I Believe You’re Right: The Effect of Confidence on Group Performance Outcomes

BY

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THESIS
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This thesis is dedicated to my mother, Donna Gholson, for all her love and support, without which this work would not be possible.
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I would like to thank my thesis committee, Jennifer Wiley, James R. Larson, Jr., and Linda Skitka, who oversaw the development of the proposal and made contributions important to the conduct of the study. Their unwavering support continues to make it possible for me to achieve my goals of excellence in research.

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SUMMARY

Previous research has shown that when making a decision, groups fail to incorporate information that is held by a single member prior to discussion (Stasser & Titus, 1985, 1987, 2003), and that groups tend to not repeat this information once it is mentioned (Stasser, Taylor, & Hanna, 1989). In this project, groups of three completed a collective memory task, in which members in one condition had the same information to remember whereas those in another condition had different information to remember, before completing a decision-making task.

Information in the decision task was distributed among the members to create a hidden profile, in which unique information given to each of the members is necessary to make a correct decision. Those that had the same information to remember in the collective recall task repeated more of their information in the decision task, including unshared information. Across both conditions, the repetition of information predicted improved group decision making, although performance on the decision-making task did not differ between conditions.

One possible explanation for this result is that when unique information was encountered in the decision task, it defied the expectations set up by the memory task in the groups that had been given all the same information to remember, and the attempts of those groups to adapt to the unique information resulted in increased repetition.
I. INTRODUCTION

Individuals are not often trusted with decisions that have a large effect on the world. Groups are constantly called upon in the form of committees, parliaments, and other collectives to ‘put their heads together’ and solve problems or make decisions. On the face of it, this practice should seem reasonable to most; indeed, groups theoretically have to their advantage more information that individual group members can bring into the conversation.

In contrast to this common-sensical view, past research has informed us that groups are surprisingly inefficient at pooling the unique information that group members hold (Stasser & Titus, 1985, 1987). That is, groups will discuss shared information, or information that everyone in the group has, at the expense of unshared information, or information that only one member of the group holds. One of the supposed advantages of working in groups is the potential access to a greater variety of information, something that this finding calls into question.

More specifically, groups’ tendency to focus on shared information during discussion greatly hinders their performance at tasks in which unshared information is important for optimal decision making. An experimental paradigm has been designed to capture this situation using hidden profile tasks (Stasser & Titus, 1985). A hidden profile task is a decision-making activity designed to simulate a “worst case scenario” condition with respect to information distribution. For any group decision, there are different ways that information can be distributed among the group members. Very rarely is all information shared (every member of the group holds every piece of information relevant to the discussion); it is much more likely that information possessed by any member is a mixture of shared and unshared, with each member bringing information into discussion that some people already know as well as unique information that only they are privy to. In hidden profile tasks, groups of participants are given information
packets (for example, information about different suspects in a murder mystery) and are told to study their information for a given length of time. After the study session, the participants must use the information they remember from their packets to collaborate and select a decision alternative (such as which suspect was guilty of the murder). The hallmark of the hidden profile task is that the information is distributed such that only the unshared information uniquely held by individual group members leads to the correct answer, where most of the shared information held by the entire group leads to an incorrect or less optimal answer. Because the biggest downfall in group decision making is generally the lack of discussion of unshared information, a hidden profile task represents an extreme test of effective group decision making. Additionally, information layout in the current study was slightly different from typical information profiles usually used in this paradigm. Specifically, the third member of each group had twice as much unshared information as did the other two members of the group. Because of this, the third member of each group was more responsible for bringing out unshared information than the other two members.

The research using hidden profile tasks was spurred by the counter-intuitive result that groups focus more on shared than unshared information, and the literature has suggested that there are two secondary factors that may be responsible for this effect (for a review, see Stasser & Titus, 2003). First, shared information holds a sampling advantage. That is, because shared information is held by every member of the group (as opposed to unshared information, which is only held by one person), shared information is more likely to be introduced initially (Stasser & Titus, 1987; Larson, Foster-Fisherman, & Keys, 1994). In a 3-person group, a piece of shared information is previously known by 3 times the number of people that know any piece of unshared information. This is known as the collective informational sampling bias, which makes
it more likely that shared information will be introduced earlier into discussion and will retain this state until enough of the shared information pool has been depleted that unshared information becomes more likely to be introduced (Larson et al., 1994). Unfortunately, many groups conclude discussion before ever reaching this point.

Second, information that has been previously introduced is less likely to be repeated if is unshared rather than shared (Larson, Christenson, Abbott, & Franz, 1996; Stasser, Taylor & Hanna, 1989). This means that even if groups happen to discuss unshared information, it is less likely that the group will revisit the information. Groups not repeating unshared information would seem to imply that group members, upon hearing unshared information, disregard or ignore it.

