Journal of Personality and Social Psychology
1999, Vol. 77, No. 5, 967–978

0022-3514/99/$3.00

Mutual Enhancement: Toward an Understanding of the Collective Preference for Shared Information

Gwen M. Wittenbaum, Anne P. Hubbell, and Cynthia Zuckerman
Michigan State University

Groups tend to discuss and repeat information known by all members (shared) more than they do information known by one member (unshared). One factor that may influence this effect is the tendency for members to positively evaluate one another when mentioning shared information. Three experiments demonstrated this "mutual enhancement" effect. Experiment 1 showed that mutual enhancement was related to participants' and their partners' exchanging the same pieces of information. Experiment 2 illustrated that mutual enhancement was not related to the extent that participants liked partners or saw them as having similar opinions. Experiment 3 showed mutual enhancement in face-to-face dyads that discussed shared information. A combined analysis across the 3 experiments showed the robustness of mutual enhancement. Implications of mutual enhancement for group discussion are considered.

Small-group discussion has the potential to inform group members of information that they previously did not know, as each group member likely knows some information that other members do not. Whereas this is most obvious in groups with members of diverse backgrounds and expertise, even homogeneous groups rarely have members with identical knowledge. Conversational norms, which dictate that communicators be informative and avoid telling others information that the others already know (Grice, 1989), seem to push group members toward sharing novel information during discussion. Moreover, if members share their unique knowledge with each other, their enlightenment could lead to better group decisions (Stasser, 1992; Wittenbaum & Stasser, 1996). With this considered, it is surprising that group members do not effectively pool their unique knowledge. Instead, they tend to discuss information that all members know (shared information) at the expense of discussing information that one member uniquely knows (unshared information; see, e.g., Gigone & Hastie, 1993; Larson, Foster-Fishman, & Keys, 1994; Schittekatte & Van Hiel, 1996; Stasser, & Stewart, 1992; Stasser, Stewart, & Wittenbaum, 1995; Stasser, Taylor, & Hanna, 1989; Stasser & Titus, 1985, 1987). This bias toward discussing more shared than unshared information has been referred to as the collective information sampling (CIS) bias (Wittenbaum & Stasser, 1997).

Researchers have tried to understand why the CIS bias occurs. Stasser (1992) proposed that groups bias their discussions toward shared information not because of motivational reasons (e.g., laziness) but because of simple probability. He argued that a piece of information is more likely to be discussed by a group when the number of members who know the information increases and the probability that a single member will mention the item increases. Because more members know and thus are able to mention shared information, it is therefore more likely to be discussed by groups. However, Wittenbaum and Stasser (1996) argued that this probabilistic sampling process cannot account for the patterns of information pooling in many groups that violate the model's assumptions, such as when member expertise is known, when members differ in their status, or when shared information can be distinguished from unshared information. In these cases, other motivational, social, and cognitive dynamics may influence members' pooling of information during discussion.

Mutual Enhancement

The purpose of the present research was to demonstrate a social factor that may partly fuel the CIS bias. We proposed that shared information holds greater importance than unshared information because its exchange during discussion serves to validate members' task knowledge. When a piece of shared information is mentioned during discussion, other members can confirm its accuracy and relevance to the group task (Festinger, 1954). Conversely, unshared information, when mentioned, cannot be validated by other members and therefore acquires uncertain importance in the group. Shared information holds a social value in the group by forming a "common ground" that allows members to better understand and relate to one another (Clark & Brennan, 1991). Therefore, when shared information is mentioned during group discussion, members respond positively because the information can be validated as relevant and accurate. Because shared information can be validated, members can attest to the ability of its communicator as someone who contributes accurate, relevant, and informative knowledge. As a result, communicators of shared information are viewed as competent and knowledgeable. Moreover, recipients of communicated shared information should feel positive about their own task competence and knowledge because the communicator judged recipients' knowledge as important

Gwen M. Wittenbaum, Anne P. Hubbell, and Cynthia Zuckerman, Department of Communication, Michigan State University.

This research was completed with the help of Kim Allen, Zak Birchmeier, Marie Carpenter, Amy Hoitenga, Rhett Kukulski, Renee Lalli, Michelle Lebeuf, Karen Mueller, Brian Potter, Kristen Swanson, and Wendy Wardynski, who all assisted with data coding and collection. Special thanks go to Frank Boster, who provided helpful feedback on a draft.

Correspondence concerning this article should be addressed to Gwen M. Wittenbaum, Department of Communication, Michigan State University, East Lansing, Michigan 48824. Electronic mail may be sent to gwittenb@pilot.msu.edu.

enough to mention. In sum, the communication of common knowledge may lead to *mutual enhancement,* a process whereby group members develop enhanced evaluations of each other's task capabilities when shared information is mentioned.

Other research has shown the benefits of possessing and communicating common knowledge in groups. Kameda, Ohtsubo, and Takezawa (1997) proposed that because members with much shared information play a pivotal role in validating other group members' knowledge, these "cognitively central" members may be perceived as particularly expert and credible. Indeed, their results showed that cognitively central members were more active members in discussion, had more influence on others' choice preferences, and had their unshared information better recalled by other members when compared with "cognitively peripheral" members (who shared little knowledge in common with others). Kameda et al. argued that people may follow a "cognitive centrality implies expertise" heuristic, which is closely aligned with Chaiken and Stangor's (1987) "consensus implies correctness" heuristic. In sum, consensus on knowledge leads group members to infer that the knowledge is accurate and important and that those who know much common information possess expert knowledge, task competence, and credibility. Communicating much shared information is a way to appear cognitively central and thus task competent. We predicted that both communicators and recipients of much shared information would develop evaluations of mutual competence.

Mutual enhancement may be a social factor influencing the tendency for groups to bias discussion toward shared information. In particular, it may facilitate the bias in groups to repeat previously mentioned shared information (see, e.g., Larson, Christensen, Abbott, & Franz, 1996; Stasser et al., 1989). The expected process by which mutual enhancement promotes the dominance of shared information during group discussion is depicted in Figure 1. The figure portrays a dyad composed of Members A and B, where A is the communicator of information and B is the receiver of information. This is oversimplified given that in a face-to-face dyad, both members are simultaneously communicators and receivers. However, this one-sided portrayal of the group interaction helps to illustrate how Member A's contribution of shared information can be reinforced by Member B's positive impressions and encouragements. Therefore, the model presents neither Member B's influence on anyone other than Member A nor Member A's reception and encouragement of Member B's information contributions.

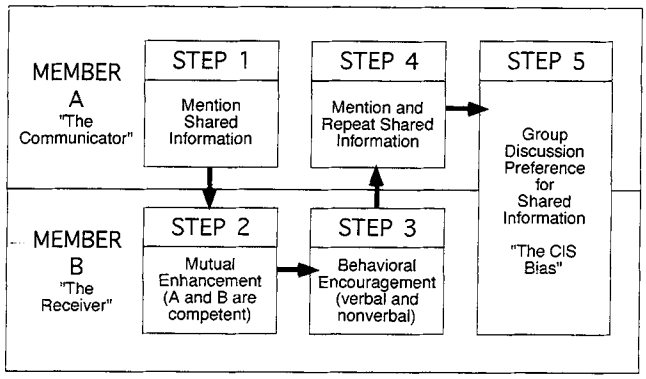

Figure 1. Model of collective information sampling (CIS) bias development from mutual enhancement.

Imagine that Member A communicates a piece of shared information to Member B (Step 1). Member B recognizes the piece of information, attests to its task relevance and accuracy, and augments his or her evaluation of Member A's task capabilities. At the same time, Member B feels an enhanced sense of self-competence given that A validated B's knowledge. The result is mutual enhancement: Member B thinks highly of A and B's task knowledge as a result of A's contribution of shared information (Step 2). Member B communicates this positive evaluation to A with behavioral encouragements (Step 3). Member B may encourage Member A nonverbally by smiling, nodding, or leaning forward. In addition, B may use verbal encouragements, such as noting the importance of the information. Member B's encouragement of Member A's shared contribution reinforces A's tendency to repeat the same shared piece of information and to mention new pieces of shared information of a similar nature (Step 4). Mentioning new pieces of shared information is likely if A infers or discovers the type of information A and B share. This exchange helps to dispose group discussion toward shared information—the CIS bias (Step 5).

