be more likely to be mentioned than unique information. First, such an effect could be due to the collective sampling dynamics. As predicted by the CIS model (Stasser

& Titus, 1987; Stasser, Taylor, & Hanna, 1989), common information has a higher chance of being mentioned as more group members know it and can mention it. Second, because participants were familiar with the task and searched for information (rather than being provided with certain pieces of information), participants probably searched for types of information that were generally regarded as important. Moreover, groups probably discussed the types of information that were commonly seen as important for the task. That is, shared perceptions of what was important information for making the decision may have guided information searches and subsequently shaped the content of discussions.

There are, however, features of the current study that may mute or eliminate the tendency to over sample common information in discussions. For example, due to the executives' familiarity with the type of task and the organizational context that was simulated, they may have actively searched for information that they thought others might overlook (Wittenbaum, Stasser, & Merry, 1996). Having done so, they may have focused their contributions to discussion on information that made their contributions distinctive.

Additionally, the bias for common information may be minimized when groups are required to rank order alternative rather than simply pick one. Research by Hollingshead (1996) found that groups who were instructed to rank order options were more likely to mention unique information than groups instructed to select the best alternative. She reasoned that rank ordering promotes more extensive discussion of the available information because rank ordering requires consideration of all decision alternatives. Hollingshead's (1996) findings are relevant to the current study, because the groups studied here were asked to rank-order four alternatives. Because of these instructions, they may have discussed a greater portion of the unique information than would be predicted from other research using instructions to choose a single best-alternative.

Repetition of Information

We are also interested in how sharedness of information affects group members' repetition of items once they are mentioned. We considered two competing hypotheses regarding the repetition of information. One is based on the empirical findings from laboratory research. The other is based on the unique nature of the CCL participants and the ownership of information that may have resulted from participants' active information search.

Repetition Hypothesis A: Consistent with previous research, groups will repeat more common than unique information. Stasser et al. (1989) and Larson, et al (1996) found that common items were repeated more than unique items, once they were mentioned. This repetition effect has been explained in terms of social validation: the accuracy of unique information can not be validated by others in the group. Others have suggested that previously encountered information is ascribed more importance than information acquired during discussion (e.g., Postmes, Spears, & Cihangir, 2001; Schulz-Hardt, & Greitemeyer, 2003).

Repetition Hypothesis B: Contrary to previous research, whereas common information may have a sampling advantage, groups will focus on unique items when they emerge and thus be more likely to repeat unique than common information. Individuals actively acquired information in the current study, and they may have felt a sense of ownership for their unique items. Thus, having mentioned an item that was new to others, they may have promoted its consideration. Moreover, high status members (Larson et al., 1996), designated leaders (Larson et al., 1998) and members with task experience (Wittenbaum 1998; Wittenbaum 2000) are more likely than others to repeat unique information. Thus, given that members of the CCL groups were top-level executives, they may have been more inclined than the typical member of a laboratory group to repeat items that were not widely shared before discussion.

Listing Information

The executive teams listed strengths and weaknesses for each candidate at the end of their discussions. Thus, we were able to analyze what groups mentioned during their discussions as well as what they decided to include on a collectively composed summary for each candidate. As with repetition, we entertained two form of the listing hypothesis. The first is based on the typical finding with laboratory groups and the other one considers the unique character of the CCL participants.

Listing Hypothesis A: Consistent with previous research, groups will retain a larger proportion of common than unique information from their discussions on their written strengths and weaknesses sheets. Stewart and Stasser (1995) found that groups were less likely to record unique information than common information on their written profiles, again, presumably because other members could not verify the accuracy of unique information or because it was considered as less important.

Listing Hypothesis B: Contrary to previous findings, groups will retain a larger proportion of unique than common information from their discussions on their written strengths and weaknesses sheets. As with the repetition of information, there are also reasons to expect that executives might not give an advantage to common information in their final solution. Stewart and Stasser (1995) found that when group members were explicitly assigned expertise for particular domains of information, less unique information was dropped from the group's written protocol than was observed for groups without assignments of expertise. It is possible that in the current groups, participants perceived one another as experts in this type of decision- making task due to their prior familiarity with similar decision-making tasks. If this is true, the group strengths and weaknesses sheets may reflect more unique information than would be expected from groups of non-experts. Moreover, if groups repeat more unique than common items as predicted in the Repetition Hypothesis B, this repetition may increase the likelihood that unique information will be salient and thus promote the inclusion of more unique information on the written protocols

Cognitive Centrality

We were also interested in exploring the idea of cognitive centrality suggested by Kameda et al. (1997). Their conceptualization of cognitive centrality derived from a view of decision-making groups as sociocognitive networks. They drew a parallel between social and cognitive networks and suggested that just as people share social links in a group, they also share cognitive links. Cognitive connections between group members can be measured in terms of how central individuals are in the cognitive network. People are more or less cognitively central to the degree to which they share information with other group members prior to discussion. A cognitively central member is someone whose knowledge is predominately shared with other members (i.e., has many information links to others) whereas a cognitively peripheral member knows mostly unique items (i.e., has few information links to others). Kameda et al. extended the idea of the greater influence of common information over unique information to the level of the member: they proposed that a member, who shares more information than another has greater influence in group discussion. Indeed, Kameda et al. (1997) showed that cognitively central members were more influential and participated more during the discussion. They suggested that, because group members prefer information that can be socially validated (i.e. common information), cognitively central members are more influential in groups. First, they can validate other people's information more often than peripheral members can. Second, others can validate most of the information that central members communicate.

The idea of cognitive centrality ties in nicely with the hypothesis that sharing unique information carries some social risk. There may be some benefit to establishing the perception of oneself as cognitively central by mentioning common information in a group discussion. By building a reputation with one's group members as someone who knows what they know, one creates a socially secure place for oneself in the group. Indeed, Kameda et al. (1997) suggested that cognitively central people acquire a reputation as credible sources and, once this reputation is established, they risk less when they do communicate unique information.

In the current study, we examined how the discussants' centrality to the cognitive network affected the degree to which they were successful in influencing the group to adopt their initial decision. Individual group members provided rankings of the alternatives before meeting as a group, and a comparison between these rankings and the group's ranking was used to derive a measure of influence.