It is this second factor that was the main motivation for the current research. Researchers have begun to discern the reasons behind the unbalanced repetition of shared information relative to unshared information. It has been suggested that one reason for this effect is the social cost incurred by repeating information that happens to not be shared by anyone else in the group (Stasser & Titus, 2003). Because multiple members of the group hold shared information, this information can be validated by others when it is introduced. Unshared information, however, cannot be validated by anyone in the group except for the member who introduces it. This creates an uncomfortable situation for the introducer, who finds himself/herself in an unsupported position, especially when the information is in conflict with the group consensus. In this case, one would expect the introducer of the information to repeat that specific piece of information less. It also creates an uncomfortable situation for the other group members. The group can incorporate the information, rethink the entire frame of their decision, and change tacks entirely, or, they can assume that the introducer of the information is mistaken, and move
on without actually addressing the implications of the newly introduced information. A consequence of the latter reaction to unshared information is that others are less likely to repeat the unshared information.

Although most previous research suggests that unshared information is less likely to be repeated, there are a few cases where it is less likely to be ignored. For example, while most research on small groups has been done with undergraduates who were generally unfamiliar with one another prior to working together (*ad hoc* groups), when groups are used whose members are familiar with each other, then the groups are more likely to consider unshared information than are *ad hoc* groups (Gruenfeld, Mannix, Williams, & Neale, 1996). Other research has found that groups more effectively pool unshared information when it is introduced by members who are known by the group to have more experience in the domain of interest (Larson et al., 1996) or the task type (Wittenbaum, 2000). Additionally, Stewart and Stasser (1995; see also Stasser, Stewart, & Wittenbaum, 1995) found that unshared information is not disregarded when introduced by someone who has been publicly labeled an ‘expert’. Furthermore, actual experts within a group are found to be more influential when they are dominant (Littlepage & Mueller, 1997). Thus, group members seem less likely to disregard unshared information when it comes from a friend or expert source.

**A. The Present Study**

The present study was designed to test two possible reasons why unshared information may fail to be incorporated into group discussion. The first proposed mechanism is the level of trust or confidence that the group has in the member who introduces the unshared information. That is, if a member of a group who is viewed positively shares a piece of unshared information, then that information should be more likely to be repeated and incorporated into the decision.
This would be consistent with the findings that groups are more likely to incorporate information introduced by someone who is an expert, is labeled an expert, or who is their friend.

Secondly, it is conceivable that the self-confidence of the individual holding the unshared information also has a moderating effect on the tendency for groups to incorporate unshared information in discussion. For instance, it has been found that more confident members have less difficulty convincing the group that their information is accurate (Hinsz, 1990; c.f. Stasser et al., 1995). This could make it more likely that the group incorporates the unshared information. Secondly, even if the information is then disregarded by others, a more confident person may be more likely to raise the information a second time. A less confident person may do the opposite - stating information in an uncertain way and then backing down if the information is disregarded. Individuals with enough self-confidence may be protected against the social costs of repeating unshared information (Stasser & Titus, 2003). This would be consistent with the findings that actual experts within a group are more influential when they are dominant (Littlepage & Mueller, 1997).

In an attempt to manipulate the impressions among group members in this study, groups of three first completed a collective recall task in which the members of some groups had all the same information to remember (Validation Condition) and the members of other groups had different information to remember (Control Condition). When one group member can verify the information of another, this invokes a social validation and a process called mutual enhancement (Wittenbaum & Bowman, 2004) whereby group members’ impressions of themselves and each other on attributes such as credibility become more positive (Wittenbaum et al., 1999). Because the groups in the Control Condition could not engage in a social validation process, this condition was expected to lead to less positive impressions. As a manipulation check, instances
of social validation during this activity were coded and group member impression ratings were obtained after the memory task and before the hidden profile task. Hypothesis 1 was that groups in the Validation Condition would show more positive impressions of themselves and each other than those in the Control Condition.

It was also expected that groups who had more positive impressions would be more likely to discuss unshared information on a subsequent hidden profile task, so Hypothesis 2 was that groups in the Validation Condition would repeat more unshared information during the hidden profile task. Unshared information is vital in a hidden profile task, so Hypothesis 3 was that groups in the Validation Condition would perform better on the hidden profile task than groups in the Control Condition.

Breaking down the predictions on an individual level, Hypothesis 4 was that those who have more positive impressions of themselves would be more likely to repeat their own unshared information (information that only they have). Additionally, Hypothesis 5 was that individuals who are viewed more positively by other group members would be more likely to have their own unshared information repeated by the group. These hypotheses more directly tested the link between positive impressions and the repetition of unshared information.