Using the three experiments described herein, we tested a component of the model: the relation between Step 1 and Step 2. In dyads, does the mention of shared information lead to perceptions that both members are task capable (i.e., mutual enhancement)? In Experiments 1 and 2, we examined this question in pseudodyads consisting of a study participant and a bogus partner who was manipulated to communicate mostly shared or mostly unshared information. In Experiment 3, we examined whether members of a face-to-face dyad enhance their evaluations of themselves and a dyad partner when they discuss shared instead of unshared information.

Experiment 1

Overview and Hypotheses

The main purpose of Experiment 1 was to demonstrate mutual enhancement in dyads. As a first demonstration, the interaction was constrained so that we could manipulate the information a member mentioned and the evaluations of the receiver of the information. Does a dyad member evaluate the self and a partner more positively when that partner communicates mostly shared instead of mostly unshared information?

A second purpose of the study was to determine whether mutual enhancement varies as a function of member status. Does a low-status member who communicates much shared information reap the evaluative benefits as much as a high-status member? High status in Experiment 1 was operationalized similar to experiments by Wittenbaum (1997, 1998). Participants believed that either they or their dyad partner were given extra experience germane to the dyad's collective task. Therefore, if participants themselves received the task experience, they believed their partner did not. Conversely, if participants did not receive task experience, they believed their partner did instead. Task experience is a task-relevant status characteristic (see Berger, Fisek, Norman, & Zelditch, 1977), which could lead the experienced member to be judged as more task competent and to hold the higher status position in the dyad relative to the inexperienced member. Participants read the applications of two job candidates and expected to exchange information about the candidates, in writing, with their partner—someone who, unbeknownst to participants, did not exist. The experimenter delivered a handwritten list of information,

presumably from the participants' partners, that contained mostly shared or mostly unshared information. Participants made various ratings about the listed information and their partner.

First, we expected to find evidence of mutual enhancement in participants' global ratings of themselves and their partner. Because partners who communicate much shared information validate the knowledge of participants, these partners should be evaluated more positively in terms of their knowledge and task competence compared with partners who communicate much unshared information. In addition, the validation from shared-bias partners should make participants positively evaluate themselves. Second, we expected that shared pieces of information would be evaluated more positively than would the same pieces of information when they were unshared. Specifically, because participants rely on a "consensus implies correctness" heuristic, they should evaluate shared information as more important, relevant, accurate, and influential than unshared information. Third, we wondered whether members' status would qualify the aforementioned predicted effects. We made no specific predictions regarding the effect of member task experience on global evaluations but were able to explore its effects.

Method

Participants and Design

One hundred twenty-eight Michigan State University (MSU) undergraduate students participated in exchange for class credit in a communication course. The design of the study was a Participant Status (experienced vs. inexperienced) × Communication Bias (shared vs. unshared) between-participants factorial. Participants were assigned to experimental conditions randomly, with the restriction of maintaining equal sample sizes. Thirty-two participants were tested in each of the four independent conditions of the factorial design.

Materials

Participants read the application materials for two hypothetical academic job candidates. The total pool of application materials contained excerpts from four typical areas of a curriculum vitae (CV): education, professional employment, teaching experience, and references. For example, the education excerpts listed each degree obtained (B.S., M.B.A., Ph.D.) along with the institution, major, and year. Under each degree was one paragraph describing various awards, thesis topics, and conference activities. The professional employment excerpts listed three jobs held since being an undergraduate and described the various responsibilities and experiences for each job. The teaching experience excerpts included the titles of each of the three courses taught and a one-paragraph description of each course, how it was taught, and student evaluations obtained in the course. Finally, the reference section listed the names of three references along with excerpts from parts of each referee's letter of recommendation.

Participants read the CV of two male candidates applying for a job in the Marketing and Logistics Department. We chose male identities for both candidates to keep them equal on dimensions other than information desirability. Job candidates' gender could be inferred from the proper name indicated at the top of the CV. Each of the four CV sections were more positive for one or the other candidate such that one had more desirable education and references, whereas the other had more desirable professional employment and teaching experience. Ratings from an independent sample of 17 participants (15 women and 2 men) confirmed this desirability structure. All CV excerpts were rated as at least moderately desirable.[1] If all of the CV excerpts were considered together, both candidates should have been preferred equally often. Indeed, after reading all of the CV excerpts, pilot participants chose each candidate equally often for the marketing position, $\chi^2(1, N = 17) = 2.88$, *ns*. Therefore, there was not a demonstrably better candidate between the two.

Table 1
Experiments 1 and 2: Distribution of Shared (S) and Unshared (U) Information in Imaginary Dyads

	Imaginary dyad		Imaginary dyad	
CV excerpt	Folder A	Folder B	Folder C	Folder D
Education	S	S	U	
Professional employment	U		S	S
Teaching experience	S	S		U
References		U	S	S

Table 1 shows the distribution of information for participants and their presumed partner, representing an imaginary dyad. Each participant received one of four folders (A, B, C, or D) containing three CV excerpts for each of the two candidates. Two of the three excerpts were *shared* (available to both participants and their presumed partner) and one excerpt was *unshared* (information read by participants and not apparently by their partner). The one excerpt of the total four not read by participants represented unshared information presumably read by participants' partner. For example, participants who received Folder C presumably exchanged information with a partner who received Folder D. Folder C participants read excerpts from professional employment and references that their presumed partner read as well. Also, they read education excerpts that their presumed partner did not read, whereas their partner apparently read teaching excerpts that participants did not read. The distribution of shared and unshared information was counterbalanced such that for half of the participants, education and teaching excerpts were shared, whereas professional employment and reference excerpts were unshared. For the other half of the participants, professional employment and reference excerpts were shared, whereas education and teaching excerpts were unshared.[2]

A practice version of the personnel selection task was created for the purpose of implementing the prior-experience manipulation. Experienced participants received three CV excerpts (same types as they received for the dyad version of the task) for two different candidates applying for the same academic position. On the basis of the CV excerpts, it was apparent that one candidate was better than the other. This was done to foster a feeling of task confidence in participants with experience.

Procedure

As participants arrived for the study, they were seated at individual desks in two different rooms with up to five participants per room. Participants were told that the study concerned "how people in dyads form preferences in light of written communication." The experimenter explained that participants would be working on a personnel selection task as a dyad with an assigned partner in the other room, someone who in actuality did not exist.

[1] We included only positive information in the candidates' application materials to make them seem realistic. That is, actual job candidates generally attempt to enhance the desirability of their knowledge and skills in order to appear attractive for the job, and thus they would be unlikely to include undesirable information on their CV.

[2] The information distribution was such that each participant read two CV excerpts that supported one job candidate and one excerpt that supported the other job candidate. Therefore, participants should have preferred a particular candidate before receiving information from the partner. Indeed, before exchanging information with the partner, most participants (77%) chose the candidate supported by the two CV excerpts instead of the candidate supported by only one excerpt, $\chi^2(1, N = 128) = 38.28$, $p < .0001$.

The experimenter further argued that often in dyads, some members have more experience with the dyad's task than others. So, to apparently simulate that kind of real-world dyad, we randomly chose one (*experienced*) member to receive additional experience working on a task similar to the dyad's, while the other (*inexperienced*) member worked on a brainstorming task (generating ideas for how to improve the quality of education at MSU) for another experimenter—someone who presumably was collecting information for a university self-study. All participants in a given room held the same experience status and assumed that their partner in the other room held the opposite experience status (i.e., experienced participants assumed their partner was inexperienced, and vice versa). The experimenter assured participants that their assignment to be experienced or not was random.

