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## MODELING THE SHARING AND INTEGRATION OF INFORMATION IN GROUP DECISION MAKING DISCUSSIONS

By

Michael Gerard Cruz

### A DISSERTATION

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

### DOCTOR OF PHILOSOPHY

Department of Communication

#### ABSTRACT

#### MODELING THE SHARING AND INTEGRATION OF INFORMATION IN GROUP DECISION MAKING DISCUSSIONS

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#### Body of Abstract

An alternative to Stasser and Titus' (1985) model of information sharing in group discussion was developed and tested. The alternative model predicted that smaller groups who were given a lower percentage of shared information prior to discussion would be more likely to exchange information and make more accurate decisions. In contrast, larger groups, and groups who were given a higher percentage of shared information were predicted to exchange information poorly and make inaccurate decisions. The model also predicted that accurate decisions would be associated with longer group discussions. The data were found to be consistent with the first prediction of the model, but not the second. Four-person groups who received a 38 percent shared information (p < .05). However, accurate decisions were not found to be more likely in longer discussions. Individual differences and group discussion content were examined to provide further insight into the information exchange process, and implications for future research were discussed.

Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision-making: Biased information sampling during discussion. Journal of Personality and Social Psychology, 48, 1467-1478.

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#### INTRODUCTION

In their model of group decision making, Hirokawa and Scheerhorn (1986) included information as an important determinant of decision quality. Small groups may make poor decisions due to the establishment of a flawed information base and due to faulty reasoning based on the group's information base. Given the importance of information to group decisions, one may wonder what causal factors influence the dissemination and utilization of information in group discussion. In particular, although Hirokawa and Scheerhorn (1986) listed ways in which information is used incorrectly, they did not discuss how the information initially becomes available to the group.

At first glance, one might suppose that a group's information base simply is the sum of the information known to all group members. However, recent research (Boster, Hale, & Mongeau, 1990; Stasser, Taylor & Hanna, 1989; Stasser & Stewart, 1992; Stasser & Titus, 1985; 1987) showed that supposition to be unwarranted. Prior to discussion, a group's information base consists of the information shared by all group members. Any information known to some, but not all group members must be discussed to become part of the information base. Under some circumstances, group members failed to discuss all the information known to them (Boster et al., 1990; Stasser & Stewart, 1992; Stasser & Titus, 1985), thereby producing an incomplete information base and impairing the group's ability to make a good decision.

The failure of group members to exchange the information known to them has been modeled as a biased sampling process (Stasser & Titus, 1985). The model described the exchange of information in group discussion, and was consistent with some past results (Stasser & Titus, 1985; 1987), but inconsistent with other results (Boster et al., 1990). The goal of this paper was to develop and test an alternative model of information exchange in group discussion.

#### REVIEW

A tendency of groups not to share information completely was observed by Stasser and Titus (1985). These authors had groups of four members choose the best of three hypothetical candidates for student body president (A, B, and C). Information relevant to the decision was provided by the researchers and included positive, neutral, and negative information about each candidate. Specifically, there were eight positive and four negative items about candidate A, and four positive and eight negative items about candidates B and C. Hence, persons knowing the entire set of information were expected to prefer candidate A.

Stasser and Titus (1985) distributed information to group members in three ways. In the <u>shared</u> condition, the complete set of information was given to all four group members. In the <u>unshared/consensus</u> condition, every group member received all four negative items about candidate A and all four positive items about candidate B (these eight items were termed shared information). The eight positive items about candidate A and the eight negative items about candidate B were equally divided among group members so that each item of information was given to only one person (these 16 items were termed unshared information). This distribution ensured that the majority of the items given to each group member favored candidate B, although the group as a whole had a preponderance of information favoring candidate A. Finally, in the <u>unshared/conflict</u> condition, information was distributed similarly to the unshared/consensus condition save that two of the four group members were given a preponderance of information favoring candidate B.

Items of information were constructed to be of equal importance. In the terminology of information integration theory (Anderson, 1974), all items were constructed to have equal weight and scale value. That is, all positive items were

constructed to have the same positive scale value, all negative items the same negative scale value, and all neutral items the same neutral scale value. Under information integration theory, the items' weights and scale values dictated that persons knowing all items (i.e., groups in the <u>shared</u> condition) would rate candidate A the highest, and would see candidates B and C as equally less desirable. Moreover in the <u>unshared/consensus</u> and <u>unshared/conflict</u> conditions, group members initially would favor an incorrect choice (candidate B or C), but collectively would possess the information necessary to make the correct decision (candidate A).

Another important feature of the information distribution in the <u>unshared/</u> <u>consensus</u> and <u>unshared/conflict</u> conditions is that all the shared information should have been consistent with pre-discussion preferences, and all the unshared information should have been inconsistent with pre-discussion preferences. Put another way, the information that is consistent with group members' opinions is known to all other group members, and the information that conflicts with group members' opinions is known only to one person. Moreover, participants were instructed prior to discussion that not all group members received the same information.

Stasser and Titus (1985) argued that groups in the <u>shared</u> condition would easily reach the correct decision because each group member had all the pertinent information prior to discussion. In addition, groups in the <u>unshared/conflict</u> condition were expected to make the correct decision because of the initial conflict induced in the group. Stasser and Titus posited that the disagreement among group members favoring candidate B and group members favoring candidate C would increase information sharing during discussion and enable groups to discover that the candidate A was actually the best choice.

In the <u>unshared/consensus</u> condition, Stasser and Titus (1985) reasoned that groups would not reach the correct decision for two reasons. First, Stasser and Titus argued that information consistent with initial preferences would be better recalled than inconsistent information, and hence would have a better chance of being discussed. If

discussion contained a preponderance of preference consistent information, then the initial bias towards an incorrect decision would be maintained, and groups would make the incorrect decision. Consistent with their prediction, Stasser and Titus found that group members recalled preference consistent information (i.e., pro-B and anti-A information) better than preference inconsistent information (i.e., pro-A and anti-B information).

Second, Stasser and Titus (1985) argued that items of shared information (consistent items) were more likely to enter discussion than items of unshared information (inconsistent items) because more group members held these items. This prediction was formalized in the biased sampling model (Stasser & Titus, 1985) which states the probability of mentioning a piece of shared information in discussion is

(1) 
$$p = 1 - (1 - x)^n$$

where x is the probability of an item of shared information being mentioned by one group member, and n is number of group members. Because the probability that a piece of unshared information is mentioned was also x, the advantage of shared information over unshared information in discussion is

(2) 
$$D = 1 - (1 - x)^n - x.$$

The model indicates that shared information always has a greater probability of being mentioned in discussion than unshared information in discussion except in the trivial case where x = 0. Put another way,  $D \ge 0$  for n > 0 and  $x \in (0, 1]$ .

As predicted by Stasser and Titus (1985), 71 percent of the unshared/consensus groups chose candidate B despite having the information necessary to conclude that A was a better candidate. In contrast, groups whose members each were given all the information made the correct decision 84 percent of the time. Although these data are consistent with the biased sampling model, Stasser and Titus did not examine the contents of group discussion to test their ideas directly. Hence their predictions of the outcomes were correct, but their description of the process that produced those outcomes remains unexamined.

Boster, Hale, and Mongeau (1990) proposed that the groups studied by Stasser and Titus (1985) made poor decisions in part because of social loafing (Latané, Harkins, & Williams, 1979). Social loafing refers to a loss of motivation that sometimes occurs when persons work in groups rather than individually. Although researchers have identified several factors that reduce social loafing (Brickner, Harkins, & Ostrom, 1986; Harkins & Jackson, 1985; Harkins & Petty, 1982; Latané, Harkins, & Williams, 1979; Zaccaro, 1984), arguably none were present in the Stasser and Titus procedures. Concluding that Stasser and Titus' groups were socially loafing, Boster et al. argued that reducing loafing would increase the accuracy of group decisions.

To assess the impact of social loafing, Boster et al. (1990) replicated the <u>shared</u> and <u>unshared/consensus</u> conditions of Stasser and Titus (1985), save that: (a) only two choices were available (A or B), (b) neutral information was eliminated, and (c) groups were to choose the best applicant for the job of assistant professor instead of candidates for student body president. Boster et al. also induced high task attraction in some groups which had been observed to reduce social loafing (Zaccaro, 1984). Results from Boster et al.'s low task attraction condition replicated Stasser and Titus (1985); however, in their high task attraction condition, 60 percent of the initially biased groups made the correct decision. Thus, a reducing social loafing increased the probability of the correct decision being made.

Surprisingly, Boster et al. (1990) also observed that task attraction did not effect the extent to which initially biased groups included inconsistent information in discussion. Groups in both conditions were equally likely to discuss inconsistent (unshared) information, yet made different decisions based on those discussions. That the content of discussion did not differ between low and high attraction groups is at odds with the biased sampling model (Stasser & Titus, 1985). The biased sampling model predicts that groups in the low attraction condition would have failed to discuss unshared information, and consequently would have made incorrect decisions.

The discrepancy between Boster et al.'s (1990) data and the biased sampling model may be due to the fact that Boster et al. did not assess the <u>total</u> amount of inconsistent information in discussion, but merely the likelihood of its appearance. Although inconsistent information was equally likely to appear in the high and low attraction conditions, the extent to which inconsistent information was repeated may have differed between the high and low attraction conditions. Another explanation for the differences between Boster et al.'s data and the biased sampling model draws on information integration theory (Anderson, 1974). According to information integration theory, similar sets of equally weighted and scaled items (as the information used by Boster et al. was constructed to be) should produce similar decisions. Perhaps Boster et al.'s low attraction groups did not view the items as having equal weight or having equal scale values. Their initial bias may have led them to attach greater weight or more extreme scale values to consistent information compared to inconsistent information.

These results are also inconsistent with the linear discrepancy model of group discussion (Boster, Fryrear, Mongeau, & Hunter, 1982). Specifically, these results are inconsistent with the norm of advocacy which states that individuals will advance only arguments consistent with their current attitudes. In the present context, the norm of advocacy implies that members of initially biased groups will discuss only pro-B and anti-A information (shared information). However, Boster et al. (1990) observed that groups exchanged preference inconsistent information under high and low task attraction conditions. Therefore, a revision or alternative to the norm of advocacy assumption was desired.

#### **HYPOTHESES**

#### An Alternative to the Biased Sampling Model

One explanation for the presence of inconsistent information in discussion is that an entirely pro-B and anti-A discussion did not reflect individual opinions accurately. Although favoring candidate B, individuals also held anti-B and pro-A information, and hence may have expected discussion to contain a similar mix of information. Put another way, the position indicated by an entirely pro-B and anti-A discussion was more extreme than individual opinions, but group members were provided with uniformly positive or negative messages only. The items of information given to group members did not vary along a spectrum from positive to negative towards a candidate. Therefore, to represent individual opinions, discussion either had to include messages that were inconsistent with those opinions, or had to include messages other than those supplied by the researcher.