Cognitive Centrality Hypothesis: Cognitively central members will be more influential in the group decision-making and participate more actively than cognitively peripheral members.

Center for Creative Leadership

As mentioned previously, the data for this study came from the Center for Creative Leadership (CCL). CCL offers top-level executives a course on leadership and decision-making styles. As part of the seminar, executives participated in the Peak Selection Simulation (PSS). One of the featured exercises in the PSS program was a small group decision-making task.

The data collected for the PSS provide an interesting opportunity to study small group decision-making. The paradigm used in the PSS is a good match with the paradigm that is often used in group decision-making research. Participants individually reviewed information about four candidates for the presidency of a division of a hypothetical company. The day following the computer searches of information, participants met in small groups. During the group meetings, they discussed the candidates, ranked ordered the candidates and then recorded the strengths and weaknesses of each of the four candidates. Individuals had access to all of the information about all candidates during their pre-discussion computer searches; their information searches were only limited by the amount of time they had before they met with their groups. All of the participants in the PSS decision-making groups were top level executives. Most were probably familiar with making personnel decisions for top-level people in their companies.

Method

Overview of Study

The primary purpose of this study was to examine information sharing patterns during discussion and how cognitive centrality affects influence processes in groups of business executives. To this end, we conducted internal analyses of individuals' computer search strategies and examined the videotaped group discussions to investigate questions of information pooling processes and group decision-making. We also examined how the extent of overlap in members' knowledge affected discussion and decision processes.

Participants

All of the participants took part in the PSS exercise as part of the CCL seminar in Colorado Springs, Colorado. A subset of 25 groups was selected from 80 groups who had completed the PSS program.. CCL assigned an identification number to each group and recorded it on the videotaped discussion and the written protocol generated by the group. Initially, groups were eliminated from the sample if the paperwork and videotape labels did not match, as it was necessary to match written materials with the correct group videotape. From the groups that met that criterion, groups were selected to control for group size and gender composition of the groups. After this selection process, 33 groups remained. Finally, groups were dropped from the sample if their individual search data were incomplete. In the final sample, there were 25 groups with complete data. Fourteen of the groups had a least one woman, and group size ranged from four to six people. See Table 1 for the number of groups at each size and gender composition.

Insert Table 1 about here

Stimulus Materials

Before participants met at CCL, they received a packet of information about the PSS. The packet contained information about a hypothetical company, Looking Glass, Incorporated. and abbreviated resumes for four candidates for the presidency of the Advanced Products Division of the company . During the PSS, participants viewed information about the job candidates individually at a computer station. The information was presented through a series of menus representing the different types of information available about each candidate. Interview questions and answers, a resume, solicited and unsolicited opinions, and a search form report was available for each candidate. Three of the four candidates were internal to the company and also had human resource information.

The CCL designed the information so that it would closely mimic the type of information executives would expect to have in a real hiring situation, and it included positive and negative attributes for each candidate. CCL asked experts in the field to review the profiles and rank the candidates. The expert solution ranked the candidates from best to worst. Each candidate had roughly the same number of screens of information. There was no systematic attempt to balance strengths and weaknesses for each candidate across the various sources of information.

Procedure

Participants viewed a brief videotaped message from an actor portraying the CEO of Looking Glass, Inc., outlining the group's task. After viewing the videotape, individuals began their computer searches of the candidate information. After 60 minutes, participants rank ordered their preferences for the four candidates. Then, the computer displayed a message that advised participants that they had completed the computer search portion of the PSS. They were instructed not to speak to anyone about their computer search until the small group discussion. During the computer search, the computer recorded the name and gender of the participants and the participants' rankings. The computer also recorded which screens of information were accessed, in what order, and how long an individual looked at each screen.

Participants met with their groups in a small room with a round table. The rooms had a large tablet of paper on one wall, a video camera in one corner on the ceiling, and a one-way mirror along one wall. All of the participants were aware that they were being videotaped as well as observed from a one-way mirror along one side of the room. A facilitator instructed the participants to discuss the candidates, rank order them as a group, and record strengths and weaknesses for each candidate as a group.

Coding Scheme

The coding scheme is divided into two categories: action codes and information codes. The action codes were developed to capture the nature of the discussants' communications throughout the discussion. Codes represent actions such as stating a preference for a candidate, agreeing with another discussant, etc. The information codes were designed to code for the actual pieces of information that individuals mentioned about the candidates.

In order to construct the information codes, numerical codes were assigned to the roughly 400 pieces of information developed by CCL for the four candidates. The codes were constructed to capture the hierarchical nature of the way in which the information was presented to the subjects via a computer menu. The information was available to subjects through a menu that contained large categories of information (e.g., Resume, HR information, Interview, etc.). Within each of those larger categories were sub-categories of information (e.g., Work history, Job approach, Education). Finally, each computer screen under a sub-category presented specific pieces of information (e.g., BA in business communication). The information codes were designed to retain as much information as participants might provide about the exact source and content of the information that s/he mentioned from the menu. For example, if a speaker said, "On Cooper's resume, under job experience, it said that he worked in Hungary," coders recorded a code that indicated a speaker referenced the resume (specifically, the job experience section) and the specific information code for working in Hungary. Alternatively, if a speaker only said, "Cooper worked in Hungary," it was coded for the specific information code for working in Hungary with '0' indicating no reference to where the information was accessed. [1]

Six coders, blind to the hypotheses, were trained over a period of several weeks. During training, the coders coded parts of several videotapes. The coders met with the experimenter and with each other to discuss questions about the codes and to reach a mutual understanding of the codes. Throughout the time that the coders were individually coding tapes, they continued to meet with an experimenter and each other weekly to answer questions and clarify their shared understanding of the codes. Nine of the tapes were coded by a second coder in order to provide a basis for estimating coder reliability. The two independent coders agreed 92% of the time on the presence and absence items of information in these nine discussion tapes.

The same set of coders also coded the written strengths and weakness lists that the groups produced at the end of their discussions. In order to estimate coder reliability, six of the lists were coded independently by two people. The two independent coders agreed 98% of the time on the presence and absence items of information in these six written protocols.

