Pre-Discussion’s Note-Taking in Hidden Profile Tasks

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ABSTRACT
It was discovered over three decades ago that groups tend to discuss common information while failing to discuss unique information in group decision-making processes. This is called group’s information pooling phenomenon or hidden profile problem. We report a work-in-progress study here that examines the effectiveness of using pre-discussion notes to address hidden profiles in group decision-making. Our data shows a moderate positive correlation between the appearance of a piece of information in participants’ notes and its appearance in the subsequent discussion, suggesting note-taking prior to the group discussion as an effective approach. Our data also indicates that hidden profiles can affect the group performance through aspects other than information sharing.

Keywords
Hidden profile, group decision-making, pre-discussion notes

INTRODUCTION
Previous work has revealed an interesting information pooling phenomenon in group discussions (Stasser & Stewart, 1985): discussed information is that which is already familiar to the group prior to the discussion, while the information that is unique to each individual remains unique (i.e., not shared) or unfamiliar (i.e., shared but receiving little attention during the discussion). As a result of this phenomenon, a decision requiring a pooling together of unique information is unlikely to be identified by the group. Unshared (unique) information is often referred to as a hidden profile in group decision-making activities.

The information-pooling phenomenon is robust across kinds of group activities, and researchers have explored various contributing factors. Lu, Yuan, and McLeod (2012) provided a comprehensive review of hidden profile research in the past twenty-five research. They performed a meta-analysis to study the effects on information sharing by five major factors that mediate the hidden profiles phenomenon, including discussion group size, total amount of information presented to group members, and strength of the bias towards or against the objects of a decision.

Even before the arrival of these social and interpersonal factors, however, there exist memory-based considerations in the task that are likely to affect those outcomes as well. The observed phenomenon of not sharing unique information could, to some extent, be due to the fact that group members forget some information during the discussion process. In a free recall task analysis, Stasser and Titus (1985) found a pattern almost identical to the one they found in the discussion of those information pieces whereby the information supporting initial preferences is more likely to be recalled both before and after discussion. Considering this recall bias exists even before the sharing of information between members (via discussion) takes place, it is hardly surprising that a bias persists in the discussion and, ultimately, in the product of the discussion itself. Although this free recall task has been preserved in several of the subsequent studies on hidden profiles (Schittekatte & van Hiel, 1996, for instance), its impact on the literature has been minimal. Issues of the extent of memory bias effects in the hidden profiles paradigm, and the application of techniques to moderate them remain unexplored.

A possible way to combat this memory effect is by allowing group members to take notes on the provided information, both in order to aid in memory consolidation and to cue that memory later if the discussion tends away from certain salient details. Based on other studies on note-taking, we hypothesized that pre-discussion’s note-taking would alleviate the hidden profile effect in group decision making.

RELATED WORK
Brief Review on Hidden Profiles And Note-Taking
Researchers have examined the hidden profile problem in different kinds of group activities and found this information pooling phenomenon to be robust. Various factors that contribute to the phenomenon were explored as well, such as the level of members’ domain expertise.
of note taking potentially improves counseling, interviews, jury discussions, etc), the effects of note taking in non-literature. In his review of the twenty studies that examined note taking behavior, those in the no note condition. In a jury study by Fitzgerald et al. (1996), participants were either encouraged to take notes or not given the means to do so. The study showed that if members can request a viewing of the transcript of an actual trial, jurors in the note taking condition made more effective decisions than did those in the no note condition. In a study by Fitzgerald (2000), participants watched a two-hour professionally created recording of a mock trial that was based on the transcript of an actual two-week court proceeding, and, among other things, were either encouraged to take notes or were not given the means to do so. The study showed that the note-taking process improved report cohesiveness, promoted a more strongly evidence-oriented approach to the case, and increased retention of information post-trial. These results suggest that taking notes prior to group discussions could increase an objective and evidence-oriented approach and improve the memories associated with that approach. Still it is worth noting that the effects of note-taking behavior are not widely agreed upon in the literature. In his review of the twenty studies that examined the effects of note taking in non-academic setting (e.g., counseling, interviews, jury discussions, etc), Hartley (2002) suggested that note taking potentially improves listening accuracy and reduces bias but the findings are complex and more studies need to be conducted.