Under the above scenario message production <u>did</u> follow the norm of advocacy, but necessarily included preference inconsistent information to represent individual attitudes accurately. In particular, the norm of advocacy dictated that discussion <u>initially</u> would contain only consistent information. As discussion proceeded, however, the discrepancy between discussion content and individual knowledge became more apparent. Awareness of the discrepancy engendered the inclusion of inconsistent information. An indication that discussions followed this pattern was that groups in the high task attraction condition (Boster et al., 1990) made the correct decision more frequently when discussions were longer. If group discussion initially contained only consistent information, then short discussions would not have included enough pro-A and anti-B items to alter initial opinions. In contrast longer discussions allowed greater opportunity for inconsistent information to be disseminated.

The above explanation entails two changes in the biased sampling model. First, the probabilities of a person mentioning consistent and inconsistent items of information may differ, whereas the biased sampling model assumed that they were equal. In particular, if the probability that a message contains an item of consistent (shared) information is denoted as x, then the probability that the message contains an item of inconsistent (unshared) information is 1 - x. The advantage of shared information over unshared information given in equation (2) then becomes:

(3) 
$$D = x - (1 - x)^n$$

The second change entailed by the above reasoning is that x (the probability that an item consistent information will be mentioned) will vary proportionally to the discrepancy between individually held information and information mentioned in discussion. Formally, let  $x_0$  denote the probability of mentioning attitude consistent information at the start of discussion. Under the norm of advocacy,

(4) 
$$x_0 = 1$$
.

Let p denote the proportion of shared information given to group members. Then, for some constant,  $\alpha$ ,  $0 < \alpha < 1$ , the change in x at time t can be written as

(5) 
$$x_{t+1} = x_t + \alpha \cdot (p - x_t).$$

The first three terms in this sequence are:

(6) 
$$x_1 = x_0 + \alpha \cdot (p - x_0),$$

(7) 
$$x_2 = x_1 + \alpha \cdot (p - x_1),$$

and

(8) 
$$x_3 = x_2 + \alpha \cdot (p - x_2).$$

Substituting for  $x_1$  in equation (7) using equation (6), and letting  $d = p - x_0$  gives

(9) 
$$x_2 = x_0 + \alpha d + \alpha \cdot [p - (x_0 + \alpha d)]$$

which simplifies to

(10) 
$$\mathbf{x}_2 = \mathbf{x}_0 + 2\alpha d - \alpha^2 d.$$

Similarly, substituting for  $x_2$  in equation (8) using equation (10) gives,

(11) 
$$x_3 = x_0 + 2\alpha d - \alpha^2 d + \alpha \cdot \left[ p - \left( x_0 + 2\alpha d - \alpha^2 d \right) \right]$$

which simplifies to

(12) 
$$x_3 = x_0 + 3\alpha d - 3\alpha^2 d + \alpha^3 d.$$

Factoring a -d from equation (12) gives

(13) 
$$x_3 = x_0 - d \cdot (-3\alpha + 3\alpha^2 - \alpha^3)$$

which can be written as

(14) 
$$x_3 = x_0 + d - d \cdot (1 - 3\alpha + 3\alpha^2 - \alpha^3)$$

Because  $(1-3\alpha+3\alpha^2-\alpha^3) = (1-\alpha)^3$ , equation (14) can be simplified to

(15) 
$$x_3 = x_0 + d - d \cdot (1 - \alpha)^3$$
.

Finally, recalling that  $d = p - x_0$ , equation (15) can be written as

(16) 
$$x_3 = p - (p - x_0) \cdot (1 - \alpha)^3$$

which generalizes to

(17) 
$$x_t = p - (p - x_0) \cdot (1 - \alpha)^t.$$

or

(18) 
$$\mathbf{x}_t = \mathbf{p} - \mathbf{d} \cdot (1-\alpha)^t,$$

where  $x_t$  is the probability of mentioning an item of shared information after *t* turns in discussion, and  $d = p - x_0$  is the discrepancy between discussion content and individual knowledge.

The advantage of shared information over unshared information can now be written as a function of t by substituting equation (18) into equation (3). Thus:

(19) 
$$D_t = x_t - (1 - x_t)^n$$

Equation (19) indicates that group size and the proportion of shared information given to group members will interact to affect the ability of groups to make correct decisions (see Figure 1). When the proportion of shared information is high, the advantage of shared information in discussion is large regardless of group size. As the proportion of shared information increases, the advantage of shared information decreases, but the rate of decrease differs for groups of different sizes. For smaller groups, the advantage of shared information decreases more rapidly than for larger groups.

Figure 1

#### Advantage of Shared Information by Experimental Condition

(The graph was produced from Equation 19. The advantage of shared information at turn 50 are: D = .29 for N = 4, 38 percent shared, D = .68 for N = 4, 67 percent shared, D = .46 for N = 8, 44 percent shared, and D = .68 for N = 8, 67 percent shared.)



All else being equal, small groups who are given a low proportion of shared information should make correct decisions the most frequently; large groups who are given a low proportion of shared information should make correct decisions less frequently; and groups of any size who are given a high proportion of shared information should make correct decisions the least frequently. However, the same body of information would be spread more thinly among the members of large groups than small groups. Put another way, members of large groups have a less complete picture of the entire set of information. Therefore, a greater amount of interaction and information sharing is necessary for the correct decision to become apparent to large groups. Large groups also are more susceptible to social loafing (Zaccaro, 1984).

The above discussion indicates that large groups who are given a low proportion of shared information may be difficult to distinguish from groups who are given a high proportion of shared information. For this reason, it is hypothesized that small groups who are given a low proportion of shared information will make correct decisions more frequently than large groups or groups who are given a high proportion of shared information.

A second implication of the model is that, as discussion proceeds, the advantage of shared over unshared information in discussion decreases. Over time, shared information becomes somewhat less likely to be mentioned, while unshared information becomes somewhat more likely to be mentioned. Therefore, the longer groups interact, the more unshared information should appear in discussion. By extension, discussion length also should be associated with decision correctness. If groups are exchanging more unshared information as discussion length increases, then correct decisions should result more frequently.

#### The Impact of Individual Differences on Discussion

In addition to the discrepancy model discussed above, the presence of inconsistent information in group discussion may be affected by the motivations of individuals during

discussion. Boster, Mayer, Hunter, and Hale (1980) observed that greater communication apprehension (McCroskey, 1980) was related to shorter speaking times in group discussion ( $\underline{r} = -.19$ ). Because Boster et al. (1990) found that shorter group discussions were associated with less accurate decisions, high communication apprehension among some group members may be associated with lower decision quality. In addition, highly apprehensive group members are more likely to withhold information in discussion, and specifically to withhold unshared, inconsistent information (Crutchfield, 1955). The more group members who withhold information, the more likely the group will choose incorrectly.

Another individual factor that may have influenced group discussion content is a desire of group members to contribute something unique to discussion rather than duplicating the efforts of others. As indicated by Harkins and Petty (1982), group members were more motivated when their contribution to group task performance was unique. Because group members were likely to be aware of a prevailing preference for candidate B, a desire to make a unique contribution may have lead to discussion of anti-B and pro-A information. In a similar vein, group members simply may have desired not to be repetitive. If only shared information were discussed, groups soon would exhaust their supply of messages. To avoid repetition or to say something unique, group members may have discussed unshared information despite its inconsistency with their opinions. The reverse is also true. A low need for uniqueness would have similar consequences to high communication apprehension. Group members without a desire to be unique would be more likely to withhold unshared information thereby reducing the group's ability to make the correct decision.

Snyder and Fromkin (1980) provided a scale relevant to the desire to make a unique contribution to group discussion. Their need for uniqueness measure was designed to assess three dimensions of the "pursuit of difference": (1) a lack of concern regarding other's reactions to one's different ideas and actions, (2) a desire not to follow rules

always, and (3) a willingness to defend beliefs publicly. Although Snyder and Fromkin argued that the three subscales could be combined to form a unidimensional need for uniqueness scale, factors (1) and (3) were of interest in this context. People high in those two factors should be more likely to mention unshared information and to avoid repeating shared information.

Group members who are high in communication apprehension and group members who are low in need for uniqueness are both more likely to be present in larger groups. That is, the probability, P, that a group of size n has a member with a particular trait is  $P = 1 - (1 - p)^n$  where p is the probability that an individual has the trait. As n increases, Pincreases. Thus, larger groups are more likely to have information withheld by apprehensive group members and members not desiring to be unique.

In addition to group size, the percentage of shared information is relevant to the impact of need for uniqueness. A high percentage of shared information increases the extent to which need for uniqueness may have an impact. When more information is shared, the similarity among group members' knowledge is greater. Strong similarity in group knowledge is a condition under which need for uniqueness might effect behavior such that persons high in need for uniqueness would feel a stronger desire to advance unshared information.

#### Information Seeking

One factor not considered by Stasser and Titus (1985) was the information seeking behavior of group members. It is reasonable to conclude that more information will be exchanged in discussion when more information is sought by group members. In particular, requests for information may result in the mention of unshared, preferenceinconsistent items. Moreover, it is hypothesized that more information seeking will occur when group members are given a low percentage of shared information.

Increased information seeking should result from a low percentage of shared information for two reasons. First, group members have less information overall. Persons

with less information are more likely to desire additional information. Put another way, persons who know little about a candidate may want to know more before making a decision. Second, less shared information entails a weaker prediscussion bias towards the incorrect candidate. Given a milder recommendation from the distributed information, group members may be more interested in discussing the information before choosing a candidate.

Larger groups should also engage in more information seeking. Like the members of groups with a low percentage of shared information, members of larger groups have less information. In addition, the fact that other group members were given different information may be more salient to persons in larger groups. An awareness that others have different information should lead to greater information seeking.

A final variable that may affect information seeking is the distribution of prediscussion preferences. If all group members prefer a particular candidate, the need to exchange information may go unnoticed. However, the disagreement of even one group member may cause information to be sought about multiple candidates.

#### Information Integration and Item Importance

The changes in the biased sampling model and the inclusion of individual difference variables address the extent to which discussion contains shared and unshared information. If group decisions simply were a matter of information integration (Anderson, 1974), then predicting discussion content would be tantamount to predicting group decisions. As noted above, however, Boster et al.'s (1990) results challenge the applicability of information integration theory. Rather than invalidating information integration theory, Boster et al.'s results may have indicated that the items of information were not perceived as equally important by group members.