After participants finished this initial task, they were given the applications of two hypothetical candidates applying for the job of assistant professor in the Marketing and Logistics Department at MSU. (Experienced participants had read similar application materials earlier for two different candidates applying for the same job.) Before reading the applications, participants explicitly were told what kind of CV excerpt they had that their partner did not and were assured that their partner had the same amount of total information as themselves.[3] Participants were instructed to read the application materials and to expect to communicate, in writing, 10 pieces of information about the candidates to their partner when finished. After reading the CV excerpts, participants privately indicated their candidate preference and returned all application materials to the experimenter.

Discussion was expected to occur by means of written information communicated by each dyad member. Therefore, each participant was asked to list exactly 10 pieces of information that she or he had read about one or both candidates and wanted to share with her or his partner. These written lists were collected in anticipation of switching the lists between the dyad members. Instead, the experimenter returned with bogus handwritten lists of information created by the experimenter but presumably written by participants' partner. These bogus lists included mostly shared information (*shared communication bias*) or mostly unshared information (*unshared communication bias*). Lists with a shared bias contained 2 unshared pieces of information in the 2nd and 9th spots and 8 shared pieces. Lists with an unshared bias contained 2 shared pieces of information in the 2nd and 9th spots and 8 unshared pieces.

For each piece of information presumably listed by their partner, participants rated its importance, relevance, accuracy, and impact on their own candidate preference. They then indicated their candidate preference a second time. Last, participants made global impression ratings of themselves and their partner. They rated their own and their partner's knowledge and task competence. In addition, two items were included as checks on the communication-bias manipulation.

Participants were verbally debriefed regarding the general purpose of the study. In addition, they were given an information sheet detailing the purpose of the study and were invited to fill out a mailing label to receive a copy of the hypotheses and results after completion of the study.

Results

Manipulation Checks

Communication bias. To determine whether participants could gauge the degree of "sharedness" bias in their partner's written list, we asked participants to complete two questions. Members rated their agreement with the following statements on scales ranging from 0 (*strongly disagree*) to 9 (*strongly agree*): (a) "On the whole, the informational items listed by my partner were not familiar to me," and (b) "On the whole, the informational items listed by my partner were not ones that I originally read about the candidates." Because ratings on the two scales were correlated, $r(126) = .69$, $p < .0001$, we created a composite measure by averaging the two ratings. The averaged composite was analyzed in a Participant Status (experienced vs. inexperienced) × Communication Bias (shared vs. unshared) between-subjects, factorial analysis of variance (ANOVA). There was only a main effect of communication bias, indicating that participants rated partners with an unshared communication bias as having more novel and unique contributions ($M = 4.64$) than partners with a shared bias ($M = 2.19$), $F(1, 124) = 42.57$, $p < .0001$. Therefore, communication bias was successfully manipulated.

Participant status. The task experience manipulation was designed to instill higher status, and therefore greater feelings of task competence, in experienced compared with inexperienced participants. Participants rated their agreement on a scale ranging from 0 (*strongly disagree*) to 9 (*strongly agree*) with the statement "I feel competent at determining the better job candidate." Agreement ratings were analyzed in a Participant Status (experienced vs. inexperienced) × Communication Bias (shared vs. unshared) between-subjects, factorial ANOVA. There was only a main effect of participant status, indicating that experienced participants ($M = 6.53$) judged themselves as more able to determine the better job candidate than did inexperienced participants ($M = 5.62$), $F(1, 124) = 6.44$, $p < .05$. Therefore, the experience manipulation successfully evoked stronger feelings of task competence from experienced participants compared with inexperienced participants.

Global Impression Ratings: Knowledge and Task Competence

After reading their partner's supposed list of information, participants rated their agreement on scales ranging from 0 (*strongly disagree*) to 9 (*strongly agree*) with the following two statements: (a) "I feel knowledgeable about the job candidates," and (b) "My partner is knowledgeable about the job candidates." Participants also rated their agreement on the same scales with the following two statements: (a) "I feel competent at determining the better job candidate," and (b) "My partner is competent at determining the better job candidate." Because ratings of self-knowledge and competence were correlated, $r(126) = .62$, $p < .0001$, as were ratings of partner knowledge and competence, $r(126) = .68$, $p < .0001$, we created composite measures of self-evaluation and partner evaluation by averaging the knowledge and competence ratings for self and partner, respectively.

Evaluation ratings were analyzed in a Participant Status (experienced vs. inexperienced) × Communication Bias (shared vs. unshared) × Member Rated (self vs. partner) mixed factorial ANOVA, with each participant making ratings for both self and partner (i.e., a repeated measure). Evidence of mutual enhancement would arise if participants evaluated themselves and their partner more favorably when the partner's communication bias was shared rather than unshared.

Results showed the expected main effect of communication bias, $F(1, 124) = 9.10$, $p < .01$, whereby evaluation ratings were higher for the shared-bias ($M = 6.57$) than for the unshared-bias

[3] In Experiment 1, participants were not explicitly told their partner's area of unshared information. That information was left to be inferred by participants. However, in Experiment 2, the materials were revised to indicate explicitly the partner's unshared information.

(M = 5.79) condition. However, this main effect was qualified by an interaction between communication bias and member rated, $F(1, 124) = 9.63, p < .01$ (see Figure 2). Specifically, participants rated their partner as more knowledgeable and task competent when the partner's communication was biased toward shared (M = 6.80) rather than unshared (M = 5.66) information, $F(1, 124) = 16.26, p < .001$. Although a similar pattern emerged for participants' evaluation of themselves (shared bias = 6.33; unshared bias = 5.92), this difference was not statistically significant, $F(1, 124) = 2.11$, *ns*. Participants' status failed to qualify these effects. There was no significant interaction of participant status with communication bias, $F(1, 124) = 2.65$, *ns*, or with communication bias and member rated, $F(1, 124) = 0.01$, *ns*.

Although evaluations of dyad members were more positive when partners communicated mostly shared instead of mostly unshared information (i.e., mutual enhancement), the pattern emerged statistically only for ratings of partners. Partners who communicated much shared information, and thus validated participants' own knowledge, were evaluated more positively than partners who did not play a validating role. Participants rated their partner as more knowledgeable and task competent when that partner biased his or her communication toward common rather than unique information. Moreover, the prior experience of participants (as well as that of their partner) did not qualify these effects.

Informational Item Ratings

The informational item ratings assessed participants' impressions of the specific items of information contributed by their partner. Results from the global impression measures imply that communicating large proportions of shared information was valued more than communicating mostly unshared information. Similarly, we expected that shared pieces of information would be more positively evaluated than unshared pieces of information. Specifically, shared items should be judged as more important, relevant, accurate, and influential than unshared items.

To explore this possibility, members rated their agreement with four statements on 10-point scales ranging from 0 (*strongly disagree*) to 9 (*strongly agree*) for each item of information presumably listed by their partner: (a) "This information is an important piece of information about the candidate," (b) "This information is a relevant piece of information about the candidate," (c) "This is an accurate piece of information about the candidate," and (d) "This information may influence which candidate I prefer." Each of these four ratings across the 10 items was compiled into four measures, each with an average rating for shared items and an average rating for unshared items. So, for example, participants' information importance ratings in the shared-bias condition were averaged across the importance ratings for the two listed pieces of unshared information and averaged across the importance ratings for the eight listed pieces of shared information. This created importance, relevance, accuracy, and influence ratings for both shared and unshared information. Measures of item importance, relevance, accuracy, and influence were analyzed in a Participant Status (experienced vs. inexperienced) × Communication Bias (shared vs. unshared) × Information (shared vs. unshared) mixed factorial ANOVA, with the information factor being a repeated measure.