Dependent Variables

Individual and Group Rankings. After individuals completed their information search of the computer data base, they were prompted to rank the four candidates. In addition to these rankings, each group ranked the four candidates at the end of their discussions. These individual rankings were compared to the group rankings and to the expert solution to assess members' influence and correctness, respectively.

Information Pooling. The videotapes were coded for information that was mentioned during the group discussion. The coding system allowed us to record where the information was accessed (i.e., from which information source) as well as the actual content of the information. The information pooling analyses were conducted using the most specific level expressed by the information codes (e.g., "Cooper worked in Hungary"). Information was coded for the number of times each piece of information was mentioned and by whom. To capture the sharedness of information, information was coded as unique, partially shared, or totally shared. Information accessed during the computer search by only one member of a group was designated unshared;

information accessed by more than one but not all members was designated as partially shared; and information accessed by all members was designated as shared.

Cognitive Centrality. Each individual received a cognitive centrality score. This score was calculated as in Kameda et al. (1997). The centrality score for each Member i, C_i, is given by:

$$C_i = \sum_{j=1}^{n} BB'_{ij} ,$$

where j ≠ i, n is group size, and B is a member (row) by information item (column) matrix. Each row of this matrix corresponds to a member and each column to an information item. If member *i* looked at item *j* the entry $c_{ij} = 1$; otherwise, $c_{ij} = 0$. To construct this matrix, we determined which screens each individual member of the group accessed to determine which members viewed each item of information. The centrality score captures both the number of information links one shares with others in the group and the number of people with whom one shares these information links. In short, a high cognitive centrality score indicates multiple information links with other members whereas a low centrality score indicates that much of a member's information is not known by others.

Participation Rates. As participation rates have been used as a measure for influence (Bottger, 1984; Littlepage & Silbiger, 1992), we decided to use these rates too for that mean. Participation rates were based on the total number of codable utterances each person made during the discussion. Of interest to the current analyses is how cognitive centrality and correctness are related to participation.

Results

Information Sampling

Information was categorized as unique (one member viewed it), partially shared (two or more, but not all, members viewed it), and common (all members viewed it). On average, a group's members collectively accessed a total of 316 items in their information search. Most of those items (187) were accessed by two or more, but not all, group members (partially shared). On average, 44 items were accessed by only one member (unshared), and an average of 85 items were accessed by all group members (shared). The analyses of discussion content were based on the proportions of items that at least one member accessed. That is, a group could only discuss an item if at least one member accessed it. Across all levels of sharedness, participants mentioned only 8.7% of information that was looked at by at least one member of the group prior to discussion. That is, groups discussed, on average, about 27 items of information about the 4 candidates.

A one-way ANOVA using level of information sharedness as a repeated measure factor was conducted on the proportions of information mentioned during discussion. There was a significant main effect for the level of sharedness, $\underline{F}(2, 48) = 41.19$, $\underline{p} < .000l$. A Tukey test revealed that an item of information was significantly more likely to be mentioned during discussion if it was common ($\underline{M}=.127$, $\underline{SD}=.058$) than if it was partially shared ($\underline{M}=.083$, $\underline{SD}=.032$), $\underline{p}<.05$. Moreover, partially shared information was mentioned significantly more often than unique information, ($\underline{M}=.037$, $\underline{SD}=.034$), $\underline{p}<.05$.

Information Repetition

The proportions of information repeated at least once after being mentioned were also analyzed in a one-way ANOVA using level of information sharedness as a repeated measure factor. This analysis showed the same pattern as above. There was a significant main effect for the level of sharedness, $\underline{F}(2, 48) = 20.03$, $\underline{p}<.0001$. A Tukey test showed that an item was significantly more likely to be discussed more than once, if it was common ($\underline{M}=.044$, $\underline{SD}=.033$)

than if it was partially shared (M=.023 SD=.016), p<.05. Additionally, partially shared information was repeated significantly more often than unique information, (M=.008, SD=.012), p<.05.

The foregoing analyses were based on the proportion of items that were repeated relative to the total number of items looked at by at least one group member. It is also informative to examine the proportion of mentioned items that were repeated. That is, the subsequent analysis divides the number of repeated items by the number mentioned during discussion, rather than by the number originally accessed by the group's members. Because 6 groups did not mention any of the unique items, the proportion of mentioned unique items that were repeated is undefined for these groups. Thus, only 19 groups could be included in this analysis if all levels of sharedness were included. However, for these 19 groups, identical proportions of mentioned unique (M=.26) and partially shared items (M= .26) were repeated. Thus, we combined the unique and partially shared categories in this analysis to enable us to include all 25 groups. All common items that were mentioned were more likely to be repeated (M=.36) than were items not initially accessed by all members (M= .26), F(1, 24)=4.07, p=.05. This result indicates that once a member mentioned an item, the item was more likely to be repeated if all members had accessed it during their information search than if some did not access it.

Information Listing

The proportions of information accessed by the group that were included on the written strengths and weakness protocols were analyzed in a one-way ANOVA using information sharedness as a repeated measure factor. Once again, there was a significant main effect for the level of sharedness, F(2, 48)=22.74, p<.0001. A Tukey test showed that an item was significantly more likely to be included on the list if it was common (M=.025, SD=.014) than if it was partially shared (M=.014, SD=.013), p<.05. Furthermore, partially shared information was significantly more likely to be included on the list than unique information (M= .004, SD=.009), $p<.05$.

These results are based on proportions of items that were listed relative to the total number of items accessed by at least one group member. Consequently, as with the repetition data, the foregoing analysis does not directly assess the proportions of items actually mentioned during discussion that were retained on the strengths and weaknesses lists. Adjusting for the numbers mentioned, resulted in the loss of the same 6 groups as with the repetition analysis. However, for the 19 groups with complete data on this dependent measure, similar proportions of mentioned unique (M=.20) and partially shared items (M= .18) were listed as strengths and weaknesses. Thus, as with the repetition analysis, we combined the unique and partially shared categories in this analysis to enable us to include all 25 groups. However, for listed items, sharedness was related to the proportion of mentioned items that were retained on the list although the effect was only marginally significant, $F(1, 24)=3.13$, $p<.1$. The trend was in the direction of a mentioned item being more likely to be included in the list if it was common (M=.23) than if it was not completely common (M=.16).