The items of information used by Boster et al. (1990) and Stasser and Titus (1985) were pretested to have equal weight, but group discussion may have altered the relative importance of some items. For example, Boster et al. noted (but did not quantify) the

occurrence of discounting in group discussion. In some instances, one group member offered an item of information, then the same, or another group member spoke to minimize the importance or relevance of the item. The opposite, bolstering, also may have occurred. Group members also may have spoken to enhance the importance of information that was consistent with their attitudes. Discounting or bolstering may have caused particular items to become more or less important to a group's decision. For example, groups could have discounted the item that candidate A received excellent teaching ratings (Boster et al., 1990) by concluding that candidate A was an easy grader. Also, groups could have bolstered the item that candidate A required too high a salary (Boster et al., 1990) by concluding that candidate A was out of reach and should be dismissed from consideration.

Discounting and bolstering in favor of the prediscussion preferences should occur more frequently when the percentage of shared information is high for two reasons. First, when more information is shared, each group member has more information on which to base an initial decision. Initial decisions based on more information may be more strongly held, and hence more strongly defended in discussion (Hunter, Danes, & Woelfel, 1978; Saltille & Woelfel, 1975). Second, group members may be less aware that they lack important information, and thus less willing to accept additional information from others that is inconsistent with their initial preferences.

#### Summary of Hypotheses

In summary, an alternative to the biased sampling model was proposed. The model incorporated different probabilities for the mention of shared and unshared information, as well as incorporating the norm of advocacy. The model stated that the percentage of shared information and group size interact to determine the inclusion of shared and unshared information in group discussion. When the proportion of shared information than larger groups. When the proportion of shared information than larger groups. When the proportion of shared information is high, group size will be

unrelated to the content of discussion. In addition to the proposed model, individual differences in communication apprehension (McCroskey, 1980) and need for uniqueness (Snyder & Fromkin, 1980) were hypothesized to impact the extent to which unshared information was included in discussion. Furthermore, information seeking behavior was hypothesized to differ under different discussion conditions. Finally, discounting and bolstering were proposed to explain the discrepancy between past results (Boster et al., 1990) and information integration theory.

#### METHOD

#### **Participants**

The study included 600 volunteers from introductory communication classes at two very large, middle western universities who received course extra credit for participating. Participants were divided into 50 groups of eight (40 experimental and 10 control groups) and 50 groups of four (40 experimental and 10 control groups). Design

The experiment used a  $2 \times 2 \times 2 \times 2$  mixed design with random assignment to treatments under the constraint that equal numbers of groups were included in each cell. Three between-groups factors were included: group size (4 or 8 members), order of decisions, and order of information distribution. One within-groups factor, the proportion of shared information given to group members for each decision (low or high), was also included. That is, each group made two decisions, one based on a high percentage of shared information, and the other based on a low percentage of shared information. Outcome variables were: (a) the group and individual decisions, (b) information in group discussions, (c) discounting, bolstering, and information seeking in group discussions, and (d) individual pre- and post-discussion recall of information.

A control condition was included also. Ten 4-person groups and 10 eight person groups were given all the information (100 percent shared) about each candidate for both decisions.

#### Decision Task

For each discussion, groups were given identical criteria on which to base their decisions prior to receiving the information (Boster et al., 1990; see Appendix A). The information from Boster et al. (1990) was used for candidates A and B for one decision. To create a second decision, and a set of information for candidate C, additional items

were constructed. The additional items were either identical to previous items or where the converse (e.g., a candidate was described as male or female, as requesting a high or low salary, as being a good or mediocre teacher, etc.). The information was constructed so that, based on the criteria provided to the groups, candidate A had eight items of positive information and four negative items, and candidates B and C had four items of positive information and eight items of negative information (see Appendix B).

Addition of a third candidate was necessary to facilitate the creation of a low percentage shared condition; the creation of high percentage shared conditions (67 percent shared) was straightforward, and mirrored the distribution of information in Stasser & Titus (1985) and Boster et al. (1990). For the low percentage shared conditions, it proved impossible to produce the same percentage of shared information for both 4 and 8 person groups. Thus for the 4-person groups, the low percentage shared condition contained 38 percent shared information, and for the 8-person groups, the low percentage shared condition contained 44 percent shared information. Furthermore, the 8person groups contained some items that were partially shared (known to two group members) so that all group members received the same total number of items. Table 1 lists the distribution of information to group members.

#### Instrumentation

Two individual difference variables were assessed. Need for uniqueness was measured using the Snyder and Fromkin's (1980) 32 item scale, and communication apprehension was measured using McCroskey's (1982) 24 item personal report of communication apprehension. Both scales used 7-point, Likert-type items. Group and individual candidate preferences were assessed by asking participants which candidate they preferred. Finally, recall of information was assessed by asking participants to list all the information they could remember about each candidate.

### **Distribution of Information**

(The items of the information are given in Appendix B.)

|               | 38 percent | <u>+A</u> | <u>-A</u>  | <u>+B</u>  | <u>-B</u> | <u>+C</u> | <u>-C</u>     |
|---------------|------------|-----------|------------|------------|-----------|-----------|---------------|
| 4-Person      | Person 1   | 1, 2      | 1, 2, 3, 4 | 2, 3       | 1, 2      | 1         | 1, 5          |
| <u>Groups</u> | Person 2   | 3, 4      | 1, 2, 3    | 2, 3, 4    | 3, 4      | 2         | 2, 6          |
|               | Person 3   | 5, 6      | 1, 2, 3    | 2, 3, 4    | 5, 6      | 3         | 3, 7          |
|               | Person 4   | 7, 8      | 1, 2, 3    | 1, 2, 3    | 7, 8      | 4         | 4, 8          |
|               | 67 percent |           |            |            |           |           |               |
|               | Person 1   | 1, 2      | 1, 2, 3, 4 | 1, 2, 3, 4 | 1, 2      | 1         | 1, 5, 6, 7, 8 |
|               | Person 2   | 3, 4      | 1, 2, 3, 4 | 1, 2, 3, 4 | 3, 4      | 2         | 2, 5, 6, 7, 8 |
|               | Person 3   | 5, 6      | 1, 2, 3, 4 | 1, 2, 3, 4 | 5, 6      | 3         | 3, 5, 6, 7, 8 |
|               | Person 4   | 7, 8      | 1, 2, 3, 4 | 1, 2, 3, 4 | 7, 8      | 4         | 4, 5, 6, 7, 8 |
|               | 44 percent |           |            |            |           |           |               |
| 8-Person      | Person 1   | 1         | 1, 2, 3    | 1, 2       | 1         | 1         | 1             |
| <u>Groups</u> | Person 2   | 2         | 1, 2, 3    | 1, 2       | 2         | 2         | 2             |
|               | Person 3   | 3         | 1, 2, 4    | 1, 2       | 3         | 3         | 3             |
|               | Person 4   | 4         | 1, 2, 4    | 1, 2       | 4         | 4         | 4             |
|               | Person 5   | 5         | 1, 2       | 1, 2, 3    | 5         | 1         | 5             |
|               | Person 6   | 6         | 1, 2       | 1, 2, 3    | 6         | 2         | 6             |
|               | Person 7   | 7         | 1, 2       | 1, 2, 4    | 7         | 3         | 7             |
|               | Person 8   | 8         | 1, 2       | 1, 2, 4    | 8         | 4         | 8             |
|               | 67 percent |           |            |            |           |           |               |
|               | Person 1   | 1         | 1, 2       | 1, 2       | 1         | 1         | 1, 5, 6, 7, 8 |
|               | Person 2   | 2         | 1, 2       | 1, 2       | 2         | 2         | 2, 5, 6, 7, 8 |
|               | Person 3   | 3         | 1, 2       | 1, 2       | 3         | 3         | 3, 5, 6, 7, 8 |
|               | Person 4   | 4         | 1, 2       | 1, 2       | 4         | 4         | 4, 5, 6, 7, 8 |
|               | Person 5   | 5         | 1, 2, 3    | 1, 2, 3    | 5         |           | 5, 6, 7, 8    |
|               | Person 6   | 6         | 1, 2, 4    | 1, 2, 3    | 6         |           | 5, 6, 7, 8    |
|               | Person 7   | 7         | 1, 2, 3    | 1, 2, 4    | 7         |           | 5, 6, 7, 8    |
|               | Person 8   | 8         | 1, 2, 4    | 1, 2, 4    | 8         |           | 5, 6, 7, 8    |
|               |            |           |            |            |           |           |               |

### Candidate and Valence

#### Procedures

Participants were brought to the research room in groups of 12 to 15. The experimenter described the procedures and distributed consent forms. Using a random drawing, participants were assigned to a group of size four, a group of size eight, or allowed to leave. Groups were taken to separate rooms for discussion, and randomly assigned to one of two orders of presentation. Half of the groups were given the low percentage shared information first, and the high percentage shared information second; the order was reversed for the other half. In addition, half the groups were given one decision first, the other half given the other decision first.

After being assigned to groups, participants were instructed that each group member would receive information but that the information presented to each group member might be different. Groups then received the information about the candidates and the criteria to be used in choosing a candidate. Next, the materials were collected, and participants recorded their pre-discussion preferences and completed the information recall measure. Finally, groups were instructed to make a consensus decision, and to discuss the information without taking notes.

At this point, videotaping began, and groups were told to begin discussion. Groups were given as much time as necessary to discuss the information and make a decision. Afterwards, the group decision was recorded by the experimenter, and the postdiscussion individual preferences and information recall measures were administered. The second discussion followed identical procedures to the first save that candidates were labeled D, E, and F rather than A, B, and C. After the second discussion, participants completed the need for uniqueness (Snyder & Fromkin, 1980) and communication apprehension (McCroskey, 1982) scales. Upon completion of the final questionnaire, participants were debriefed, pledged to silence until the conclusion of the study, and dismissed.

#### RESULTS

#### Coding

All coding was done by two coders, and the mean of their responses was used for data analysis. Interrater reliability was assessed by the intraclass correlation (Ebel, 1951). Participants' pre- and post-test recall of information was coded for occurrences of the presented information (see Tables 2, 3, and 4). In addition, responses that were not part of the information given to the participants were coded as negative or positive items about each candidate. The vast majority of these responses were reversals of the correct information. For example, a male candidate would be remembered as female, or an experienced candidate would be remembered as inexperienced. Another error in recall occurred for a handful of participants who listed a candidate as a "minority (Caucasian)". These were coded as if the person had misremembered the item (i.e., as other positive information). A third set of responses consisted of statements such as "the best qualified candidate" or "the least attractive candidate". These also were coded as other information that was positive or negative. Occasional repetitions of information were also recorded, but not considered in the data analysis. Interrater reliability for the coded recall data was  $\underline{r} = .94$ .