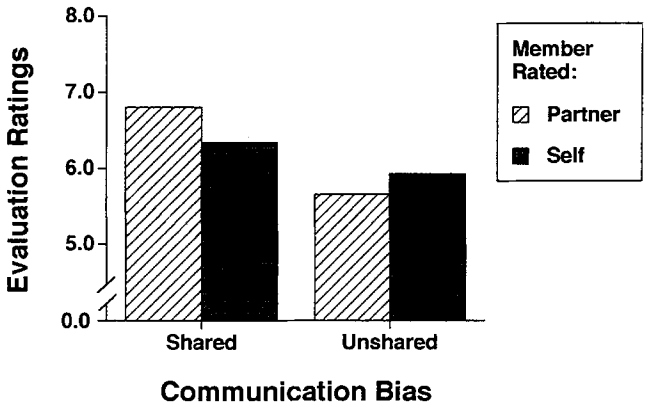

Figure 2. Experiment 1: Evaluation ratings as a function of communication bias and member rated.

Results for all four measures showed only a main effect of information. Shared information was rated as more important information about the candidates (M = 6.42) than was unshared information (M = 5.83), $F(1, 124) = 12.54, p < .001$. Shared information was rated as more relevant information about the candidates (M = 6.39) than was unshared information (M = 5.76), $F(1, 124) = 16.05, p < .0001$. Shared information was rated as more accurate information about the candidates (M = 7.46) than was unshared information (M = 6.29), $F(1, 124) = 64.59, p < .0001$. Last, shared information was rated as having more of an impact on participants' candidate preference (M = 5.64) than was unshared information (M = 5.11), $F(1, 124) = 9.88, p < .01$. Participant status failed to qualify the effects on any of these four measures. In sum, when participants rated each of their partner's contributed items of information for its importance, relevance, accuracy, and influence, shared items came out on top for all four measures.

Relation Between Evaluations and Similarity in Written Lists

The evaluation results showed that partners with a shared communication bias were judged as more knowledgeable and task competent than partners with an unshared communication bias. However, it is not clear whether the shared-bias partner was preferred because of the sharedness of the information or because the specific pieces of information communicated by the partner were more likely to match the pieces listed by participants on their own lists. If the high evaluations of the shared-bias partner were being driven by a validation process, then we would expect a positive correlation between those evaluations and the degree of overlap in participants' lists and partners' bogus lists.

The overlap of information in participants' and partners' written lists could range between zero and eight in the shared-bias condition and between zero and two in the unshared-bias condition. Because of this confound, participants in the shared-communication-bias condition experienced more information matches between their own and the partner's list (M = 2.39) than did participants in the unshared-bias condition (M = 0.77), $F(1, 124) = 55.20, p < .0001$. Moreover, the more similar participants' and partners' lists were, the higher evaluations (knowledge and task competence) for the self were, $r(126) = .21, p < .01$, and partner, $r(126) = .19, p < .05$. These correlations imply that the

stronger the partners' validation of participants' knowledge was, the better participants felt not only about their partner's capabilities but about their own capabilities as well (i.e., mutual enhancement). However, it is unclear whether the correlations with evaluations were driven by written-list similarity or the communication-bias manipulation, given the confound. Therefore, we correlated self and partner evaluations with list similarity only for participants in the shared-communication-bias condition. Results showed that, when holding communication bias constant, greater list similarity was associated with higher evaluations of the self, $r(62) = .27$, $p < .05$, but not of the partner, $r(62) = .02$, *ns*.

These results suggest that written-list similarity between participants and partners underlies the tendency for participants to evaluate themselves more positively when the partner communicates much shared information. However, partners who communicate much shared information are positively evaluated whether they duplicate participants' contributed information or not.

Discussion

Experiment 1 demonstrated findings consistent with mutual enhancement. In imagined dyads, participants judged partners who communicated mostly shared information to hold more task knowledge and competence relative to partners who conveyed much unshared information. Although it did not reaching traditional levels of statistical significance, there was a tendency for participants to evaluate themselves more positively when their partner communicated much shared information. Mutual enhancement may be driven by the fact that items of information were judged as more important and relevant to the task when they were shared than when they were unshared. Moreover, participants were more likely to judge information as accurate and influential on their decision preferences when it was shared than when it was unshared. Therefore, group members who communicate much of the kind of information that can be validated as accurate, important, and relevant come to be judged as possessing more task competence and knowledge as a result.

The consequences of communicating much shared or much unshared information were unaffected by group members' status. The benefits ascribed to partners who communicated much shared information applied to both experienced and inexperienced partners. Status differentiation in groups may result from members' beliefs about one another based on their communication bias. Members, regardless of prior experience, may attain higher status by communicating much shared information. That is, members can bias their contributions to discussion in a way that will help them acquire high status in the group. Whether members actually use information strategically to gain status is a question for future research.

Experiment 2

We have proposed that mutual enhancement is the result of a social-validation process. Members who communicate shared information are judged as task capable because their contributions can be validated by others as task relevant and accurate. Recipients of communicated shared information also should evaluate themselves as task capable, given that their knowledge was important enough for another member to mention it during discussion. The evaluative enhancement of both communicators and receivers of shared information defines mutual enhancement. However, evidence of recipients' enhanced self-evaluation was weak in Experiment 1. Although participants tended to rate themselves as more capable when their partner communicated mostly shared instead of mostly unshared information, this effect was not strong enough to reach statistical significance. Despite this fact, participants' self-competency ratings rose with increases in similarity between their own and their partner's communicated shared information. So, it seems that increased validation from partners was associated with participants' increased perceptions of self-competence. However, stronger evidence is needed to demonstrate the self-evaluation component of mutual enhancement. Experiment 2 was designed to provide another test of mutual enhancement.

In Experiment 2, we also attempted to identify the type of validation process affecting mutual enhancement. We assumed that the sharedness of information provides the validation for group members. However, validation could be a function of perceived similarity between participants' and partners' presumed decision preference. The unshared information presumably possessed by participants' partners supported the opposite job candidate from the one that participants should have preferred. Therefore, the partner who communicated much of this unshared information would have seemed to disagree with participants on the preferred job candidate more than the shared-bias partner. Thus, shared-bias partners were similar to participants in that they appeared to prefer the same job candidate as participants. It is possible that the positive evaluations of partners with a shared communication bias were due to the validating role of partners' presumed candidate preference. In Experiment 2, we assessed participants' perceptions of their partners' candidate preferences to see whether this was the case.

Finally, the mutual enhancement effects shown in Experiment 1 may have been due to participants liking the shared-bias partner more than the unshared-bias partner. Shared-bias partners may have been judged as more similar to participants than unshared-bias partners, given their information contributions and presumed decision preference. Such perceived similarity could lead to greater liking of the shared-bias partner (Byrne, 1971). The mutual enhancement process, as we have outlined it, is not a function of group members liking communicators of shared information. To determine whether indeed mutual enhancement is associated with participants' liking of their partner, we collected affective measures in Experiment 2.

Overview and Hypotheses

In Experiment 2, we attempted to replicate the mutual enhancement effect. As in Experiment 1, participants exchanged 10 pieces of written information about two job candidates with a partner who communicated mostly shared or mostly unshared information. Participants made global evaluations of self and partner, as well as completing additional measures assessing similarity and liking of the partner and inferences regarding the partner's candidate preference. We expected to find evidence of mutual enhancement: Partners and participants would be judged as more task capable when partners communicated much shared information instead of much unshared information. We also explored the possibility that mutual enhancement was related to liking of the partner and perceived similarity of partners' candidate preference with participants' preference.

Method

Participants and Design

Forty-eight MSU undergraduate students participated in exchange for class credit in a communication course. Communication bias (shared vs. unshared) was the between-participants factor. Participants were assigned to experimental conditions randomly, with the restriction of maintaining equal sample sizes. Twenty-four participants were tested in each of the two independent conditions.