Summary. These results support our Information Sampling Hypothesis: the likelihood that individuals would mention an item increased when more people knew it prior to discussion. These results are consistent with much of the previous research in the information sampling literature (e.g., Stasser et al, 1989; Larson, et al., 1996). There was also partial support for the Repetition Hypothesis A in that common information was more likely to be repeated once it was mentioned than was unique and partially shared information. However, we found no difference between partially shared and unique information in terms of repetition during discussion. There was limited support of our Listing Hypothesis A in that common information, which was mentioned during group discussion, was more likely to be retained on the strength and weaknesses lists than was unique and partially shared information although this effect was only marginally significant.

Normative Value of Information

Due to the unique participant pool and their familiarity with the type of task, we suspected that a collective information sampling process due to the numbers of members accessing items might not be the only factor affecting discussion content. Both the likelihood that group members accessed an item and then later discussed it might be due to the perceived relevance or importance of the item to the decision task. To test the idea that members may have a script or an interview model guiding their selections, we examined the computer search data for 576 CCL participants whose groups were not included in this study because of missing data. For each item, we computed the proportion of these participants who accessed the item during their computer search. This proportion was used as an indicator of the normative understanding about an item's perceived relevance or usefulness in the population of participants from which groups were composed. We computed the average normativeness of shared, partially shared, and unique information for each group. A one-way ANOVA where information sharedness was a repeated measure was conducted on these normativeness values, and a significant main effect for information sharedness emerged, $F(2, 48)=1291.93$, $p<.0001$. A Tukey test showed that common information was significantly more normative ($M=.85$, $SD=.029$) than partially shared information ($M=.60$, $SD=.028$), $p<.05$. Likewise, partially shared information was more normative than unique information ($M=.30$, $SD=.054$), $p<.05$. Thus, not surprisingly, normativeness was strongly related to whether information was viewed by one, two or more, or all group members during their information search. This raises the possibility that the number of a group's members accessing an item is only a proxy for the normativeness and normativeness of information determines the likelihood that it will be discussed. In the traditional laboratory study of collective information sampling, this potential confound is removed by experimental control of access to information.

In order to further investigate the role of information normativeness, we conducted a series of multilevel regressions (Kenny, Mannetti, Pierro, Livi, & Kashy, 2002) to predict whether items were mentioned, repeated and included on the strengths and weakness lists. In these analyses, information items were treated as nested in the group. To predict whether an item was mentioned, we restricted the set of items with each group to those that accessed by at least one member of the group during the information search. For each item, we used the following predictors: the proportion of group members who accessed the item (sharedness) and the proportion of other CCL participants who also accessed the item (normativeness). For group level predictors, we computed the mean sharedness and mean normativeness of all items in the set accessed by at least on group member. In the regression including the item level predictor of sharedness and the group level predictor of average sharedness of items, sharedness was a significant predictor of mentioning, $F(1, 7878) = 99.81$, $p < .0001$. Similarly, in the regression using normativeness as the item level predictor and average normativeness of all items accessed by the group, normativeness was a significant predictor of mentioning, $F(1, 7878) = 144.42$, $p < .0001$. When both item sharedness and normativeness (and their corresponding group level predictors) were entered in the regression simultaneously, only normativeness significantly predicted mentioning, $F(1, 7877) = 44.84$, $p < .0001$. In the presence of normativeness, sharedness was not a significantly predictive, $F(1, 7877) = 0.79$, ns.. The information mentioned during discussion seemingly reflected the perceived importance of the information in the population of CCL participants and the number of members of each group who accessed an item was related to the likelihood that it would be mentioned only because group level sharedness was related to the overall normativeness of an item. Thus, even though our Information Sampling Hypothesis was supported, the underlying process was quite different than is the case for the typical laboratory study of information sampling in decision making groups.

A similar series of multilevel regressions were conducted to predict whether mentioned items were repeated. However, in these analyses, only the set of items mentioned at least once during the discussion were included, not the entire set accessed during the computer search by a group's members. This restriction on the set of items considered is due to the fact that an item could not be repeated if it was not mentioned. In the regression including the item level predictor of sharedness and the group level predictor of average sharedness of items, sharedness was a significant predictor of whether an item was repeated once mentioned, $F(1, 668)= 8.79$, $p< .004$. Similarly, in the regression using normativeness as the item level predictor and average normativeness of all items accessed by the group, normativeness was a marginally significant predictor of mentioning, $F(1, 667)= 3.66$, $p< .06$. When both item sharedness and normativeness (and their corresponding group level predictors) were entered in the regression simultaneously, only sharedness significantly predicted mentioning, $F(1, 665)= 5.36$, $p<.03$. In the presence of sharedness, normativeness was not a significantly predictive, $F(1, 664)= 0.26$, ns.. Whereas normativeness predicted whether an item would be mentioned, sharedness predicted whether it would be repeated once mentioned. The more members who had accessed an item during their computer search, the more likely it would be repeated once it was mentioned. This finding supports Repetition Hypothesis A: sharedness promotes the repetition of items once they are introduced into discussion.

We also conducted a series of multilevel regressions to predict whether a discussed item would be included on the strengths and weaknesses lists. We also considered repetition as a potential predictor because preliminary analyses showed that a higher proportion (.29) of items that were repeated during discussion were included in the lists than items that were mentioned but not repeated (.14), χ^2 (1, N=694) = 22.4, p< .0001. Both sharedness and normativeness (in the presence of their respective group level averages) by themselves were significant predictors, F(1, 670)= 2.15, p<.04, and F(1, 670)= 2.25, p<.03, respectively. However, when repetition was included as a predictor, neither sharedness nor normativeness were significant predictors, F(1, 668)= 0.07, ns., and F(1, 668)= 1.12, ns., respectively. However, in the regression including all predictors, repetition during discussion remained highly predictive of inclusion on an item on the final list, F(1, 665)= 22.47, p<.0001.