Videotapes of group discussion were coded for: (a) speaking time of each group member (Tables 5 and 6), (b) occurrences of items of information, (c) occurrences of information other than that given to participants (coded as positive or negative), (d) occurrences of discounting, (e) occurrences of bolstering, and (f) occurrences of information seeking (Tables 7 and 8). Speaking time was coded by watching the videotape once for each group member; occasions where two or more group members spoke simultaneously were included for each person speaking. Interrater reliability for the coded speaking times was  $\underline{r} = .93$ .

### Pre- and Post-Discussion Recall of Information for 4-person Groups

(Table entries are the mean number of items recalled by individual group members including information that was not distributed (i.e., misremembered or imagined information).)

|                        | Candidate/<br>Valence | Pretest<br><u>Mean</u> | Pretest<br>Std. Dev. | Posttest<br><u>Mean</u> | Posttest<br>Std. Dev. |
|------------------------|-----------------------|------------------------|----------------------|-------------------------|-----------------------|
| 38 percent<br>Decision | A-positive            | 1.74                   | 0.89                 | 2.89                    | 1.52                  |
|                        | A-negative            | 2.14                   | 0.90                 | 2.21                    | 1.12                  |
|                        | <b>B</b> -positive    | 2.01                   | 1.06                 | 2.33                    | 1.18                  |
|                        | <b>B-negative</b>     | 1.38                   | 0.77                 | 1.74                    | 1.12                  |
|                        | C-positive            | 0.59                   | 0.62                 | 0.58                    | 0.70                  |
|                        | C-negative            | 1.76                   | 1.10                 | 2.32                    | 1.15                  |
|                        |                       |                        |                      |                         |                       |
| 67 percent             | A-positive            | 1.81                   | 0.89                 | 2.42                    | 1.34                  |
| Decision               | A-negative            | 2.93                   | 0.98                 | 2.97                    | 1.24                  |
|                        | <b>B-positive</b>     | 3.17                   | 1.14                 | 3.28                    | 1.19                  |
|                        | B-negative            | 1.60                   | 0.78                 | 2.37                    | 1.25                  |
|                        | C-positive            | 0.47                   | 0.59                 | 0.40                    | 0.64                  |
|                        | C-negative            | 3.48                   | 1.14                 | 3.51                    | 1.40                  |

Pre- and Post-Discussion Recall of Information for 8-person Groups

(Table entries are the mean number of items recalled by individual group members including information that was not distributed (i.e., misremembered or imagined information).)

|            | Candidate/<br><u>Valence</u> | Pretest<br><u>Mean</u> | Pretest<br>Std. Dev. | Posttest<br><u>Mean</u> | Posttest<br><u>Std. Dev.</u> |
|------------|------------------------------|------------------------|----------------------|-------------------------|------------------------------|
| 44 percent | A-positive                   | 1.07                   | .61                  | 2.05                    | 1.46                         |
| Decision   | A-negative                   | 2.02                   | .70                  | 2.21                    | 0.91                         |
|            | B-positive                   | 2.13                   | .86                  | 2.50                    | 1.01                         |
|            | B-negative                   | 1.16                   | .56                  | 2.00                    | 1.18                         |
|            | C-positive                   | 0.33                   | .48                  | 0.41                    | 0.59                         |
|            | C-negative                   | 1.27                   | .94                  | 1.98                    | 1.16                         |
|            |                              |                        |                      |                         |                              |
| 67 percent | A-positive                   | 0.98                   | 0.61                 | 2.14                    | 1.47                         |
| Decision   | A-negative                   | 2.01                   | 0.75                 | 2.23                    | 0.93                         |
|            | <b>B-positive</b>            | 2.13                   | 0.93                 | 2.44                    | 1.12                         |
|            | B-negative                   | 1.02                   | 0.61                 | 1.90                    | 1.26                         |
|            | C-positive                   | 0.28                   | 0.48                 | 0.23                    | 0.45                         |
|            | C-negative                   | 3.15                   | 1.08                 | 3.22                    | 1.16                         |

### Pre- and Post-Discussion Recall of Information for Control Groups

(Recall data for 4- and 8-person groups were combined because, unlike the experimental groups, individual group members received identical information regardless of group size.)

|          | Candidate/<br>Valence | Pretest<br><u>Mean</u> | Pretest<br>Std. Dev. | Posttest<br><u>Mean</u> | Posttest<br>Std. Dev. |
|----------|-----------------------|------------------------|----------------------|-------------------------|-----------------------|
| First    | A-positive            | 5.37                   | 1.49                 | 5.66                    | 1.36                  |
| Decision | A-negative            | 2.50                   | 0.98                 | 2.79                    | 1.07                  |
|          | <b>B-positive</b>     | 2.43                   | 1.01                 | 2.70                    | 1.09                  |
|          | <b>B-negative</b>     | 4.95                   | 1.36                 | 5.07                    | 1.43                  |
|          | C-positive            | 1.08                   | 1.04                 | 1.09                    | 1.03                  |
|          | C-negative            | 4.95                   | 1.40                 | 5.15                    | 1.31                  |
|          |                       |                        |                      |                         |                       |
| Second   | A-positive            | 5.82                   | 1.47                 | 5.63                    | 1.50                  |
| Decision | A-negative            | 2.82                   | 1.14                 | 2.56                    | 1.23                  |
|          | <b>B</b> -positive    | 2.60                   | 1.11                 | 2.41                    | 1.21                  |
|          | B-negative            | 4.85                   | 1.41                 | 4.52                    | 1.81                  |
|          | C-positive            | 1.36                   | 0.97                 | 1.32                    | 1.10                  |
|          | C-negative            | 4.95                   | 1.76                 | 4.67                    | 1.80                  |

Individual and Group Discussion Durations for Experimental Groups

(Table entries are in units of seconds.)

|               |           | 4-person groups |            | 8-person groups |            |
|---------------|-----------|-----------------|------------|-----------------|------------|
|               |           | 38 percent      | 67 percent | 44 percent      | 67 percent |
|               | Mean      | 106.58          | 113.69     | 57.49           | 60.50      |
| Individuals   | Std. Dev. | 106.35          | 158.78     | 55.03           | 63.86      |
|               | Minimum   | 1               | 3          | 1               | 1          |
|               | Maximum   | 521             | 994        | 272             | 395        |
|               |           |                 |            |                 |            |
|               | Mean      | 426.33          | 454.77     | 459.95          | 484.03     |
| <u>Groups</u> | Std. Dev. | 391.39          | 608.15     | 366.91          | 336.44     |
|               | Minimum   | 35              | 35         | 8               | 1865       |
|               | Maximum   | 1869            | 1869       | 16              | 1292       |

Individual and Group Discussion Durations for Control Groups

(Table entries are in units of seconds.)

|               |           | 4-person groups |            | 8-person groups |            |  |
|---------------|-----------|-----------------|------------|-----------------|------------|--|
|               |           | 38 percent      | 67 percent | 44 percent      | 67 percent |  |
|               | Mean      | 43.05           | 16.92      | 12.96           | 22.93      |  |
| Individuals   | Std. Dev. | 67.07           | 20.18      | 24.78           | 37.18      |  |
|               | Minimum   | 1               | 1          | 1               | 1          |  |
|               | Maximum   | 286             | 84         | 147             | 212        |  |
|               |           |                 |            |                 |            |  |
|               |           |                 |            |                 |            |  |
|               | Mean      | 172.20          | 67.70      | 103.70          | 183.40     |  |
| <u>Groups</u> | Std. Dev. | 219.57          | 57.13      | 146.09          | 202.65     |  |
|               | Minimum   | 10              | 4          | 9               | 8          |  |
|               | Maximum   | 692             | 155        | 501             | 673        |  |
Table 7

Information, Discounting, and Bolstering During Discussion in 4-person Groups

(Table entries are the mean number of occurrences of information, discounting, bolstering, and information seeking in discussion including the positive and negative information that occurred in discussion but was not given to the groups (with variances in parentheses). Information seeking was not valenced so there is only one table entry per candidate.)

|          | Candidate/<br>Valence | Information  | Discounting | Bolstering | Information<br>seeking |
|----------|-----------------------|--------------|-------------|------------|------------------------|
| 38%      | A+                    | 8.30 (33.96) | .23 (.33)   | .25 (.50)  | 75 (1 22)              |
| Decision | A-                    | 7.88 (35.14) | .47 (.82)   | .15 (.34)  | .73 (1.32)             |
|          | <b>B</b> +            | 8.17 (30.15) | .23 (.44)   | .03 (.03)  | 1 00 (1 08)            |
|          | В-                    | 6.68 (25.20) | .43 (.66)   | .18 (.25)  | 1.00 (1.08)            |
|          | <b>C</b> +            | 2.20 (14.52) | .03 (.02)   | .03 (.03)  | 45 ( 51)               |
|          | C-                    | 7.13 (32.57) | .25 (.60)   | .08 (.12)  | .43 (.31)              |
|          |                       |              |             |            |                        |
| 67%      | <b>A</b> +            | 6.68 (36.38) | .25 (.40)   | .47 (1.03) | 1.00 (1.60)            |
| Decision | A-                    | 7.83 (21.43) | .25 (.29)   | .40 (1.07) | 1.00 (1.69)            |
|          | B+                    | 8.43 (29.12) | .08 (.12)   | .30 (.63)  | 65 ( 80)               |
|          | B-                    | 7.53 (26.05) | 1.20 (3.24) | .35 (.80)  | .03 (.80)              |
|          | C+                    | 1.25 (1.68)  | .08 (.07)   | .03 (.02)  | 25 ( 24)               |
|          | C-                    | 6.35 (10.69) | .00 (.00)   | .23 (.54)  | .33 (.34)              |

Table 8

Information, Discounting, and Bolstering During Discussion in 8-person Groups

(Table entries are the mean number of occurrences of information, discounting, bolstering, and information seeking in discussion including the positive and negative information that occurred in discussion but was not given to the groups (with variances in parentheses). Information seeking was not valenced so there is only one table entry per candidate.)