Materials

Participants read the application materials for the same two hypothetical academic job candidates that were used in Experiment 1. Moreover, information was distributed to participants in the same manner (see Table 1).[4]

Procedure

Experiment 2 was conducted in the same manner as Experiment 1, with exceptions noted below. Before participants read the job candidate application materials, the experimenter told participants that their partner in the other room did not differ from them in any significant way and that assignment to rooms was random. Participants were told that they would be exchanging 10 pieces of information about the candidates with their partner in the other room.

Participants read the application materials, indicated their candidate preference and certainty, and listed 10 pieces of information about the candidates to share with their partner. A bogus partner's list containing mostly shared information (shared bias) or mostly unshared information (unshared bias) was returned to each participant. No mention was made of the partner's candidate preference. Participants then indicated their candidate preference a second time. Last, they made global impression ratings of themselves and their partner, including measures of similarity, liking, and presumed similarity of their partner's preference. Participants were verbally debriefed and invited to receive a copy of the results after completion of the study.

Results

Manipulation Check

The check on the communication-bias manipulation consisted of the same two items as used for Experiment 1, except participants made agreement ratings on a scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*). Because the two scales were correlated, $r(48) = .61$, $p < .0001$, a composite measure was created by averaging the two ratings. The averaged composite was analyzed in a communication bias (shared vs. unshared) between-subjects ANOVA. Participants rated partners with an unshared communication bias as having more novel and unique contributions ($M = 5.29$) than partners with a shared bias ($M = 3.54$), $F(1, 46) = 10.28$, $p < .001$. Therefore, communication bias was successfully manipulated.

Global Impressions: Knowledge, Task Competence, and Credibility

After reading their partner's supposed list of information, participants made the same task knowledge and task competence ratings for self and partner as they did in Experiment 1, except their agreement was rated on a scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*). In addition, they rated their partner's and their own source credibility as agreement on scales ranging from 1 (*strongly disagree*) to 9 (*strongly agree*) with the statements "My partner is a credible source of information about the job candidates" and "I feel that I am a credible source of information about the job candidates." Ratings of knowledge, competence, and credibility were averaged into a composite evaluation measure for both self (Cronbach's $\alpha = .81$) and partner (Cronbach's $\alpha = .77$).

Evaluation ratings were analyzed in a Communication Bias (shared vs. unshared) × Member Rated (self vs. partner) mixed factorial ANOVA, with each participant making ratings for both self and partner (i.e., a repeated measure). Evidence of mutual enhancement would arise if participants evaluated their partner and themselves more favorably when the partner's communication bias is shared rather than unshared.

Results showed the expected main effect of communication bias, $F(1, 46) = 9.79$, $p < .01$, whereby evaluation ratings were higher for the shared-bias ($M = 7.01$) than the unshared-bias ($M = 6.04$) condition. Moreover, the interaction between communication bias and member rated was not significant, $F(1, 46) = 2.02$, *ns* (see Figure 3). Participants not only rated the shared-bias partner higher ($M = 6.92$) than the unshared-bias partner ($M = 5.89$), $F(1, 46) = 8.28$, $p < .01$, but they also rated themselves higher ($M = 7.11$) when the partner communicated much shared instead of much unshared information ($M = 6.19$), $F(1, 46) = 6.59$, $p < .01$. These results show evidence of mutual enhancement: Partners who validate participants' knowledge about the job candidates by sharing common information are perceived to hold more knowledge about those candidates, competency to choose between them, and credibility as sources of information than partners who provide little validation of shared information. Moreover, the validation that shared-bias partners provided made participants feel better about their own task capabilities.

Relation Between Evaluations and Inferred Partner Preference

The evaluation results showed that participants and partners were evaluated more positively when partners demonstrated a shared communication bias. Was mutual enhancement due to validation provided by the shared-bias partner's presumed preference similarity? To address this question, we asked participants to rate their agreement on a scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*) with the statement "My partner liked the same job candidate that I did." Participants in the shared-bias condition ($M = 5.88$) did not judge their partner's preference as more similar than participants in the unshared-bias condition ($M = 5.29$), $t(46) = 1.20$, *ns*. Therefore, the mutual enhancement shown by participants whose partner communicated mostly shared

[4] As in Experiment 1, participants should have preferred a particular candidate before exchanging information with the partner. Indeed, before receiving information from the partner, most participants (73%) chose the candidate supported by two CV excerpts instead of the candidate supported by only one excerpt, $\chi^2(1, N = 144) = 10.83$, $p < .001$.

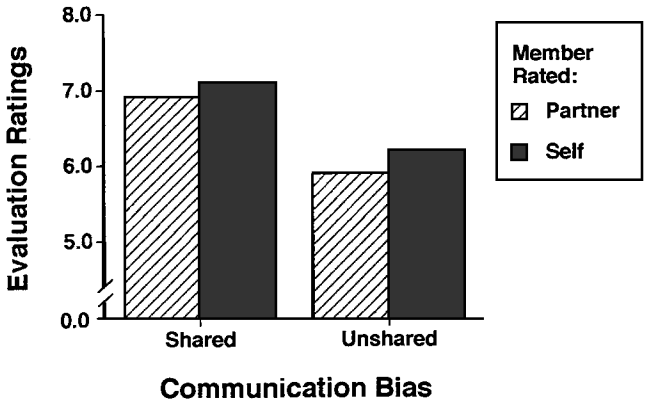

Figure 3. Experiment 2: Evaluation ratings as a function of communication bias and member rated.

information was unlikely due to inferences of greater preference similarity.[5]

However, if inferences of partners' candidate preference could vary, would such variation be associated with mutual enhancement? To this end, we correlated participants' preference similarity ratings with their evaluations of themselves and their partner. Results showed that greater inferred preference similarity with the partner was associated with higher evaluations of the partner, $r(46) = .31, p < .05$, but not of the self, $r(46) = .05$, *ns*. Therefore, the more participants perceived that their partner was validating their own candidate preference, the greater they judged their partner's (but not their own) task capabilities. Opinion similarity can provide the validation to produce enhanced evaluations of the similar others. However, this process cannot explain the mutual enhancement effects demonstrated in Experiment 2, given that communication bias was unrelated to inferences of perceived preference similarity.

Relation Between Evaluations and Liking

Was mutual enhancement due to participants liking partners more when they communicated much shared information? To explore this question, we asked participants to rate their agreement on scales ranging from 1 (*strongly disagree*) to 9 (*strongly agree*) with five statements related to liking: (a) "I like my partner," (b) "I feel that I would get along with my partner," (c) "I respect my partner," (d) "I value my partner's contribution to the task at hand," and (e) "I would want to work with my partner again." These five measures were averaged to form a composite liking measure (Cronbach's $\alpha = .86$), which was used in subsequent analyses.

The proportion of shared information communicated by partners affected how participants evaluated themselves and partners. The next question is whether partners' communication bias affected participants' liking of partners. A *t* test revealed that shared-bias partners ($M = 6.39$) were liked no more than unshared-bias communicators ($M = 6.26$), $t(46) = .35$, *ns*. Therefore, the mutual enhancement shown by participants when their partner communicated mostly shared information was unlikely due to greater liking of the partner.

However, if liking of the partner could vary, would such variation be associated with mutual enhancement? To this end, we correlated participants' partner-liking ratings with their evaluations of themselves and their partner. Results showed that liking was uncorrelated with evaluations of the self, $r(46) = .09$, *ns*, yet positively correlated with evaluations of the partner, $r(46) = .40$, $p < .01$. Therefore, increase in participants' liking of the partner was associated with increase in evaluations of the partner, but not of the self. Partner liking can produce enhanced competency evaluations of partners. However, this process cannot explain the mutual enhancement effects demonstrated in Experiment 2, given that communication bias was unrelated to liking of the partners.