Figure 1 summarizes the results of these regressions and includes the significant standardized regression weights and their standard errors. As the figure illustrates, normativeness predicted whether an item would be mentioned during discussion but the number of group members who accessed the item predicted whether it would be repeated once it was mentioned. Neither sharedness nor normativeness had a direct influence on the retention of an item on the strength and weakness list compiled at the end of discussion. However, repeated items were much more likely to be included than items that were not repeated during discussion. This pattern of findings suggests that the apparent influence of sharedness on the inclusion of an item on a list was mediated by repetition.

Include Figure 1 here

Cognitive Centrality

The cognitive centrality hypothesis predicted that cognitively central members would be more influential in the group. Cognitive centrality scores were calculated for each group member based on the formula given in Kameda et al. (1997) and described earlier. The mean cognitive centrality score for an individual in this sample is 654, SD=137. One can think of this index as representing the number of information links between a member and the rest of the group.

In order to assess the relationship between cognitive centrality and influence during discussion, an influence score was computed based on the distance between individuals' pre-discussion ranking and their group's final ranking of the candidates. This influence could take on values from '0' to '10.' A score of '10' indicates no difference between the individual and the group ranking, and a '0' indicates that the group's ranking was the inverse of the individual's original ranking. The mean influence score for an individual in this sample is 7.5, $\underline{SD}$=2.23, indicating that group rankings were relatively close to the typical member's ranking.

Group rankings were closer to the expert solution ($\underline{M}$ = 8.38, $\underline{SD}$=1.93) than were the members' initial rankings ($\underline{M}$ = 7.31, $\underline{SD}$=1.19), $\underline{F}(1, 23) = 7.92$, $\underline{p} < .01$. As a result, members whose initial ranking was close to the expert solution would appear to be influential. Indeed, being correct may have enhanced one's influence but we wanted to control for correctness in evaluating the relationship of cognitive centrality and influence. Thus, we also computed a correctness index for each member. The index was computed like the influence index except it was based on the ranking contained in the expert solution, rather than the group's ranking. As with the influence score, the correctness score could vary from '0' to '10.' A '10' indicates that an individual's ranking was identical to the expert solution and a '0' indicates that the individual's ranking was the inverse of the expert solution.

In order to investigate the effect of cognitive centrality on influence, we conducted a series of multilevel regressions. In these analyses, members were nested within groups. For each member, we used the following predictors: cognitive centrality and closeness of the member's initial ranking to the expert solution (correctness). For group level predictors, we computed the mean centrality and mean correctness for other members of the group. In the regression including member centrality and the group level predictor of average centrality of others, member centrality was a positively related to influence, $F(1, 107) = 25.80$, $p < .0001$. Additionally, the average centrality of others in the group was negatively related to influence, $F(1, 98.8) = 13.34$, $p < .001$. That is, a member was influential to the degree that s/he was cognitively central and the remaining members of the group were not. In the regression using correctness as the member level predictor and average correctness of the others in the group as the group level predictor, only correctness was a significant predictor of influence, $F(1, 123) = 32.13$, $p < .0001$. When both cognitive centrality and correctness (and their corresponding group level predictors) were entered in the regression simultaneously, both remained significant predictors of influences, $F(1, 104) = 13.16$, $p < .001$ and $F(1, 121) = 18.78$, $p < .0001$. Additionally, the average centrality of the other members was also still negatively related to influence, $F(1, 106) = 4.67$, $p < .04$. The implication is that cognitively central members were more influential in moving the group toward their initial solution than were their more cognitively peripheral peers. It also helped if the member's initial solution was close to the expert solution and other members of the group were relatively cognitively peripheral.

We considered the possibility that the individuals who accessed more information had higher centrality scores (i.e., more informational overlap with other simply by virtue of having more information) and were more influential. However, when the total amount of information accessed was added to the regression model for predicting influence, it was not a significant predictor, $F(1, 106) = 0.76$, ns, and member centrality, average group centrality and member correctness remained significant predictors. Figure 2 summarizes these findings and includes the significant standardized regression weights and their standard errors.

Insert Figure 2 here

Participation rates are often used as an index of influence for group members (Bottger, 1984; Littlepage & Silbiger, 1992). We measured participation by counting the total number of codable utterances for each individual and used this measure as another gauge of influence. The mean amount of participation for an individual in this sample was 98.22, SD=27.40. We correlated our index of group influence (the distance between an individuals' ranking and the group ranking) with participation rates. The mean correlation between participation and group influence across all groups (M = -.01; SD = .35) was not significantly different from 0, $t(22)$=-.20, p = .84. It does not appear that group members were influential due to high participation rates. The mean correlations across groups between participation and correctness (M =-.04, SD=.35) and participation and centrality (M=.03, SD=.30) were likewise not significantly different from 0, $t(23)$=-.57, p=.58 and $t(23)$=.46, p=.64, respectively.

Thus, the cognitive centrality hypothesis received strong support. Consistent with the hypothesis, cognitively central members were more influential than peripheral members. Cognitively central members did not, however, participate more than cognitively peripheral members did, which was contrary to the hypothesis and contrary to Kameda et al.'s findings (1997).

Discussion

The purposes of this study were to examine the generalizability of laboratory research on information sharing to a high-fidelity, hiring task embedded in a hypothetical organizational context and to look at the impact of cognitive centrality in group decision-making. To this end, we conducted internal analyses of data collected from groups of executives who completed a hiring exercise in a leadership training course.

Information Sampling

Unshared information had a similar fate in this sample as in previous research on information sampling (Stasser & Titus, 1985; 1987; Stasser, et al., 1989; Stewart & Stasser, 1995): unique information was less likely to be mentioned than common information. However, these results suggest that unique information was less likely to be mentioned for reasons that are different from those suggested by previous research. Larson et al. (1994) and Stasser and Titus (1987; see also, Larson et al. , 1996; Stasser et al., 1989;) argued that unique information suffers from a sampling disadvantage. They showed that information that is known to only one person prior to group discussion is less likely, due to collective sampling dynamics, to be mentioned during discussion.