|          | Candidate/<br>Valence | Information  | Discounting  | Bolstering | Information<br>seeking |
|----------|-----------------------|--------------|--------------|------------|------------------------|
| 38%      | A+                    | 7.50 (38.15) | .43 (1.17)   | .03 (.02)  | 00 ( 91)               |
| Decision | A-                    | 8.20 (39.86) | .23 (.28)    | .05 (.05)  | .90 (.81)              |
|          | <b>B</b> +            | 9.63 (29.52) | .33 (.53)    | .13 (.27)  | 1.02(05)               |
|          | B-                    | 8.13 (31.60) | .43 (.61)    | .15 (.44)  | 1.02 (.93)             |
|          | C+                    | 2.82 (6.76)  | .00 (.00)    | .03 (.02)  | 47 (51)                |
|          | C-                    | 6.75 (20.86) | .08 (.12)    | .00 (.00)  | .47 (.31)              |
|          |                       |              |              |            |                        |
| 67%      | <b>A</b> +            | 7.35 (38.28) | .38 (.60)    | .45 (1.02) | 1 22 (2 23)            |
| Decision | A-                    | 8.65 (41.46) | .70 (1.91)   | .52 (1.08) | 1.23 (2.33)            |
|          | <b>B</b> +            | 9.15 (34.90) | .50 (1.59)   | .55 (1.43) | 1 32 (1 92)            |
|          | B-                    | 8.50 (48.62) | 2.15 (13.21) | .73 (3.28) | 1.52 (1.52)            |
|          | C+                    | 1.25 (2.86)  | .05 (.05)    | .00 (.00)  | 30 ( 32)               |
|          | C-                    | 6.75 (21.27) | .08 (.22)    | .15 (.23)  | .30 (.32)              |

Items and other information in discussion were coded similarly to the written recall data with two caveats. First, occurrences of items specifying the sex of a candidate were counted only when a group member stated that a candidate was male or female, and not counted each time the pronouns "he" or "she" were used. Second, information was not counted when immediately corrected by the speaker. For example, one group member stated, "Person B was a male. No, I mean person A was a male." For this variable, the interrater reliability was  $\underline{r} = .92$ .

Discounting was defined as any instance in which a group member negated or contradicted the importance of an item of information. For example, one participant mentioned that a candidate received good teaching ratings, but then argued that the ratings were meaningless because, "Usually when students like a professor it's not 'cause they learned a lot. They just like the easy ones." Bolstering was defined as any instance in which a group member increased or promoted the importance of an item of information. For example, after hearing that a candidate wanted a high salary, a group member replied "...what's the use of offering him the job when he won't take it anyway." Occurrences of information seeking were counted for each candidate, as well as general requests for information. The interrater reliabilities for discounting, bolstering, and information seeking were attenuated by a restriction in range. For a large number of cases no discounting, bolstering, or information seeking occurred, and in no case did discounting, bolstering or information seeking occur frequently.

#### **Preliminary Analyses**

Prior to testing hypotheses, some preliminary analyses were conducted. First, the communication apprehension and need for uniqueness scales were subjected to confirmatory analysis. Using the criteria of internal consistency and parallelism, items were removed from all four factors (three need for uniqueness dimensions and one

communication apprehension dimension) to produce content valid measures. Means, standard deviations,  $\alpha$ s, and the correlations among these variables are listed in Table 9.

#### Table 9

#### Correlations, Means, Standard Deviations, and Cronbach's as

(Higher scores indicate greater need for uniqueness and greater communication apprehension on a scale from 1 to 7. Asterisks indicate correlations significant at p = .05)

| (1) Need for Uniqueness I      | <u>(1)</u><br>1.00 | (2)  | <u>(3)</u> | <u>(4)</u> |  |
|--------------------------------|--------------------|------|------------|------------|--|
| (2) Need for Uniqueness II     | .12*               | 1.00 |            |            |  |
| (3) Need for Uniqueness III    | .43*               | .24* | 1.00       |            |  |
| (4) Communication Apprehension | 52*                | 05   | 47*        | 1.00       |  |
| Means                          | 5.06               | 3.89 | 4.73       | 3.15       |  |
| Standard Deviations            | .91                | .90  | 1.02       | 1.04       |  |
| Cronbach's a                   | .69                | .63  | .67        | .94        |  |
|                                |                    |      |            |            |  |

A second analysis examined the impact of the information distribution on prediscussion preferences (see Table 10). Overall, 204 of 960 prediscussion decisions (21 percent) were for candidate A. In the low percentage shared condition, 127 of 480 (26 percent) chose A, while 77 of 480 (16 percent) chose B or C in the high percentage shared condition. Similar prediscussion preferences were produced by Stasser and Titus (1985; 25 percent preferred A prior to discussion) and Boster et al. (1990; 18 percent preferred A prior to discussion). Among control groups, 108 of 120 decisions (90 percent) preferred candidate A prior to discussion. The analysis of variance indicated that group size and percentage of shared information interacted to effect prediscussion preferences ( $\underline{F}(1, 478) = 17.84, p < .01, \eta^2 = .033$ ). Specifically, persons in groups of four with a low percentage of shared information were significantly more likely to choose candidate A

(mean = 1.59)

# Table 10

### Pretest Decision Distributions

(In the 38 percent shared condition, 10 groups had 1 person chose C, and in the 67 percent shared condition 1 person chose C. For the 44 percent shared condition, 18 persons chose C, and in the 67 percent shared condition 12 persons chose C. In all other cases, group members who did not choose candidate A, chose candidate B.)

|          | Number of group<br>members choosing A | 38% shared <u>decision</u> | 67% shared<br><u>decision</u> |
|----------|---------------------------------------|----------------------------|-------------------------------|
| 4-Person | 0                                     | 10                         | 19                            |
| Groups   | 1                                     | 6                          | 15                            |
|          | 2                                     | 7                          | 6                             |
|          | 3                                     | 13                         | 0                             |
|          | 4                                     | 4                          | 0                             |

|          |   | 44% shared<br><u>decision</u> | 67% shared decision |
|----------|---|-------------------------------|---------------------|
| 8-Person | 0 | 9                             | 12                  |
| 010005   | 1 | 15                            | 16                  |
|          | 2 | 10                            | 6                   |
|          | 3 | 6                             | 3                   |
|          | 4 | 0                             | 3                   |

than persons in groups of eight or persons given a high percentage of shared information (groups of four, high percentage shared: mean = 1.89; groups of eight, low percentage shared: mean = 1.85; groups of eight, high percentage shared: mean = 1.88). The means are somewhat puzzling because, by information integration, the condition in which the information manipulation is weakest is the 8-person, low percentage shared condition.

Finally, analysis of variance was used to assess the impact of decision order and information distribution order on information recall for each candidate and for individual pretest decisions (see Table 11). Decision order had a significant impact only on recall for candidate C in the high percentage shared condition ( $\underline{F}(1, 476) = 5.83$ , p < .05,  $\eta^2 = .012$ ). Order of information shared had a significant on: recall for candidate B in the low percentage shared condition ( $\underline{F}(1, 476) = 4.65$ , p < .05,  $\eta^2 = .010$ ), recall for candidate C in the high percentage shared condition ( $\underline{F}(1, 476) = 20.77$ , p < .01,  $\eta^2 = .041$ ), and pretest decisions in the high percentage shared condition ( $\underline{F}(1, 476) = 6.88$ , p < .01,  $\eta^2 = .014$ ). The variable for which distribution order had a strong effect, recall for Candidate C, was not critical to further analyses because few individuals or groups chose candidate C. <u>Group Decisions</u>

To test the hypothesized impact of group size and percentage of shared information on group decisions, an analysis of variance was conducted. Because the efficacy of the information induction varied by condition, the distribution of prediscussion preferences was included as a covariate. The analysis indicated that percentage of shared information and group size interacted to effect group decisions (( $\underline{F}(1, 77) = 6.86, p < .02, \eta^2 = .029$ ). The covariate, individual pretest decision distribution, also had a significant effect both between groups ( $\underline{F}(1, 77) = 27.60, p < .01, \eta^2 = .102$ ) and within groups ( $\underline{F}(1, 77) = 20.81 \text{ p} < .01, \eta^2 = .098$ ). An *a priori* contrast analysis also was conducted to test the specific prediction that 4-person groups with a low percentage of shared information

# Table 11

Impact of Decision Order and Information Distribution Order

|                       | Dependent<br>Variable                                 | Independent<br>Variable | <u>F</u> | р   | <u>n</u> ² |
|-----------------------|-------------------------------------------------------|-------------------------|----------|-----|------------|
| Low Percent<br>Shared | Pretest                                               | Decision:               | 1.63     | .20 | .003       |
|                       | Decision                                              | Information:            | 2.58     | .11 | .005       |
|                       | Rocall: A                                             | Decision                | 0.03     | .86 | .000       |
|                       | <u>Recall.</u> A                                      | Information:            | 0.08     | .84 | .000       |
|                       | Decelli D                                             | <b>Decision</b> :       | 3.51     | .06 | .007       |
|                       | <u>Recall:</u> B                                      | Information:            | 4.65     | .03 | .010       |
|                       | <u>Pretest</u><br><u>Decision</u><br><u>Recall: A</u> | <b>Decision</b> :       | 0.00     | .96 | .000       |
|                       |                                                       | Information:            | 0.36     | .55 | .001       |
| High Percent          |                                                       | Decision:               | 2.46     | .12 | .005       |
| Snared                |                                                       | Information:            | 6.88     | .01 | .014       |
|                       |                                                       | <b>Decision</b> :       | 0.04     | .84 | .000       |
|                       |                                                       | Information:            | 3.48     | .06 | .003       |
|                       | Decally D                                             | Decision:               | 1.78     | .18 | .004       |
|                       | <u>Recall:</u> B                                      | Information:            | 0.46     | .50 | .001       |
|                       | <u>Recall:</u> C                                      | Decision:               | 5.83     | .02 | .012       |
|                       |                                                       | Information:            | 20.77    | .00 | .041       |

would make the correct decision more frequently than groups in the other three conditions (i.e., 4-person, high percent shared groups and 8-person low and high percent shared groups (see Table 12 for the cell means and contrasts). This contrast model was significant (F(1, 78) = 18.33, p < .01,  $\eta^2 = .107$ ).

Table 12

**Group Decisions** 

(Table entries are the proportion of groups who chose candidate A (i.e., the correct answer) with 40 groups per cell. A priori contrasts are shown in brackets. Among the groups who chose incorrectly, only one group (4-person, 38 percent shared condition) chose candidate C.)

#### Information Distribution

|                   |              | 38 (44) percent | 67 percent | 100 percent |
|-------------------|--------------|-----------------|------------|-------------|
| Group Size        | <u>Eight</u> | .250 [-1]       | .275 [-1]  | 1.00        |
| <u>Group Size</u> | Four         | .600 [+3]       | .125 [-1]  | 1.00        |

### Speaking Time and Information in Discussion

Although the pattern of group decisions was consistent with the hypotheses, the model also predicted that longer group discussions would be associated with a greater amount of unshared information in discussion. To test this hypothesis, three analyses of variance were conducted with group size as the between groups factor, percentage of shared information as the within groups factor, and group discussion duration as the covariate. The dependent variables for these analyses were the information about candidates A, B, and C in discussion. Information was computed by summing the number

positive statements made about a candidate in discussion and subtracting the number of negative statements made about the candidate in discussion.