Discussion

Experiment 2 produced data consistent with mutual enhancement. Partners who communicated much shared information were judged as more task competent, knowledgeable, and credible than partners who communicated much unshared information. This validation process also affected participants' evaluations of themselves—an effect that emerged more strongly in Experiment 2 than in Experiment 1. When their partner's knowledge validated their own, participants judged themselves as more knowledgeable, competent, and credible. This finding suggests that when group members communicate much shared information, all members may experience a collective high—judging themselves and other members as quite capable. Furthermore, this mutual enhancement was unlikely due to perceived opinion similarity between participants and partners or participants' liking of partners. Shared-bias partners were not liked more than unshared-bias partners, nor were they judged as having more similar opinions. The evaluative benefits accrued to communicators and receivers of shared information seem due to the validating role of the information rather than validation of opinions or liking.

Experiment 3

In Experiments 1 and 2, we constrained dyadic interaction to written communication with a bogus other in order to provide initial demonstrations of mutual enhancement. However, mutual enhancement presumably is a process that occurs in freely interacting groups. We designed Experiment 3 to test whether mutual enhancement occurs in face-to-face, interacting, ad hoc dyads.

Demonstrating mutual enhancement in face-to-face dyads would seem more difficult than constraining interaction, as in Experiments 1 and 2. First, in face-to-face dyads, members can form inferences about partners' capabilities on the basis of salient physical features (e.g., physical attractiveness, age, race), perceived similarity (e.g., style of dress), or competency as a communicator (e.g., assertiveness, confidence). These factors may add random variance to evaluations of partners, making it difficult to find evidence of mutual enhancement. Second, some group tasks may suppress mutual enhancement. In Experiment 2, we found that perceived preference similarity was associated with higher evaluations of partners' competency. Because decision-making groups communicate their decisional preferences, whether members agree or disagree with each other, rather than the kind of

[5] Additional analyses for Experiment 2 showed that partners with a shared communication bias ($M = 5.32$) were not judged as more similar to participants than were unshared-bias partners ($M = 5.23$), $F(1, 46) = 0.21$, *ns*.

information communicated, may drive their competency ratings. Therefore, it may be difficult to demonstrate mutual enhancement in groups that work on decision-making tasks relative to tasks that do not require preference exchange.

Overview and Hypotheses

In Experiment 3, we attempted to demonstrate mutual enhancement in interacting dyads. Previously unacquainted dyad members read identical or different information about two job candidates. During discussion, they either reached an agreement on the better candidate of the two or collectively recalled candidate information without sharing their decisional preferences. After discussion, members made the same global evaluations as did participants in Experiment 2.

We expected to find evidence of mutual enhancement: Members would judge themselves and their partner as more task capable in dyads with identical rather than different information. This result should occur because dyads with the same information can discuss only shared information whereas dyads with different information can discuss only unshared information. Because members with all shared information can validate each other's knowledge, we predicted they would come to see each other as competent, knowledgeable, and credible communicators. We also explored the possibility that mutual enhancement would be more prevalent in collective-recall dyads than in decision-making dyads. Because preference similarity is associated with higher competency evaluations, variation in initial preference similarity may erase mutual enhancement in decision-making dyads. However, collective-recall dyads exchange only information and not preferences. So for these dyads, variation in preference similarity should not affect subsequent competency judgments.

Method

Participants and Design

One hundred sixty MSU undergraduate students participated in exchange for class credit in a communication course. The design of the study was a Communication Bias (shared vs. unshared) × Task Type (decide vs. recall) between-groups factorial, with a two-member dyad as the unit of analysis. Participants were assigned to dyads and experimental conditions randomly, with the restriction of maintaining equal sample sizes. Twenty dyads were tested in each of the four independent conditions of the factorial design.

Materials

Participants read application materials for the same two job candidates as described in Experiments 1 and 2. However, in Experiment 3, each participant read two instead of three excerpts from the CV. Two forms of the CV were created: Form A contained excerpts from each candidate's education and professional employment, and Form B contained excerpts from each candidate's teaching and references. Thus, each member received one excerpt that supported one candidate and one excerpt that supported the other. This was done to equalize preference for the two candidates.

Procedure

As participants arrived for the study, they were randomly assigned to one of three small rooms with 2 participants per room. Participants who knew one another were not placed in the same room. The dyads in each room were seated across from each other at a table, separated by a partition. Participants were told that the study concerned "how people in dyads form preferences in light of discussion." The experimenter explained that participants would be working on a personnel selection task as a dyad with the opportunity later to discuss the job candidates.

Participants were given either the same (shared communication bias, or shared bias) or different (unshared communication bias, or unshared bias) application information about the job candidates. Dyad members in the shared-bias condition each received the same form of the CV, either Form A or Form B. Half of the dyads in this condition received Form A, and the other half received Form B. For dyad members in the unshared-bias condition, one member received Form A and the other received Form B. Before reading the applications, participants were told that they and their partner may receive information about the job candidates that the other did not have. However, they were assured that each dyad member possessed the same total amount of information. Participants were instructed to read the application materials and to expect to discuss the candidates with their partner when finished. Participants in the *decide* condition were told that their dyad collectively would be deciding on the better candidate of the two, whereas participants in the *recall* condition expected collectively to recall as much candidate information as possible. After reading the CV excerpts, participants privately indicated their candidate preference and returned all application materials to the experimenter.

Immediately before discussion, dyads were moved to adjacent seats and reminded of their task. Dyads in the decide condition were told to reach a decision on the better candidate of the two in any manner they saw fit. Furthermore, they were asked to discuss both facts about the candidates and their candidate preferences. Dyads in the recall condition were told to recall collectively as many facts about the candidates as possible. Members recorded recalled facts in a recall booklet. Also, these dyads were asked to discuss information about the candidates without sharing their candidate preferences. Each dyad was given up to 15 min to complete their discussions.

After discussion, members were again separated at opposite ends of a table to complete a questionnaire. They indicated their candidate preference a second time and made global impression ratings of themselves and their partner. They rated their own and their partner's knowledge, task competence, and credibility. In addition, items were included as checks on the communication-bias and task-type manipulations. Participants were debriefed verbally and invited to fill out a mailing label to receive a copy of the results after completion of the study.

Results and Discussion

Manipulation Checks

Communication bias. The check on the communication-bias manipulation consisted of the same two items as used for Experiment 2. Because the two scales were correlated, $r(78) = .92$, $p < .0001$, we created a composite measure by averaging the two ratings. The averaged composite was analyzed in a Communication Bias (shared vs. unshared) × Task Type (decide vs. recall) between-groups factorial ANOVA, with a two-person dyad as the unit of analysis. Dyad members in the unshared-bias condition rated partners as having more novel and unique contributions ($M = 7.09$) than partners in the shared-bias condition ($M = 2.70$), $F(1, 76) = 139.24$, $p < .0001$. Therefore, communication bias was successfully manipulated.

Task type. We used four questions to assess successful manipulation of task type. Participants rated their agreement on a scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*) with the following four statements: (a) "My partner and I discussed which candidate we preferred," (b) "My partner and I discussed facts about the candidates instead of which candidate we thought was

better," (c) "My partner and I tried to remember together as much information about the candidates as possible," and (d) "My partner and I tried to decide together on the best candidate for the job." Each measure was analyzed in a Communication Bias (shared vs. unshared) × Task Type (decide vs. recall) between-groups factorial ANOVA.

Decision-making dyads (M = 8.50) reported discussing their preferred candidates more than did collective-recall dyads (M = 1.96), $F(1, 76) = 369.98$, $p < .0001$. In addition, decision-making dyads (M = 8.01) reported trying to determine the better candidate more than did collective-recall dyads (M = 2.36), $F(1, 76) = 339.49$, $p < .0001$. However, collective-recall dyads (M = 8.56) were more likely than decision-making dyads (M = 7.09) to agree that they discussed candidate facts instead of preferences, $F(1, 76) = 37.02$, $p < .0001$. Also, collective-recall dyads (M = 8.64) were more likely than were decision-making dyads (M = 7.36) to agree that they tried to remember as much candidate information as possible, $F(1, 76) = 31.03$, $p < .0001$. All measures suggest that the different task demands of collective recall and decision making were successfully manipulated.