Theoretical Ground of Our Work

Prior to Bonito’s model (2007), there were three general explanations to account for why members fail to provide unique information in the hidden profile tasks. The first explanation suggested that the unique information had less probability to be mentioned because of its distributional disadvantage. The second explanation considered the influence of the members’ initial preference. And the third explanation focused on the social influence of the shared information in the discussion dynamics. By knowing that the information was common among majority of the group, the members would consider it to be more legitimate and credible than the unique information.

Taking Burke’s perspective (1974) that acquiring a speaking turn and filling it were different decision-making processes, Bonito (2007) pointed out that the three explanations did not make this difference clear. As an alternative explanation, he proposed the local model of information sharing in small groups. Bonito’s model considered that a piece of information has three states: knowledge as the data stored in the long-term memory; potential contribution as the information contained in the short-term memory and is task-relevant; and contribution which is task-relevant and is in the discussion. Bonito (2007) emphasized the dynamic aspect of a piece of information such that depending on the discussion context the same content in a message can be considered to be different contributions in different contexts.

The model considers two processes that help information transition from one state to another. An activation process that retrieves task related information from the knowledge units and puts it to the state of potential contribution, or puts the information produced through discussion (i.e., the information in the contribution state) or through one’s own thinking process (i.e., the information in the potential contribution state) to the knowledge state. The other process refers to one making a decision of whether or not to contribute to a discussion with the information from the potential contribution state. According to Bonito’s (2007) model, these two processes are serial with the activation process precedes the choice process. The activation process often requires the cueing of the information to be activated, such as a result of the context of the previous discussion or of the member’s internal thinking. Then in the choice process various factors can come into play affecting the actual decision of whether or not one should share the activated information in the potential contribution state including the mentioned information which could affect the members’ social standing status in the discussion. The decision is also affected by the relevance of that information, as retrieved information remains in the short-term memory for only a limited period of time before being reallocated to the long-term memory.
Based on Bonito’s (2007) model, we expect that information retrieval in the first step could be facilitated by the note-taking activity due to the persistence of the source in the discussion. The notes, acting as continuous reminders of unique information, could complement the need for contextual cueing. Additionally, cued information is expected to last longer in the short-term memory with the presence of the notes, as the physical presence of the information should support its retention. Thus the hidden profile effect by the conversational bias can be further eroded in the second step, as the immediate congruence of a piece of shared information with the context of a discussion loses some importance.

These probable effects of information persistence on decision-making in small group discussions open us up to the question: how does information persistence in the form of individuals’ notes on pre-discussion scripts impact the group’s discussion of that information and their subsequent resolution? And more specifically: does the extensiveness of recorded information on participants’ notes affect their sharing of that information during the group discussion.

RESEARCH DESIGN

The Experiment Materials
The present study included 28 participants in seven four-person different groups. All participants had lived in either Canada or the United States from birth to at least age 18 and spoke English as their first language.

A murder-mystery hidden profile task was used. In this task, participants were required to act as four crime investigators to identify a murderer from four suspects. The investigators had information about the suspects through provided scripts. Scripts contained both shared information (common to all group members) and unique information (common only to one, two, or three members). In total, there were 58 pieces of information: 35 were shared among all group members, 4 among three members, 5 among two members, and 14 were kept to only one member. We pilot tested the appropriateness of the task for the study.

The Procedure
Upon arriving at the study, participants were informed about the study and provided their consent. They then filled out a background questionnaire. When all four participants were finished the questionnaire, each was handed a script as well as a sheet of blank paper. Participants were then given 15 minutes to read, study, and take notes on the scripts. All teams were informed that there were differences between the scripts before studying them.

At the end of the 15 minutes, the scripts were taken away; notes were left. The participants were given up to one hour to solve the murder. Discussions were video recorded and lasted between 16 - 60 minutes. At the end of the discussion the participants completed a second questionnaire giving feedback on the decision-making process and outcome.