These analyses indicated that discussion length had an impact only on the discussion of candidate C. Longer discussions were associated with an increasingly negative depiction of candidate C (between groups  $\beta = -.45$ , df = 77, p < .01; within groups  $\beta = -.25$ , df = 77, p < .03). There was also tendency for longer discussions to result in a more negative depiction of candidate A (between groups  $\beta = -.20$ , df = 77, p < .07).

The relationship between discussion length and discussion content was investigated further by conducting separate analyses on groups who made the correct decision and groups who made an incorrect decision. A difference was observed for groups with a low percentage of shared information who made an incorrect decision compared to correct groups or groups with a high percentage of shared information. For low percentage shared, incorrect groups, longer discussions produced greater proportions of negative information about candidates A ( $\beta = -.34$ , df = 42, p < .03) and C ( $\beta = -.52$ , df = 42, p <.01). In all other cases, discussion time was not related to information in discussion (see Table 13 for results). Unfortunately, very few high percentage groups made the correct decision, so the statistical power for those analyses is very low. The  $\beta$ s for these groups appear substantial, and may be indicative of significant relationships that were not detected because of the small sample size.

#### Discounting, Bolstering, and Information Seeking

One reason for the absence of a relationship between discussion length and discussion content may have been the occurrence of discounting, bolstering, and information seeking in group discussion. To investigate differences in these variables, analyses of variance were conducted for each candidate separately, with group size as the between-groups factor, percentage of shared information as the within-groups factor, and the distribution of prediscussion preferences as the covariate. Discounting scores were

# Table 13

# Impact of Discussion Length on Information in Discussion

| Condition             | <b>Candidate</b> | ß    | <u>df</u> | p   |
|-----------------------|------------------|------|-----------|-----|
| Low percent           | Α                | 337  | 42        | .03 |
| incorrect             | В                | 115  | 42        | .43 |
|                       | С                | 523  | 42        | .00 |
| Low percent           | Α                | 134  | 30        | .55 |
| correct               | В                | .013 | 30        | .96 |
| decision              | С                | 325  | 30        | .13 |
| High percent shared,  | Α                | 087  | 60        | .51 |
| incorrect<br>decision | В                | .098 | 60        | .44 |
|                       | С                | 071  | 60        | .59 |
| High percent shared,  | Α                | .441 | 12        | .25 |
| correct               | В                | 359  | 12        | .31 |
|                       | С                | 466  | 12        | .18 |

computed by summing the number of times negative items were discounted and subtracting the number of times positive items were discounted for each candidate. Bolstering scores were computed by summing the number of times positive items were bolstered and subtracting the number of times negative items were bolstered. Thus, higher discounting and bolstering scores indicated a discussion that was more favorable towards a candidate.

With discounting as the dependent variable, group size and percentage of shared information produced a significant interaction for candidate A ( $\underline{F}(1, 77) = 4.52$ , p < .04,  $\eta^2 = .024$ ). A post hoc contrast analysis indicated that discounting occurred in favor of candidate A in 4-person, low percentage shared groups (mean = .250; contrast coefficient = +1) and in 8-person, high percentage shared groups (mean = .325; contrast coefficient = +1) and <u>against</u> candidate A in 8-person, low percentage shared groups (mean = -.200; contrast coefficient = -2) with 4-person, high percentage groups in between (mean = .000; contrast coefficient = 0). Specifically,  $\underline{F}(1,77) = 5.82$ ,  $\underline{p} < .02$ ,  $\eta^2 = .031$ . For candidates B and C, percentage of shared information was the only significant predictor of discounting (<u>F(1, 77) = 15.72, p</u> < .01,  $\eta^2$  = .087, and <u>F(1, 77) = 4.81, p</u> < .04,  $\eta^2$  = .029 respectively). Discounting occurred in favor of candidate B significantly more when the percentage of shared information was high (mean = 1.387) than when percentage of shared information was low (mean = .150) The opposite relationship held for candidate C. Discounting occurred in favor of candidate C significantly less when percentage of shared information was high (mean = .025) than when percentage of shared information was low (mean = .150).

Bolstering was predicted successfully only for candidate B. Pretest decision distribution ( $\underline{F}(1, 77) = 7.38$ ,  $\underline{p} < .01$ ,  $\eta^2 = .0.043$ ) and group size ( $\underline{F}(1, 77) = 7.10$ ,  $\underline{p} < .01$ ,  $\eta^2 = .042$ ) both had main effects. Eight-person groups and groups with a greater proportion of members preferring candidate B were more likely to bolster in favor of candidate B.

The occurrence of information seeking in discussion was also investigated. No significant impact was observed for group size, pretest decision distribution, or percentage of shared information. The lack of significant results was not surprising because very little information seeking occurred in the group discussions.

#### Individual Differences

The next analyses investigated the extent to which individual difference variables influenced the extent to which group members participated in discussion. Of particular interest were the communication apprehension scale (McCroskey, 1982) and the first and third factors of the need for uniqueness scale (Snyder and Fromkin, 1980). Separate multiple regressions were run with the speaking times for the low and high percentage decisions as the dependent variables, and the individual difference variables as independent variables. Group size and pretest recall of information about each candidate also were entered as independent variables.

For both dependent variables, neither the two need for uniqueness factors nor communication apprehension had a significant impact. Predictably, group size had an impact such that members of 4-person groups spoke longer than members of 8-person groups for high and low percentage shared discussions ( $\beta = -.288$ , df = 474, p < .01 and  $\beta$  = -.233, df = 474, p < .01 respectively). Pretest recall of positive information about candidate C was also significantly positively associated with speaking time for both percentages of shared information ( $\beta = .203$ , df = 474, p < .01 and  $\beta = .143$ , df = 474, p < .01 respectively). The only other significant for recalled information occurred for positive information about candidate A in the high percentage shared condition ( $\beta = .107$ , df = 474, p < .04).

Also investigated with respect to the individual difference variables was the extent to which information items were repeated in discussion. This analysis regressed the repetitions of each individual item of information (12 per candidate), the repetitions summed over the positive and negative items for each candidate, and the repetitions

summed over all the items for each candidate onto the three need for uniqueness factors and communication apprehension. Thus, 45 regressions with four independent variables were computed; eight of the 180  $\beta$ s were statistically significant (see Table 14). Given the number of analyses, the significant findings arguably were due to sampling error.

### Table 14

#### Significant $\beta$ s for Repetitions of Information in Discussion

(NU = need for uniqueness, and CA = communication apprehension. N = 480.)

| Candidate | Item/Valence | Independent<br><u>Variable</u> | ß    | ₽   |  |
|-----------|--------------|--------------------------------|------|-----|--|
| Α         | 3-           | NU1                            | 276  | .04 |  |
| Α         | 8-           | NU1                            | 415  | .01 |  |
| Α         | All+         | NUI                            | 294  | .03 |  |
| В         | 2-           | NU1                            | 301  | .02 |  |
| В         | 4-           | СА                             | .223 | .05 |  |
| В         | 7-           | NU1                            | .268 | .05 |  |
| С         | 1+           | NU1                            | .222 | .05 |  |
| С         | 3-           | NU3                            | 283  | .03 |  |
|           |              |                                |      |     |  |

#### Comparing Recalled Information to Information in Discussion

A final analysis examined the relationship between the recall of information and the inclusion of information in discussion. For each candidate, and for positive and negative information separately, two variables were computed. First, the frequency with which an item was mentioned in discussion that no group member had recalled was computed (D\R). Second, the frequency with which an item was recalled by at least one group

member, but not mentioned in discussion was computed (R\D). Both variables were weighted by the number of items available (i.e., four items were negative about A and positive about B and C, and eight items were positive about A and negative about B and C) and subjected to an analysis of variance with group size as the between groups factor, percentage of shared information as the within groups factor, and the distribution of prediscussion preferences as the covariate.

The results of these analyses are summarized in Table 15. Group size and the distribution of prediscussion information did not have a significant main effect for any dependent variable. Percentage of shared information had a significant main effect for four types of information. For negative information about A and positive information about B, both D\R and R\D were more likely to occur when percentage of shared information was high. Put another way, memory of initially forgotten information was significantly more likely to preserve the initial bias when percentage of shared information was high. For negative information about C, D\R was more likely to occur when the percentage of shared information was low. Also, for positive information about C, R\D was more likely to occur when percentage of shared information about C, R\D was more likely to occur when percentage of shared information about C, R\D was more likely to occur when percentage of shared information about C, R\D was more likely to occur when percentage of shared information about C, R\D was more likely to occur when percentage of shared information about C, R\D was more likely to occur when percentage of shared information about C, R\D was more likely to occur when percentage of shared information about C, R\D was more likely to occur when percentage of shared information was low.

When the interaction between percentage of shared information and group size was significant, two patterns emerged. For D\R, a crossover interaction was observed such that 4-person groups with a low percentage of shared information, and 8-person groups with a high percentage of shared information were less likely to discuss information that no group member had listed on the pretest recall measure. A crossover interaction also was observed for R\D such that 4-person groups with a high percentage of shared information, and 8-person groups with a low percentage of shared information were less likely to discuss information that at least one group member had listed on the pretest recall measure.