Global Impressions: Knowledge, Task Competence, and Credibility

After discussion, participants made the same task knowledge, task competence, and credibility ratings for self and partner as in Experiment 2. Ratings of knowledge, competence, and credibility were averaged into a composite evaluation measure for both self (Cronbach's α = .83) and partner (Cronbach's α = .85). Evaluation ratings were analyzed in a Communication Bias (shared vs. unshared) × Task Type (decide vs. recall) × Member Rated (self vs. partner) mixed factorial ANOVA, with each dyad member making ratings for both self and partner (i.e., a repeated measure). Evidence of mutual enhancement would arise if members were to evaluate their partner and themselves more favorably when they discussed shared instead of unshared information.

Results showed the expected main effect of communication bias, $F(1, 76) = 6.52$, $p < .05$, whereby evaluation ratings were higher for the shared bias (M = 6.76) than the unshared bias (M = 6.19) condition. Moreover, the interaction between communication bias and member rated was not significant, $F(1, 76) = 0.04$, *ns* (see Figure 4). Members of dyads that discussed all shared information rated their partner higher (M = 6.76) than members that discussed all unshared information, (M = 6.18), $F(1, 76) = 6.37$, $p < .05$. Also, dyad members rated themselves higher when they discussed all shared (M = 6.76) instead of all unshared information (M = 6.21), $F(1, 76) = 5.92$, $p < .05$. These results show evidence of mutual enhancement: Members of dyads that discussed validating shared information perceived themselves and their partner as more knowledgeable about those candidates, competent to choose between them, and credible as sources of information than members of dyads that discussed unshared information.[6]

Was mutual enhancement more prevalent in collective-recall dyads than in decision-making dyads? Surprisingly, the task-type factor failed to produce significant effects alone or in combination with the other factors. Dyad members rated each other more positively when shared instead of unshared information was discussed for both decision-making (shared bias = 6.68; unshared bias = 6.18), $F(1, 76) = 5.20$, $p < .05$, and collective-recall dyads (shared bias = 6.85; unshared bias = 6.22), $F(1, 76) = 7.99$, $p < .05$. Thus, there was no difference in the communication-bias effect for decision-making versus collective-recall dyads, $F(1, 76) = 0.07$, *ns*.

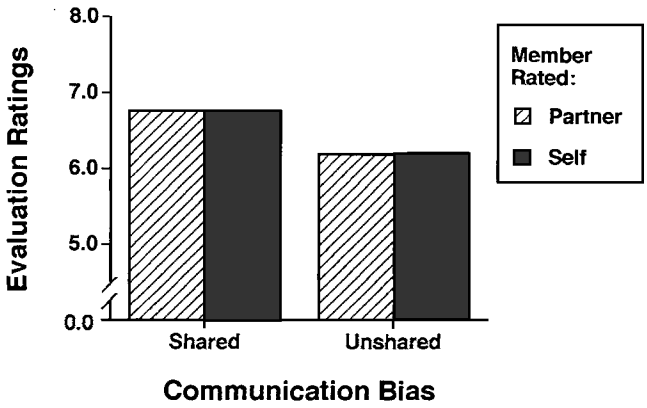

Figure 4. Experiment 3: Evaluation ratings as a function of communication bias and member rated.

In sum, the mutual enhancement effect seems robust in that it emerged in face-to-face, interacting dyads despite extraneous factors that may have attenuated it. In these dyads, members had the opportunity to acquire information about their partner—their appearance, demographic groups, activities and interests, and interaction style. If members did use such information to evaluate the task capabilities of their partner, they did not use it to the extent that it erased the mutual enhancement effect. Members still evaluated one another as more task capable when they discussed shared instead of unshared information. Moreover, they did so even in groups that exchanged decision preferences—something that could have eliminated the effect. This result speaks to the perseverance of mutual enhancement across two common group tasks: decision making and collective recall.

Combined Analysis Across Experiments

Dyad members evaluated themselves and their partner more positively when shared instead of unshared information was communicated. This mutual enhancement effect was demonstrated in both pseudo and face-to-face dyads. However, we did not find a significant effect of enhancement for self-evaluations in Experiment 1. To provide a better assessment of whether self-evaluations are enhanced, we combined the data from the three experiments (N = 336) and tested for a self-enhancement effect. Evaluation ratings for the self were aggregated across the three experiments and analyzed in a Communication Bias (shared vs. unshared) × Experiments (1 vs. 2 vs. 3) between-subjects factorial ANOVA. Results showed only a main effect of communication bias, $F(1, 330) = 11.35$, $p < .001$. Participants rated themselves as more task capable when shared information (M = 6.65) was communicated

[6] This mutual enhancement effect is unlikely due to members of dyads with a shared communication bias liking one another or perceiving a similar candidate preference more than members of dyads with an unshared bias. As in Experiment 2, communication bias was unrelated to measures of liking, $F(1, 76) = 1.31$, *ns*, and perceived candidate similarity, $F(1, 76) = 1.51$, *ns*.

rather than when unshared information (M = 6.09) was communicated. Moreover, the effect of communication bias was not qualified by experiments, $F(2, 330) = 0.48$, *ns*. Therefore, the nonsignificant self-enhancement effect in Experiment 1 was not significantly different from the self-enhancement effects in Experiments 2 and 3. The smaller effect of communication bias for self-ratings in Experiment 1 falls within the range expected by sampling error. In sum, combining the data from all three experiments demonstrated the mutuality of enhancement. Dyad members evaluated not only their partner but also themselves as more task capable when shared information was communicated.

General Discussion

Prior theories of the information-pooling process in decision-making groups have considered the CIS bias to be a result of probability (e.g., Larson et al., 1994; Stasser, 1992). That is, shared information is discussed by groups more than unshared information because shared information is known by more people and has more sampling opportunities during early discussion. However, Wittenbaum and Stasser (1996) argued that probability models cannot account for the CIS patterns observed in many groups where members know what information is shared and unshared. Indeed, many motivational, social, and affective processes likely feed, augment, and suppress the CIS bias.

We propose that mutual enhancement may be one reason why groups collectively prefer shared information during discussion. Shared information validates members' knowledge and eases the interaction by helping members relate to one another. Those who communicate shared information receive positive evaluations from other members for doing so. Moreover, recipients of shared information feel better about their own task knowledge when another member mentions their information. Members who are positively reinforced (verbally or nonverbally) for communicating shared information may continue to do so because they enjoy the validation and encouragement from others. It may be this interactive validation process that fuels a group's tendency to repeat previously mentioned shared information (e.g., Larson et al., 1996; Stasser et al., 1989). That is, members may prefer to mention and repeat the kind of information that other members encourage and view as important.

Mutual enhancement cannot likely explain all of the variance in why groups prefer shared information during discussion. Other factors may fuel the CIS bias as well. In particular, the bias in initial mentioning of shared information during group discussion (Step 1 in Figure 1) may be due in part to probability. Because a piece of shared information potentially can be mentioned by all members, it is more likely to emerge during group discussion. When shared information is mentioned, the behavioral encouragements stemming from mutual enhancement facilitate the discussion of more shared information—the CIS bias. Although probability may affect initial mentioning of shared information, our model presumes that mutual enhancement and the communication of these positive evaluations augment groups' discussion preference for shared information. Therefore, mutual enhancement is a process that leads to the CIS bias.[7]

It is important to note that mutual enhancement may be limited to communication between group members who are not well acquainted. In such groups, members may feel more comfortable discussing information to which they know others can relate. In this way, members can establish others' confidence in their contributions before trying their hands at riskier, novel information. Therefore, when members do not know one another well, they may expect each other to establish credibility and expertise through the communication of shared information. Members who do so are rewarded with positive evaluations from others. This idea is consistent with Hollander's (1958, 1964) notion of "idiosyncrasy credit." Mentioning shared information may help unacquainted members gain the social credit to risk subsequent innovative actions, such as mentioning unshared information. However, groups of friends may evaluate each other more positively when they share novel information—information that is risky to share because other members need to accept that the communicator is correct before they can use it. In friendship groups, members may not need to establish their credibility as communicators because friends already trust one another, thereby accepting unshared information when mentioned. Indeed, Gruenfeld, Mannix, Williams, and Neale (1996) found that groups of familiar individuals pooled novel information better than groups of strangers. Therefore, mutual enhancement may be less pervasive in well-acquainted groups.