Data Analysis
To explore the role of pre-discussion notes in the group decision-making process, we analyzed the group discussions and pre-discussion notes. We developed a coding framework to assess the amount of shared and unique information in the notes and group discussions. Both authors individually compared an initial list of information pieces from the scripts to the information pieces identified within the transcript of one discussion. After expanding the original list to include anything that it hadn’t previously accounted for, two authors re-coded the discussion transcript, discussed any differences they found between their analyses, and arrived at one, comprehensive list of information pieces to be identified and compared across all participants. Information pieces recorded in the participants’ notes were coded using the same schema arrived at for the group discussions.

The information pieces shared (or otherwise explicitly stated) by each participant in each transcript were coded, such that one piece that had been spoken multiple times would be counted each time it was spoken (by each participant), although this information was not used for the current set of analyses. Dissimilarly, if the same information piece was repeated multiple times within one participant’s notes, it was still only recorded once (as the reason behind analysis of information in notes was to ascertain simply whether recorded information was shared, and because it was extremely rare for an information piece to appear multiple times in one participant’s notes).

RESULTS
Although the seven teams had two different conditions in this experiment (i.e., the presence vs. absence of the requirement to ask why questions) the number of such questions raised by the team members did not seem to be significantly affected by the condition. The team with the most ‘why’ questions was in the presence condition a total of nineteen such questions in their discourse, but two of the four teams in the absence condition had thirteen ‘why’ questions. Additionally, one team from each condition correctly identified the murderer. Also, a t-test compared the amount of information shared by groups in the presence condition against the amount shared by groups in the absence condition; the results of this test were not significant, suggesting that the requirement to question did not affect the amount of shared information in this experiment. For these reasons, we did not differentiate the teams in the later analysis when summatting the coded data across the discussions.

Compared to the “no-hidden profile” situation, only two of the seven experiment teams identified the murderer correctly. However, no correlation was found between the number of participants possessing a piece of information (i.e., whether the information is shared by one, two, three or all participants) and the total number of times a single piece of information was shared (summatated across all discussions and all participants). The non-significant correlation of
[R=0.12] failed to support the theory that the uniqueness of a piece of information affects its appearance in a discussion - a central tenet of the hidden-profiles phenomenon.

The only statistically significant test was a moderate, positive correlation [R=0.31] between the presence of a piece of information in an individual’s notes and its subsequent sharing in the discussion. This was tested by correlating the total number of times a piece of information appeared in the notes in the study (summed across all discussions and all participants) and the number of times that same piece of information appeared in the discussions themselves (summed, again, across all discussions and all participants). This suggests, at least, that thorough note taking (coupled reference to notes that have been taken) increases information sharing by group members.

**DISCUSSION AND CONCLUSION**

Given that there is little difference between our task and the other hidden profile tasks in the literature, the hidden-profiles phenomenon was expected to exist and be as observable in our task as in other tasks. However, we failed to find significant differences with respect to information sharing. Instead, we observed that there is a moderate positive correlation between the appearance of a piece of information in participants’ notes and its appearance in the subsequent discussion. This observation suggests that note-taking prior to group decision-making could be an effective way to combat the hidden-profiles problem. From Bonito’s (2007) model about information sharing in small groups, it seems likely that people are using their notes to remind them of information. The notes may also serve to support their confidence in the information they have in some way. It is worth further investigation to examine the role of these notes in the discussions.

Although we did not observe the hidden-profile phenomenon in the experiment, the performance of the team still seemed to be affected negatively by the inequality of the information distribution among the team members. This implies that the hidden profiles can affect the performance of the group decision-making not only through the information-pooling factor but also through other aspects of the process. We suggest more investigation to explore these other impact of the hidden profiles. We are also conducting more sessions to further examine the effects of note-taking on hidden profile tasks.

One implication from our study is that in the design of a digital environment to support distributed collaboration, retrieving personal notes relevant to the current meeting or session and displaying them to the users highlighting the unmentioned parts are expected to help users identify and bring to the table the hidden profiles.

**REFERENCES**