Lastly, as one member of each group was given more unshared information than the other members, a final hypothesis focuses on the third member of each group who was more responsible for the group’s performance. Because those who have dominant personalities tend to attain influence in face-to-face groups (Aries, Gold, & Weigel, 1983; Anderson & Kilduff, 2009), a trait dominance measure was included in the study design. It is expected that when the member that has the most unshared information is more dominant, he/she should be better able to
sway the group towards their opinion. Thus, Hypothesis 6 is that the dominance of this member would be positively related to group performance.

II. METHODS

A. Participants and Design

One hundred and fifty-six introductory psychology students (Mean age = 18.89, SD = 1.08, 86.5% female) from the University of Illinois at Chicago participated in the study as members of 52 3-person same-sex ad hoc groups. Same-sex groups are standard in this research to avoid complications that mixed-sex interactions may initiate (Aries, Gold, & Weigel, 1983). These groups were split into two experimental conditions, the Control Condition and the Validation Condition. Participants earned partial credit toward the fulfillment of a course requirement.

Of the original 52 groups, 11 failed to show the initial preference profile required for the hidden profile paradigm, and thus were excluded from analysis. Another group was excluded for failing to follow directions (they showed one another their information during the study period of the hidden profile task). A final group was excluded due to equipment failure. This left 39 groups (21 Validation Condition, 18 Control Condition) available for analysis.

Within these 39 groups, some did not complete all measures. In many analyses, groups out of the final sample were excluded from the analysis due to missing data. Before results of these analyses are reported, the number of groups excluded will be explained. In total, 31 groups (17 Validation Condition, 14 Control Condition) completed all the main dependent variables in the study.
B. **Materials**

Participants in this study performed four tasks: (1) the collective recall task (that served as the manipulation), (2) initial impression ratings of accuracy and credibility, (3) the hidden profile task, (4) final impression ratings.

1. **Collective recall task**

The exact materials given to participants for this task are included in Appendix A. Participants received instruction about a teaching award that is given annually at UIC. It is called the “Silver Circle” teaching award, and every year it goes to the professor who is the most popular with students and therefore gets the most student votes. Participants were given packets of information containing a number of student evaluation comments about two hypothetical professors that were eligible for this award (identified only as Professor A and Professor B), and they were told that they must use this information to decide which of the two professors is most likely to have received the award. Each piece of information was either positive or negative and focused on one attribute of the professor. For example, one positive evaluation comment read, “Professor B clearly enjoys teaching.” whereas one negative evaluation comment read, “Professor A is not interested in whether or not the students learn anything.” These materials are similar to those previously used by Larson, Foster-Fishman, and Keys (1994) and Winquist and Larson (1998). Participants had 2 minutes to study a total of 16 student evaluation comments. After this 2-minute session, packets were collected and participants were asked to privately record on an index card which of the two professors they thought was most likely to have received the teaching award. Next, the experimenter gave participants a surprise recall task (i.e., they were not told in advance that there would be a memory test). They were given 10 minutes to work on the task, and groups were told to try to continue working until the time had expired. The
group was asked to work together to recall the comments as accurately as possible. Because a need for accuracy enhances the mutual enhancement effect (Wittenbaum & Bowman, 2004), groups were instructed to write comments word-for-word if they could. One of the group’s members (volunteered on basis of quality of handwriting) wrote down the comments the group could recall during the task.

This task was identical in both conditions, except for the fact that all group members in the Validation Condition received packets containing the same information about the professors, whereas group members in the Control Condition each received packets that contained different sets of comments about the professors.

2. **Initial impression ratings**

Directly after the collective recall task, participants filled out a questionnaire that measured their evaluations of the task-relevant attributes of each of their groupmates and themselves, and then the task as a whole. The wording to this questionnaire was taken from Wittenbaum and Bowman (2004) and is included in Appendix B. Specifically, participants rated their agreement on a 1 (Strongly Disagree) to 9 (Strongly Agree) scale of statements about themselves and their groupmates. Statements were, “I/ The group member to the left/right of me am/is a credible source of information about the professors.” and “The information I/ the group member to the left/right of me contributed was accurate.” The statements showed acceptable intercorrelation (self $r = .69$, other $r = .81$) and were averaged to form separate pre-decision making impression measures of one’s self and the others in the group. The impressions that the group had regarding each individual group member was calculated as the average rating given to each individual by their groupmates on the two ratings. A single group score was also computed by averaging all the responses on these items for all members (group $\alpha = .85$). Participants also
answered questions about their more global perceptions of the task and their group’s performance, including their level of enjoyment, liking of others and whether they tried to perform well on the task.