The sampling disadvantage aside, it was reasoned that a number of variables in the current study might enhance the likelihood that executives would mention unique information. The participants in this study were familiar with hiring decisions, and they rank ordered the options, both of which can lead to more mentioning of unique information. Furthermore, it was reasoned that the social consequences of mentioning unique information in this sample may have been positive, as they could have been seen as a way of disclosing one's own expertise; and this may have led to more unique information coming out during discussions. Finally, in the current study, information was not differentially distributed among the executives prior to their group discussions. The sharedness of the information differed to the extent to which participants selected it during their information search. Nonetheless, evidence for the bias favoring the discussion of common information still emerged.

It appears that part of the explanation for the information sampling patterns in the current study is the social importance of selecting particular bits of information. Common information was more normative than partially shared information, which was more normative than unique information. This suggests that there was a subset of information that was popular with the CCL participants. That is, there seemed to a socially shared perspective that some types of information were more important or relevant in making the hiring decision (Tindale & Kameda, 2000). Thus, normativeness not only predicted whether an item was mentioned during group discussion but also predicted how many members of each group were likely to access the information during their computer search.

Executives in this study appeared to have selected information in a way that created common information that was socially valued. It seems that there was a set of information that people in this population (i.e., business executives) implicitly agreed a priori was important for making a hiring decision. Unique information may have remained unshared due in part to the fact that it was viewed as less important to the group's task. Therefore, the "naturally" occurring variability in the sharedness of information may have indeed had social consequences. However, they were different from what was anticipated. It seems that there is implicit understanding among the executives of how such a hiring task should be resolved. Consequently, looking for and bringing into discussion information items that are not part of "the" solution does not, as speculated, reveal something about one's own expertise, but might rather be seen as evidence that a person is not familiar with the socially accepted way of solving the task. It was reasoned that allowing the variability in information's sharedness to emerge somewhat naturally would facilitate mentioning of unique information. However, the executives in this study were still more likely to mention common information during discussion.

Repetition of Information

Also, in terms of repetition of information, we obtained a finding that is consistent with patterns of discussion repetition that has been observed in previous research: Common information was more likely to be repeated once it was mentioned than was unique and partially shared information.

The question that arises is whether that could have been due to the normativeness of the mentioned items. However, normativeness did not predict which items were repeated. To the contrary, the number of group members who accessed the item before discussion (sharedness) predicted whether an item was repeated. Apparently information was not repeated because participants were attuned to what was the normatively acceptable information. It seems rather to be the case that once a piece of information was mentioned, it gained more weight and credibility if more than one member knew it before discussion. This finding is consistent with what was found and proposed by Stasser, et al. (1989) and by Stewart and Stasser (1995). They showed that common information, once it has been mentioned, is more likely to be repeated during group discussions. They suggested that this tendency to repeat common information may be because group members can validate the accuracy of common information, and groups have more confidence in common information, because more group members can validate it (see also Larson, Christensen, Abbott, & Franz (1996); Wittenbaum, Hubbell, & Zuckerman (1999)). That is, groups tend to repeat information in which they are most confident.

However, Stewart and Stasser (1995) also reasoned that personal expertise might serve as validation for unique information and increase repetition of unique items. That is, if an expert mentions unique information, it need not be validated by other members of the group. The notion that groups in the current study might tend to focus on unique information, once it was mentioned during the discussion, came from the idea that group members from this population might be seen by one another as experts at this type of task. We found however the opposite: even the executives were more likely to repeat items that were widely-shared by a group's members before discussion.

Another reason for repeating common information may be due to a rehearsal effect. This explanation was originally suggested by Stasser et al. (1989) but has not been systematically examined. However, given the large amount of information that the participants in the current hiring simulation had available, the memory load was undoubtedly high. Moreover, discussion occurred a day after the executive completed their computer searches. Thus, if they had not accessed an item in their computer search but heard it mentioned during discussion, this brief exposure may have not been sufficient to ensure later recall even if the item was relevant to later discussion. However, if they had accessed it during their computer search and then heard it again during discussion, this additional exposure may have been sufficient to increase the item's availability during subsequent discussion. Thus, such a rehearsal effect could give common information an advantage over unique information even if both were seen as equally valid.

Retention of Information on Written Summary

As for the retention of information, our reasoning concerning the predictions resembles the ones for repetition of information. Based on past findings, we hypothesized that common information had a higher chance to end up on a written protocol than unique information. The rationale for this prediction is again based on the need for social validation of the contributed information. For unique information, social validation is impossible, by definition, as no other member knows the information. In Stewart and Stasser's study (1995) explicit expertise assignments decreased the amount of unique information that was dropped from the group's written protocol. Thus, in this earlier study, it appeared that, in lieu of social validation, expert recall of unique information was trusted as accurate.

We found weak support for the hypothesis that common information was more likely to be retained on the strength and weakness lists than was unique and partially shared information. The effect of sharedness on the process leading to the retention of information on the written summaries is, however, indirect. Repetition of information during discussion, not the sharedness nor the normativeness of information, directly predicted whether an item was retained on the written record. Normativeness had only a distal, indirect effect in that it predicted what was mentioned during discussion. Sharedness had a more proximal, but still indirect, effect in that it predicted what items were repeated. This pattern suggests that information that was repeated was salient to the group members at the time that they completed the strengths and weakness list. Moreover, it is possible that the shear repetition made the information seem more credible and important.

However this should not be taken as an indication that group members did not see each other as experts, as we cannot say that the effect would not have been stronger within a comparison group, consisting for example of undergraduates. But it shows that even business executives do not give equal weight to bits of information in their final decision, irrespective of how many other group members had previously accessed the information. Information that is repeatedly discussed clearly has an advantage.

In sum, an implicit normative understanding about what types of information are relevant for a task was important in determining what information was brought up during group discussion. But beyond shaping the initial content of discussion, normativeness did not have an impact. What information was repeated during group discussion was related to how many members accessed it before discussion. What kind of information ended up on the summary list, presumably reflecting what was deemed important and supportive of their final decision, was shaped by the things that were repeated. Thus, in an important way, how many members of a group accessed an item during their individual information searches, affected the likelihood that the item would be retained on the final written record.

Cognitive Centrality

Kameda et al. (1997) introduced the idea of cognitive centrality. They proposed that people can be linked to one another in a cognitive network of common knowledge. They found evidence that cognitively central people are more influential and participate more in groups.