# Table 15

Information Recall and Occurrence in Discussion by Experimental Condition

(N = group size, and Percent shared = percentage of shared information. For all analyses, the degrees of freedom were 1 and 76.)

|             | Candidate/Valence | Independent Variable      | <u>F</u> | р   | <u></u> д2 |
|-------------|-------------------|---------------------------|----------|-----|------------|
| Information | <b>A-</b>         | Percent shared            | 113.65   | .00 | .014       |
| discussed   |                   | $N \times Percent shared$ | 2.70     | .10 | .003       |
| recalled    | B+                | Percent shared            | 3.13     | .08 | .008       |
|             |                   | $N \times Percent shared$ | 4.89     | .03 | .012       |
|             | B-                | Percent shared            | 3.52     | .06 | .011       |
|             |                   | $N \times Percent shared$ | 4.16     | .05 | .013       |
|             | C+                | Percent shared            | 8.63     | .01 | .034       |
|             |                   | $N \times Percent shared$ | 8.63     | .01 | .034       |
|             | C-                | Percent shared            | 14.09    | .01 | .054       |
|             |                   | $N \times Percent shared$ | .01      | .91 | .000       |
|             |                   |                           |          |     |            |
| Information | B+                | Percent shared            | 4.59     | .04 | .022       |
| recalled    |                   | $N \times Percent shared$ | 3.72     | .06 | .018       |
| discussed   | <b>B-</b>         | Percent shared            | 3.66     | .06 | .019       |
|             |                   | $N \times Percent shared$ | .36      | .55 | .002       |
|             | <b>C</b> +        | Percent shared            | 3.69     | .06 | .013       |
|             |                   | $N \times Percent shared$ | 1.03     | .31 | .004       |
|             | C-                | Percent shared            | .72      | .40 | .003       |
|             |                   | N × Percent shared        | 4.09     | .05 | .017       |

Also investigated was whether differences in D\R and R\D were associated with the valence of the information (positive or negative), the candidate (A, B, or C), or the percentage of shared information (low or high) (see Table 16 for the means). An analysis of variance with three within-groups factors produced a significant 3-way interaction ( $\underline{F}(1, 880) = 11.86$ ,  $\underline{p} < .01$ ,  $\eta^2 = .006$ ) with D\R as the dependent variable. The pattern of means was not readily interpretable and, given the power of the analysis, the significance test may have produced a Type I error. The same may be said for the three 2-way interactions and the three main effects that also were significant (Fs ranging from 12.27 to 83.39,  $\eta^2$ s ranging from .020 to .071).

Table 16

#### Occurrence of D\R and R\D

 $(D\R = information discussed by groups but not listed in the pretest recall measure. R\D = information recalled by at least one group member but not included in discussion.)$ 

|            |                       | Low Perce | ent Shared | High Percent Shared |          |
|------------|-----------------------|-----------|------------|---------------------|----------|
|            |                       | Negative  | Positive   | Negative            | Positive |
| <u>D\R</u> | <u>Candidate</u><br>A | .037      | .013       | .203                | .025     |
|            | В                     | .019      | .023       | .186                | .046     |
|            | С                     | .014      | .041       | .062                | .016     |
|            |                       |           |            |                     |          |
|            | Α                     | .159      | .313       | .147                | .356     |
| <u>R\D</u> | В                     | .227      | .106       | .281                | .169     |
|            | С                     | .316      | .275       | .295                | .328     |
|            |                       |           |            |                     |          |

With R\D as a dependent variable, the analysis indicated a significant interaction between valence and candidate ( $\underline{F}(2, 880) = 48.26$ ,  $\underline{p} < .01$ ,  $\eta^2 = .033$ ). The pattern of means indicates that negative information about candidate A and positive information about candidate B and C were significantly less likely to be recalled but not discussed (a post hoc contrast analysis produced  $\underline{F}(1, 880) = 134.25$ ,  $\underline{p} < .01$ ,  $\eta^2 = .046$ ). Informal Observations of Discussion Content

Although not quantified and analyzed, some interesting behaviors in group discussions deserve mentioning. First, a method was observed by which participants adhered to the norm of advocacy, but still mentioned preference inconsistent information. When asked why they disliked, for example, candidate A, many group members responded, "...the only positive thing about A is..." or, "...everything about A was negative except...." In other words, group members promoted their position by arguing that there was little evidence contrary to their position.

Another striking feature of the group interactions was the presence of numerous logical errors. Some of the errors that recurred frequently enough to be noticeable were:

- Group members assumed that unfamiliar information was forgotten information. Unfamiliar, preference-inconsistent information was believed to be information that they had considered in making their initial decision, but then had forgotten. Because the information was assumed already to have been considered, it did not influence their current preferences.
- 2. Group members assumed that unfamiliar information was inaccurate. Hearing, for example, that a candidate is female, one person replied, "Are you sure? Mine didn't say that." Many group members seemed unwilling to accept any information unless multiple group members recalled it. Furthermore, group members who were challenged after mentioning unshared information often admitted uncertainty in their recall and retracted the information. Thus group decisions were first a matter of deciding what

information was reliable (usually shared information), then integrating the information and making a decision.

- 3. Group members drew conclusions from an absence of information on a particular criterion. This error occurred most frequently when participants who had not read about the sex of a candidate concluded that the candidate must be male. Also, candidates whose race was not specified were often assumed to be white.
- 4. Group members assumed that only one candidate could have a particular attribute. For example, one person mentioned that candidate A would accept a low salary and another replied, "Mine said C was the one who didn't want a lot of money." The group then argued whether A or C would accept a low salary and concluded that neither piece of information was reliable.

In some cases a group member would make one of the errors listed above and another group member would correct him or her. Some groups, however, left the errors uncorrected, and hence were more susceptible to incorrect decisions.

In addition to making logical errors, some groups appeared to be unable to handle the volume of information included in discussion. Some groups exchanged sufficient information to conclude that candidate A was the best applicant, but did not assemble the information and recognize the import of their discussion. One group specifically stated an intention to enumerate the good and bad information about each candidate and to choose the candidate with the most positive and fewest negative characteristics. The group then listed a body of information that, by their own criterion, favored candidate A, but chose candidate B anyway because they did not accurately count the items mentioned.

A final observation concerns the approaches groups took to making the decision. Most groups seemed to view group interaction as a forum for stating their opinions, and hearing the opinions of others. Little effort was made to organize and make sense of the relevant information. Instead, opinions and information were offered, and then critically evaluated. In striking contrast, some participants quickly grasped that different group members had received different information. In these groups an effort was made systematically to amass all the available information before choosing a candidate. The distinction between groups who evaluated information before exchanging all information is similar to the distinction between effective and ineffective brainstorming groups (Osborn, 1963). Osborn argued that brainstorming groups would not be effective if ideas were evaluated during a brainstorming session. Rather, ideas should be generated first, and critical evaluation should occur subsequently.

In addition, some groups may have exchanged information more effectively because they viewed the task as having a correct answer rather than being a matter of opinion. Stasser and Stewart (1992) observed that when groups believe an objectively correct answer exists, they are more likely to exchange information. As might be expected, groups that systematically exchanged information appeared to make the correct decision more frequently.

#### DISCUSSION

The central focus of this study was to develop and test a model of information sharing in group discussion that improved on the biased sampling model (Stasser and Titus, 1985). The new model differed from the biased sampling model in that the probability of group members discussing shared information differed from the probability of discussing unshared information. The model further incorporated the norm of advocacy, and posited that the probability of group members mentioning shared and unshared information in discussion was a function of individual knowledge and the content of group discussion.

The data were consistent with the first implication of the model that smaller groups with a low percentage of information would perform better than larger groups and groups with a high percentage of shared information. However, the model also indicated that longer group discussions should contain more unshared information, and this prediction was not consistent with the data. The content of discussion was not significantly associated with the length of group discussion.

One possible reason that longer discussions were not associated with an increased proportion of unshared information is the occurrence of discounting and bolstering in discussion. The groups that were most likely to arrive at the correct decision (4-person, low percentage of shared information) were also most likely to discount information in favor of the best candidate. In the other conditions, discounting was more likely to occur against the best candidate. If so, then the information discussed by groups may not be the most important factor in determining group decisions. Instead, the initial reactions groups have to the information may be more important.

A second reason for the absence of a relationship between discussion duration and discussion content may have been the tendency for some groups very quickly to come to a

correct decision after very systematically exchanging information. In addition, a handful of groups interacted for a very long time, but spent most of their time arguing about specific pieces of information rather than continuing to exchange information. One group argued for over an hour without making the correct decision and without significantly adding to their knowledge about the candidates. Consistent with this argument, low percentage shared discussions that produced incorrect decisions contained more negative information about candidate A as discussion length increased, whereas discussion length and discussion content were not related when correct decisions were made, or groups were given a high percentage of shared information. Perhaps low percentage shared groups who made incorrect decisions were more likely to view the decision task as subjective rather than as having an objectively correct answer. Stasser and Stewart (1992) observed that such groups were more likely to make incorrect decisions.

This study also investigated the impact of individual difference variables on group discussion. Contrary to Boster et al. (1980) who observed a correlation of  $\underline{r} = -.19$  between communication apprehension and speaking frequency, the addition of communication apprehension and need for uniqueness factors did little to improve the explanatory or predictive power of the present analyses. In particular, communication apprehension was not related to speaking frequency. The absence of an impact for communication apprehension may have been caused the significant positive skew (skew = .52) in the distribution of communication apprehension scores. Most of the participants had very low communication apprehension scores.

An additional finding of this study concerned the relationship between recall of information and discussion of information. Perhaps most interesting result was that many groups discussed information that no group member had mentioned on the prediscussion measure of recall. Clearly, some statements in discussion cued recall of additional information. Also important was the pattern of information that was recalled, but not discussed. The main effect for percentage of shared information that was observed for

positive information about candidate A and negative information about candidate B was consistent with the biased sampling model (Stasser and Titus, 1985) and the revision of the model presented here. Both models predicted that when percentage of shared information was high, unshared information was less likely to be discussed. However, the interaction between percentage of shared information and group size was not readily explainable. Further theoretical work is necessary to clarify the causal processes that led 4-person, high percentage shared groups and 8-person, low percentage shared groups to recall more information but fail to discuss it.

The results of this study have implications for future research in this area. Most notably, the present findings indicate that the exchange of information was not the sole determinant of decision quality. Instead, the reception and interpretation of the information by group members played a strong role. Groups exchanged information similarly across conditions, but made different decisions because discounting and bolstering occurred differently across conditions. Future models of the decision making process in this context need to incorporate the weighting of information in addition to the presence of information in discussion.

A revised model also would need to explain the finding that longer discussions did not contain an increased amount of unshared information. The occurrence of discounting and bolstering may be incorporated to that end. Specifically, the extent to which groups exchange unshared information would be affected by group size and the percentage of information shared, but also by the reactions of group members to the information. When group members react to bolster shared information and discount unshared information, subsequent discussion may include less unshared information. In contrast, if groups accept unshared information, or even bolster it, subsequent discussion may include more unshared information.

The extent to which groups react neutrally or favorably to inconsistent information also may depend on the type of task and the nature of the information used. Judgmental

decisions, and decisions that are perceived as judgmental may be more susceptible to discounting and bolstering. Tasks that are perceived as intellective, on the other hand, may be characterized more by a rational and extensive exchange of information (consistent with Stasser and Stewart, 1992). An interesting question is whether the perception that a decision is objective or subjective is more important than the decision's actual objectivity or subjectivity.

Another potentially important feature of the task is the familiarity and experience of group members with the type of decision being made. Group members with greater prior knowledge or experience may be more capable of distinguishing facts from opinions, and intellective from judgmental decisions. In this study, some groups did not understand the role of an assistant professor. This caused them to spend more time on irrelevant issues (i.e., deciding what an assistant professor does), and less time exchanging information. These groups were more likely to misunderstand (through discounting or bolstering) the import of certain items. For example, one group recalled that candidate A had a Ph.D., but forgot that the other candidates also had Ph.D.'s. A Ph.D. was considered unimportant for an assistant professor, so this information was discounted.