We tested the relation between Step 1 and Step 2 in Figure 1: The communication of shared information leads to mutual enhancement. The next step in our research program will be to demonstrate that mutual enhancement is communicated verbally (e.g., verbal assertions that contributing shared information is valued) and nonverbally (e.g., smiles, head nods). Finally, we hope to show that behavioral encouragements stemming from mutual enhancement facilitate a group-discussion preference for shared information. The present experiments represent the beginning of our examinations along this line.

Conclusions

In the present research, we took the area of collective-information sampling into a new direction that highlights the potential social influences associated with information pooling. Clearly, probabilistic models cannot capture all of the social dynamics that occur during information pooling in small groups (Wittenbaum & Stasser, 1996). In the future, researchers should aim to identify how these dynamics may create, augment, and attenuate the CIS bias.

Mutual enhancement lies at the heart of the movement toward socially shared cognition in the study of small groups. Many small-groups researchers in social psychology have advocated

[7] According to Stasser's (1992) model, each item of information, whether shared or unshared, is equally memorable and thus likely to be recalled by a group member. The CIS bias occurs at the group-discussion level, not at the member-memory level. Experiments 1 and 2 met the equal memorability assumption: Shared and unshared items were equally memorable because the same items were counterbalanced to be shared half of the time and unshared the other half. For this reason, individuals recalling information on the written lists (to be shared with partners) drew in an unbiased fashion from their memories, listing shared and unshared information that was proportionate to the total pool that they read for both Experiment 1, $F(1, 124) = 0.30$, *ns*, and Experiment 2, $F(1, 46) = 0.14$, *ns*. That is, participants did not show a bias toward shared information in their written recall. These results are consistent with Stasser's (1992) assumption that the CIS bias is a group-level phenomenon and with our assumption that mutual enhancement precedes the CIS bias.

examining the reciprocal relation between collective processes and individual cognition (Levine, Resnick, & Higgins, 1993; Nye & Brower, 1996; Resnick, Levine, & Teasley, 1991). The present research did just that by showing how the communication of socially shared knowledge affects person perception. Furthermore, Experiments 1 and 2 highlighted the utility of using individual-level methods for understanding group-level phenomena. Doing so can suggest processes that may occur in groups that sole analysis at the group level would never reveal. As Steiner (1986) suggested, analyses at the group and individual levels can augment knowledge in each area. To the extent that results are consistent across the levels, one has added assurance in the phenomenon of study. We hope that the present research continues the movement toward socially shared cognition well into the future and helps to enrich the understanding of the collective bias toward shared information.

References

Berger, J., Fisek, M. H., Norman, R. Z., & Zelditch, M., Jr. (1977). *Status characteristics and social interaction.* New York: Elsevier.

Byrne, D. (1971). *The attraction paradigm.* New York: Academic Press.

Chaiken, S., & Stangor, C. (1987). Attitudes and attitude change. *Annual Review of Psychology, 38,* 575–630.

Clark, H. H., & Brennan, S. E. (1991). Grounding in communication. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 127–149). Washington, DC: American Psychological Association.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7,* 117–140.

Gigone, D., & Hastie, R. (1993). The common knowledge effect: Information sampling and group judgment. *Journal of Personality and Social Psychology, 65,* 959–974.

Grice, P. (1989). *Studies in the way of words.* Cambridge, MA: Harvard University Press.

Gruenfeld, D. H., Mannix, E. A., Williams, K. Y., & Neale, M. A. (1996). Group composition and decision-making: How member familiarity and information distribution affect process and performance. *Organizational Behavior and Human Decision Processes, 67,* 1–15.

Hollander, E. P. (1958). Conformity, status, and idiosyncrasy credit. *Psychological Review, 65,* 117–127.

Hollander, E. P. (1964). *Leaders, groups, and influence.* New York: Oxford University Press.

Kameda, T., Ohtsubo, Y., & Takezawa, M. (1997). Centrality in sociocognitive networks and social influence: An illustration in a group decision-making context. *Journal of Personality and Social Psychology, 73,* 296–309.

Larson, J. R., Jr., Christensen, C., Abbott, A. S., & Franz, T. M. (1996). Diagnosing groups: Charting the flow of information in medical decision-making teams. *Journal of Personality and Social Psychology, 71,* 315–330.

Larson, J. R., Jr., Foster-Fishman, P. G., & Keys, C. B. (1994). Discussion of shared and unshared information in decision-making groups. *Journal of Personality and Social Psychology, 67,* 446–461.

Levine, J. M., Resnick, L. B., & Higgins, E. T. (1993). Social foundations of cognition. *Annual Review of Psychology, 44,* 585–612.

Nye, J. L., & Brower, A. M. (Eds.). (1996). *What's social about social cognition? Research on socially shared cognition in small groups.* Thousand Oaks, CA: Sage.

Resnick, L. B., Levine, J. M., & Teasley, S. D. (1991). *Perspectives on socially shared cognition.* Washington, DC: American Psychological Association.

Schittekatte, M., & Van Hiel, A. (1996). Effects of partially shared information and awareness of unshared information on information sampling. *Small Group Research, 27,* 431–449.

Stasser, G. (1992). Pooling of unshared information during group discussion. In S. Worchel, W. Wood, & J. Simpson (Eds.), *Group process and productivity* (pp. 48–57). Newbury Park, CA: Sage.

Stasser, G., & Stewart, D. (1992). Discovery of hidden profiles by decision-making groups: Solving a problem versus making a judgment. *Journal of Personality and Social Psychology, 63,* 426–434.

Stasser, G., Stewart, D. D., & Wittenbaum, G. M. (1995). Expert roles and information exchange during discussion: The importance of knowing who knows what. *Journal of Experimental Social Psychology, 31,* 244–265.

Stasser, G., Taylor, L. A., & Hanna, C. (1989). Information sampling in structured and unstructured discussions of three- and six-person groups. *Journal of Personality and Social Psychology, 57,* 67–78.

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.

Stasser, G., & Titus, W. (1987). Effects of information load and percentage of shared information on the dissemination of unshared information during group discussion. *Journal of Personality and Social Psychology, 53,* 81–93.

Steiner, I. D. (1986). Paradigms and groups. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 251–289). New York: Academic Press.

Wittenbaum, G. M. (1997, June). *The benefits of high status in collective information sampling: Why might they occur?* Paper presented at the Nags Head International Conference on Organizations, Groups, and Social Networks, Boca Raton, FL.

Wittenbaum, G. M. (1998). Information sampling in decision-making groups: The impact of members' task-relevant status. *Small Group Research, 29,* 57–84.

Wittenbaum, G. M., & Stasser, G. (1996). Management of information in small groups. In J. L. Nye & A. M. Brower (Eds.), *What's social about social cognition? Research on socially shared cognition in small groups* (pp. 3–28). Thousand Oaks, CA: Sage.

Wittenbaum, G. M., & Stasser, G. (1997, May). *The role of group member status in collective information sampling: Some psychological underpinnings.* Paper presented at the annual meeting of the Midwestern Psychological Association, Chicago.

Received April 23, 1999
Revision received May 14, 1999
Accepted May 14, 1999 ■