In the current study, we also found that member centrality was positively related to influence, while the average centrality of other group members was negatively related to influence. This effect of centrality was not due to central member’s being more correct. Nonetheless, correctness was also positively related to influence. We could show that a cognitively central member was influential, and that such a person was even more influential when his/her initial solution was close to the expert solution, and when other group members were not cognitively central. One should imagine a person, who shared a lot of cognitive links with many other group members, but most of the other group members shared mainly cognitively links with that person. The structure of the cognitive links of an influential person within a group can easily remind us of a manager, who has several experts for different areas working for her. All experts report to the manager about their field, however they do not have much communication between each other about their area of expertise. In that case the manager is cognitively central as she shares a lot of cognitive links with many others in her team. However the other team members are all relatively peripheral as they share cognitive links mainly with the manager.

Whereas cognitive centrality increased influence among these executive, it was not related to higher participation during group discussion. There was virtually no correlation between participation rates and cognitive centrality or between participation rates and correctness. Further, participation was not correlated with group influence. Although this is a null finding, it is interesting in its own right. It is inconsistent with a general well known cynical attitude that influence can be due to simply talking a lot. Moreover, it suggests that what was said was more important than how much was said in these executive teams. This finding is inconsistent with other research that has shown that people use participation rates as an indication of correctness or degree of expertise (e.g., Littlepage & Silbiger, 1992). But perhaps, high-level business executives have learned to focus more on the quality than the quantity of contributions to judge competence and expertise. As participation was not related to correctness in the current study, the executives were well served to ignore talkativeness as a heuristic cue for competence.

It is also important to note that the current study used participation rates that were based on a relatively objective measure from a third party coder. Often research on participation uses group members' estimates of participation as an index of participation (e.g., Kameda et al., 1997; Littlepage & Silbiger, 1992). It is possible that people who were influential in the current groups were perceived as high participators, when in fact they were not. If participants had ranked one another's participation, as they did in Kameda et al.'s study (1997), they may have ranked central and correct people high relative to others regardless of their actual participation rates.

<u>Implications for Information Pooling</u>

One reason for delegating decisions to groups is that group discussion provides a means of pooling the diverse information of its members and, thus, a group's decision is more informed than a decision made by any one of the members. The benefits of information pooling are compromised if members discuss primarily information that they shared in common before discussion. Pooling is critical to good decision making when the information supporting a superior choice is largely unique before discussion as in hidden profiles. In a hidden profile task, the superiority of the best option will not be discovered if unique information is not mentioned during discussion.

Information access was not controlled in the hiring task completed by the executive teams in the PSS program. Thus, there was no attempt to construct a hidden profile. However, it is reasonable to ask if these executive teams would have been more successful at discovering a hidden profile than the typical laboratory group. The answer is seemingly that they would not.

The best predictor of whether an item of information was mentioned during the discussions of these executive teams was how often the item was accessed by people who were not members of the teams. Thus, discussions contained primarily information that was accessed by the majority of individuals in the population from which teams were composed. Items that were accessed by relatively few were unlikely to emerge in discussions. Thus, if information that supported a superior choice were accessed by relatively few people, group discussions would not typically include this information. In this case, groups would end up selecting the choice that was supported by widely-accessed information. The conclusion is: Whatever is commonly known before group discussion is amplified in the contents of discussion, and the choice supported by what is commonly known will likely be the group's choice. In short, our results suggest that group discussions amplify common information and do not effectively pool unique information.

The finding that cognitively central members were more influential adds another layer of evidence that group choice is an effective mechanism for identifying options that are supported by common information. Stated simply, the influence of a member is enhanced if she shares a lot of information with other members. Members who bring diverse information to the group will be cognitively peripheral, and their influence will be compromised. That is, having different information than others in a group decreased the ability to persuade others to adopt one's solution. Thus, unique information was not a valued commodity but was a liability.

Stasser & Birchmeier (2003) suggested that one way to enhance the consideration of uncommon or unique information is to assign members expert roles. They noted that assigned expertise increased the mentioning and repetition of unique information in laboratory groups (Stasser et al., 1995, 2000; Stewart and Stasser, 1995). We suggested earlier that the CCL executives may have viewed each other as experts. However, the key may not be expertise per se, but differentiated roles. First, expert roles would allow members to focus their contributions on unique information associated with their role and increase the likelihood that uniquely-held information would emerge during discussion. Second, and perhaps more importantly, unique information from a recognized expert is credible. In the current study, the CCL setting took participants out of their organizational context and muted cues that may have signaled differing and perhaps complementary domains of expertise. An open question is whether a setting that reinforced rather then obscured expert roles may have yielded different findings. For example, would cognitive centrality be an asset for promoting one's position if the person were labeled an expert? After all, "experts" are expected to know things that others do not and, at least to some degree, be cognitively peripheral.

We also noted that high status members (Larson et al., 1996), designated leaders (Larson et al., 1998) and members with task experience (Wittenbaum 1998; Wittenbaum 2000) are more likely than others to repeat unique information. It is important to note that in the experimental studies, members of a group were different in terms of status, leadership and task experience. For example, in Wittenbaum (1998), some members had experience with the task and others did not within each group. In this social situation, the experienced members were more likely than the inexperienced ones to repeat unique information. If a group had been composed of all experienced members, it is not clear that they would have been more likely than a group of all inexperienced members to repeat unique information. That is, it may not be the characteristics of the participants, per se, but the nature of their relationships with one another that is important.

But looking at decision making groups in real life, it is less likely that they would consist of experts and non-experts making a decision about issues that fall within the area of expertise of one or more of the group members. The most important decision making groups in real life consist of experts only. Think of the board of a company, the Federal Open Market Committee of the Federal Reserve Bank, the Governing Council of the European Central Bank, all small groups consisting of experts of equally high status, who make decisions that vastly influence our economy and consequently to a great deal our economic well-being. For this sort of real life decision making groups, the results of the current study have relevant implications. Because members of the executive teams were all high status, leaders who were experienced at group decision-making and consequently they were more or less equal to one another. Our results suggest that teams of experts without differentiated roles are also prone to the information sampling bias.