The tendency for some ineffective groups to concentrate on the criteria for making the decision rather than the decision itself is consistent with work by Hirokawa and Pace (1983) who studied the relationship between the phases of group interaction and group decision making effectiveness. High quality decisions tended to be associated with an orderly progression through the phases of the unitary sequence model (see Poole, 1981 for a discussion). In contrast, ineffective decision making groups tended to spend too much time in particular phases, such as orientation to the problem. The current results imply that deviation from a unitary sequence results in lower quality decisions because information is not exchanged adequately. In addition, deviations from the unitary sequence may have resulted from group members perceiving the decision to be judgmental rather than intellective (Stasser & Stewart, 1992).

The above discussion implies that this study may not generalize to tasks that are more recognizably objective, or to tasks that are more recognizably subjective. In the former case, groups should be less likely to discount and bolster, and hence information exchange should be more the most important determinant of decision quality. In the latter case, groups should be more likely to discount and bolster in favor of their initial positions, and information exchange may be nearly irrelevant to group decisions.

#### CONCLUSION

This study indicated that the criticisms leveled at the biased sampling model were justified, but that the alternative presented here did not fully capture the revisions necessary. While group size and percentage of shared information interacted to effect group decisions, the predicted impact on group discussion content did not materialize. The discounting and bolstering of information in discussion appears to an important determinant of group decisions, and further work is needed to incorporate them into the mathematical model presented here. Moreover, task characteristics appear to be important factors in determining how well information is exchanged, and how well the information is integrated to produce a group decision.

In advising decision making groups on improving their effectiveness, this study indicates that the fundamentals of brainstorming (Osborn, 1963) may be relevant in other types of group discussions. Brainstorming ideally consists of idea generation without evaluation. Analogously, decision making should consist, initially, of information exchange without evaluation (i.e., discounting and bolstering). Evaluation early in discussion appears to allow the perpetuation of prediscussion biases, but by delaying evaluation of ideas, groups may overcome individual biases and thus make better decisions.

APPENDICES

### Appendix A

#### Decision Criteria Given to All Group Members

(The same criteria were used both decisions except that A, B, and C were replaced with D, E, and F for the second decision.)

An academic department at a large university is in the process of hiring a new faculty member. The department is looking for a person who is an excellent teacher while being able to teach a diverse set of courses, has a record of producing a large quantity of quality research, and is willing to engage in various service activities, both inside and outside the university. The ideal candidate should also have strong educational preparation and considerable college teaching experience.

The department is, however, operating under some constraints. There are strong pressures from the Dean, higher administration, and the state government to hire both women and minority faculty. Furthermore, because of budget constraints this year the department will be unable to offer a large salary. Finally, the department has had trouble lately hiring and retaining faculty members. Thus, they would prefer to make an offer to someone likely to take the job, and likely to stay with the department for a substantial period of time.

After a nationwide search the department has narrowed its choice to three candidates, A, B, and C. Descriptions of the three candidates follow. Please read the description carefully. You will be asked to discuss the candidates with others and to reach consensus on a hiring decision.

## Appendix B

## Complete Descriptions of Candidates with Valences

(Items are listed in the order that they were presented to participants. Items were presented as shown save that the pronouns indicating the sex of the candidates were removed when the sex of the candidate was unspecified.)

## Candidate A

- +1. Candidate A graduated from one of the top communication programs in the country. He was the best Ph.D. student in the program.
- +2. Since graduation candidate A has had over 10 years of university teaching experience.
- +3. Candidate A has received consistently positive teaching ratings from his students.
- -1. It is clear from his record that he is <u>unable</u> to teach a wide variety of courses.
- -2. Candidate A does not publish a great quantity of research each year.
- +4. His publications are rated by his peers to be of excellent quality.
- +5. In the past candidate A has taken a very active role in university governance, such as the University Senate.
- -3. Candidate A has something of an "ivory tower" outlook; he refuses to participate in community service activities such as consulting with local businesses and governmental groups.
- +6. The Dean of the College of Communication Arts and Sciences has been pressuring the department to hire a minority faculty member for some time, and candidate A is a member of a minority group.
- -4. The Dean has also been pressuring the department to hire more women faculty members, and candidate A is male.
- +7. The college budget is tight this year and the preferred candidate will not receive a large salary offer. During an interview candidate A indicated that he would not require a particularly large salary offer.
- +8. In his career candidate A has demonstrated a great deal of commitment and loyalty to the institutions for which he has worked. Thus, there is reason to expect that were he offered the job, and were he to accept, he would be with the university for a long time.

## Candidate B

- -1. Candidate B was an average student and graduated from a communication program that is <u>not</u> considered one of the top Ph.D. programs in the country.
- -2. Since graduation candidate B has had 5 years of university teaching experience.
- -3. Candidate B has received consistently mediocre teaching ratings from her students.
- +1. It is clear from her record that she is <u>able</u> to teach a wide variety of courses.
- +2. Candidate B publishes a great quantity of research each year.
- -4. Her publications are rated by her peers sometimes to be of dubious quality.
- -5. In the past candidate B has not taken a very active role in university governance.
- +3. Candidate B has consulted with many businesses and governmental groups. She places a priority on continuing such activities.
- -6. The Dean of the College of Communication Arts and Sciences has been pressuring the department to hire a minority faculty member for some time, and candidate B is a Caucasian.
- +4. The Dean has also been pressuring the department to hire more women faculty members, and candidate B is female.
- -7. The college budget is tight this year and the preferred candidate will not receive a large salary offer. During an interview candidate B indicated that she would require a salary that would be difficult for the college to pay.
- -8. In her career candidate B has worked at three different institutions. Thus, there is reason to expect that were she offered the job, and were she to accept, she would be with the university for a short time.

# Candidate C

- -1. Candidate C was an average student and graduated from a communication program that is <u>not</u> considered one of the top Ph.D. programs in the country.
- +1. Since graduation candidate C has had 11 years of university teaching experience.
- -2. Candidate C has received consistently mediocre teaching ratings from his students.
- -3. It is clear from his record that he is <u>unable</u> to teach a wide variety of courses.
- +2. Candidate C publishes a great quantity of research each year.
- +3. His publications are rated by his peers to be of very high quality.
- -4. In the past candidate C has not taken a very active role in university governance.
- +4. Candidate C has consulted with many businesses and governmental groups. He places a priority on continuing such activities.
- -5. The Dean of the College of Communication Arts and Sciences has been pressuring the department to hire a minority faculty member for some time, and candidate C is a Caucasian.
- -6. The Dean has also been pressuring the department to hire more women faculty members, and candidate C is male.
- -7. The college budget is tight this year and the preferred candidate will not receive a large salary offer. During an interview candidate C indicated that he would require a salary that would be difficult for the college to pay.
- -8. In his career candidate C has worked at three different institutions. Thus, there is reason to expect that were he offered the job, and were he to accept, he would be with the university for a short time.

## Candidate D

- +1. Candidate D graduated from one of the top communication programs in the country. She was the best Ph.D. student in the program.
- -1. Since graduation candidate D has had 5 years of university teaching experience.
- -2. Candidate D has received consistently mediocre teaching ratings from her students.
- +2. It is clear from her record that she is <u>able</u> to teach a wide variety of courses.
- -3. Candidate D does not publish a great quantity of research each year.
- +3. Her publications are rated by her peers to be of excellent quality.
- +4. In the past candidate D has taken a very active role in university governance, such as the University Senate.
- +5. Candidate D has consulted with many businesses and governmental groups. She places a priority on continuing such activities.
- +6. The Dean of the College of Communication Arts and Sciences has been pressuring the department to hire a minority faculty member for some time, and candidate D is a member of a minority group.
- +7. The Dean has also been pressuring the department to hire more women faculty members, and candidate D is female.
- +8. The college budget is tight this year and the preferred candidate will not receive a large salary offer. During an interview candidate D indicated that she would not require a particularly large salary offer.
- -4. In her career candidate D has worked at four different institutions. Thus, there is reason to expect that were she offered the job, and were she to accept, she would be with the university for a short time.

## Candidate E

- +1. Candidate E graduated from one of the top communication programs in the country. She was the best Ph.D. student in the program.
- -1. Since graduation candidate E has had 5 years of university teaching experience.
- -2. Candidate E has received consistently mediocre teaching ratings from her students.
- -3. It is clear from her record that she is <u>unable</u> to teach a wide variety of courses.
- +2. Candidate E publishes a great quantity of research each year.
- -4. Her publications are rated by her peers sometimes to be of dubious quality.
- -5. In the past candidate E has not taken a very active role in university governance.
- +3. Candidate E has consulted with many businesses and governmental groups. She places a priority on continuing such activities.
- -6. The Dean of the College of Communication Arts and Sciences has been pressuring the department to hire a minority faculty member for some time, and candidate E is a Caucasian.
- +4. The Dean has also been pressuring the department to hire more women faculty members, and candidate E is female.
- -7. The college budget is tight this year and the preferred candidate will not receive a large salary offer. During an interview candidate E indicated that she would require a salary that would be difficult for the college to pay.
- -8. In her career candidate E has worked at three different institutions. Thus, there is reason to expect that were she offered the job, and were she to accept, she would be with the university for a short time.

# Candidate F

- -1. Candidate F was an average student and graduated from a communication program that is <u>not</u> considered one of the top Ph.D. programs in the country.
- -2. Since graduation candidate F has had 4 years of university teaching experience.
- +1. Candidate F has received consistently excellent teaching ratings from his students.
- -3. It is clear from his record that he is <u>unable</u> to teach a wide variety of courses.
- +2. Candidate F publishes a great quantity of research each year.
- -4. His publications are rated by his peers sometimes to be of questionable quality.
- -5. In the past candidate F has not taken a very active role in university governance.
- +3. Candidate F has consulted with many businesses and governmental groups. He places a priority on continuing such activities.
- -6. The Dean of the College of Communication Arts and Sciences has been pressuring the department to hire a minority faculty member for some time, and candidate F is a Caucasian.
- -7. The Dean has also been pressuring the department to hire more women faculty members, and candidate F is male.
- +4. The college budget is tight this year and the preferred candidate will not receive a large salary offer. During an interview candidate F indicated that he would not require a particularly large salary.
- -8. In his career candidate F has worked at three different institutions. Thus, there is reason to expect that were he offered the job, and were he to accept, he would be with the university for a short time.

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