Conclusions

The CCL executive teams were more likely to mention information that was widely-shared and unlikely to mention information that was sparsely sampled before discussion. This pattern emerged even though access to information was not controlled as in a typical laboratory study of information pooling. Thus, the contents of discussions were largely a reflection of what individuals were most inclined to access in their information searches.

Interestingly, however, beyond the point of bringing up information during group discussion, the popularity of information had no impact. Whether information was repeated during group discussion seemed to depend most directly on how many members had accessed the information before discussion. Moreover, how often an item was repeated during group discussion affected its likelihood to be documented on the groups' written protocol. Hence, information that is normatively valued tends to emerge in discussion but which items are repeated and retained on written summaries seems to depend more on the internal group dynamics.

Finally, cognitive centrality enhanced influence in the sense that members who shared more information links with others were more likely to get the group to adopt a solution that was close to their initial individual solution. Moreover, a cognitively central person was even more influential when others in the group were cognitively peripheral.

These findings underscore the importance of social sharedness in the deliberations and decisions in these executive groups (Kameda, Tindale & Davis, 2003; Tindale & Kameda, 2000). At the highest level, socially shared notions in the population from which group were composed about what was important simultaneously predicted what group members would access and subsequently what they would discuss. At the group level, information that was commonly accessed by the members was more likely to be repeated once it was mentioned and repetition predicted what would end up on the written summaries. At the individual level, a member was more influential if she shared information with others in the group.

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Footnote

[1]A copy of the coding manual can be obtained from Susanne Abele or Garold Stasser.

Table 1

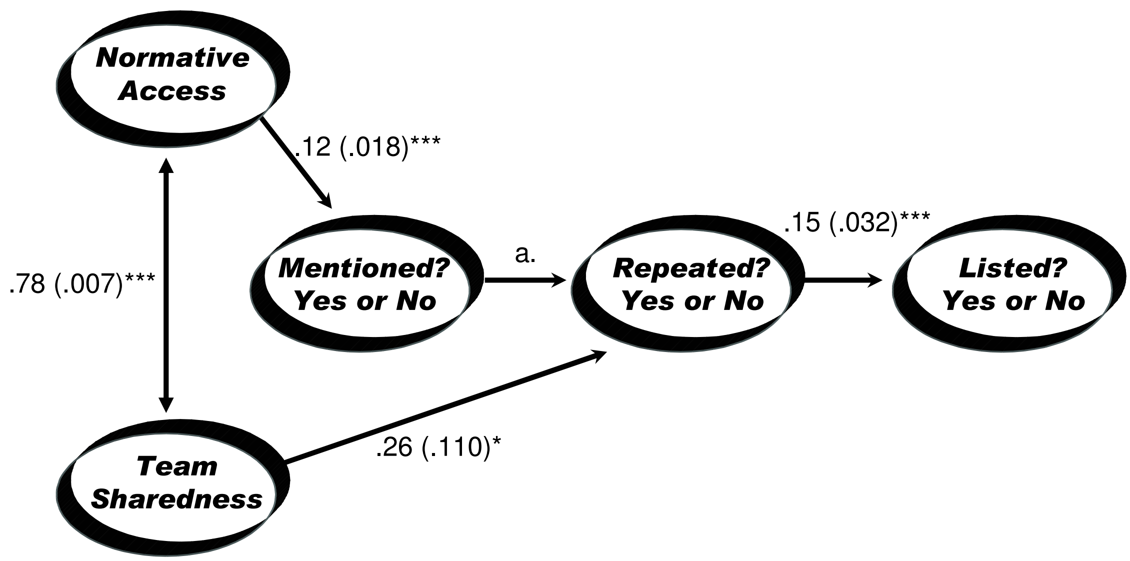
Number of Groups at Each Size and Gender Composition

	Group Size		
Gender Composition	6	5	4
All Male	5	3	3
Mixed-Gender	6	5	3

Figure Captions

Figure 1. Predicting whether an item will be mentioned, repeated and listed; standardized partial regression included for significant links with estimated standard errors in parentheses.

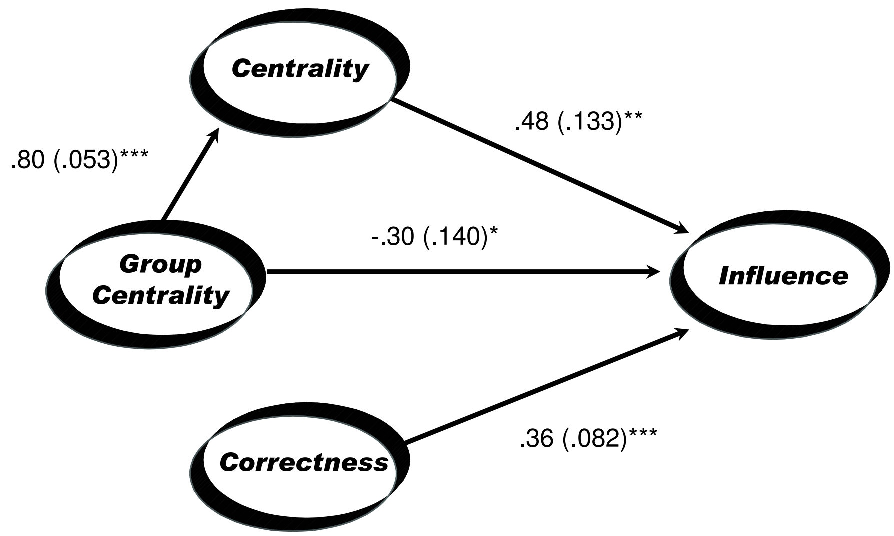
Figure 2. Predicting member influence from member centrality, average group centrality, and correctness of member's initial solution; partial regression coefficients included for significant links with estimated standard errors in parentheses.



a. Structural Link: Information could only be repeated if it was already mentioned.

*** p<.0001; * p<.05

Figure 1. Predicting whether an item will be mentioned, repeated and listed; standardized partial regression included for significant links with estimated standard errors in parentheses.



*** p<.0001; ** p < .001; * p<.05

Figure 2. Predicting member influence from member centrality, average group centrality, and correctness of member's initial solution; partial regression coefficients included for significant links with estimated standard errors in parentheses.

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