3. **Hidden profile task**

Participants in both conditions also performed a financial investment task in which they had to decide as a group how to partition a hypothetical $2.6 M investment fund between two pharmaceutical companies, each of which was said to be developing a new cholesterol-lowering drug. One company, Bluestone Pharmaceuticals, was described as developing the drug Chol-BLUE. The other company, Reddington Pharmaceuticals, was said to be developing the drug Chol-RED. The experimenter told participants that each company is seeking venture capital to help pay for additional development work that needs to be done before bringing its drug to market. The group’s task was to decide how the $2.6M fund should be divided between the 2 companies, with the specific division reflecting their view on the relative likelihood of each drug eventually becoming commercially successful. The experimenter told them that to the extent that one drug is more likely than the other to become a commercial success, more of the investment fund should be allocated to the company developing that specific drug. This task is similar to ones used previously (Larson & Harmon, 2007; Larson, Sargis, & Bauman, 2004; Larson, Sargis, Elstein, & Schwartz, 2002), however, in this study, groups were to allowed to allocate a certain percentage of the fund to Chol-BLUE, a certain percentage to Chol-RED, and could also save a percentage of the fund. Saving the fund for later investments was allowed so that the resources given to one company would not be completely orthogonal to the other. This option was original to this study.
This investment decision was based on information initially given to the group members prior to discussion. To create two alternatives, with one being clearly better than the other, there was more positive information about Chol-RED (8) than Chol-BLUE (5), whereas there was more negative information about Chol-BLUE (4) than Chol-RED (1). The information described hypothetical results from a variety of animal, human, manufacturing, and marketing studies of each drug (For example, “Chol-BLUE may be beneficial to human patients as a post-operative treatment following many types of surgical procedures.”). As shown in Figure 1, the information was distributed in such a way that six items were read by at least two group members (shared information), and 12 items were read by just one member (unshared information), with each member reading some shared and some unshared information.

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*Figure 1.* The distribution of information among the members. (B) and (R) represent pieces of information regarding Chol-Blue and Chol-Red, respectively. Plus (+) and minus (-) signs symbolize the valence of the information. Numbers differentiate items of the same type. x’s indicate that the information was held by that specific member, while a blank means that the member did not hold that information. Information above the line is shared, while information below the line is unshared.
The valence and importance of each separate item has been pretested in prior research to ensure that it was perceived as intended (Sargis & Larson, 2002). The information was distributed in such a way that two of the participants in each 3-person group should have preferred the less optimal alternative (members 1 and 2 in Figure 1), and one should have preferred the optimal alternative (member 3). To optimize decision making (i.e. choose the stronger alternative), groups had to incorporate information that only one of the members read (i.e., unshared information) into discussion.

The exact information to which the figure refers is included in Appendix C. Group performance on this task was measured by subtracting the percentage of the $2.6M fund that the group allocates to Chol-BLUE (the less optimal alternative) from the percentage of the fund the group provides to Chol-RED (the optimal answer). This created a difference score that indicated how well the group performed. Participants had 15 minutes to study their information and 15 minutes to deliberate face-to-face (without access to the information). Groups had the option of alerting the researcher if they had reached a decision before 15 minutes had expired.

4. **Final questionnaire**

After the hidden profile task, participants completed a second questionnaire that measured their impressions of themselves, their groupmates, and the performance of the groups as a whole, in addition to a few other measures. The exact wording to this questionnaire is included in Appendix D.

Before beginning the ratings, participants were asked to privately allocate percentages of the $2.6M fund to either of the two drug companies on their own at the beginning of the questionnaire to serve as a measure of their agreement with the group decision. Then a series of confidence ratings were obtained. On one new set of items, participants used 0 (Not at all
Confident) to 6 (Very Confident) scales to rate themselves and their groupmates. The new items were, “During the cholesterol-lowering drug task, how confident were you in your/your group’s ability to remember information you/they read,” “How confident were you in your/your group’s ability to decide which information you/they read was relevant to the group decision.”, and “Overall, how confident were you in yourself/your groupmates during today’s session?” These items were highly intercorrelated (self $\alpha = .81$, other $\alpha = .85$) and so were averaged to form a composite scores of confidence, both in the self and others in the group. These measures were also used to form both scores reflecting the overall group’s confidence (group $\alpha = .90$).

Following the confidence items, participants completed the same items on accuracy and credibility used for the pre-decision making impression ratings. These ratings showed a moderate intercorrelation (self $\alpha = .54$, other $\alpha = .84$) and were averaged to form final impression scores. Noting the low reliability, analyses were done using credibility and accuracy separately, yet the results obtained were similar to those found when these ratings were combined. Therefore, despite the lack of high reliability, these items were analyzed as a composite variable. These measures were also used to create scores reflecting impressions across all group members (group $\alpha = .87$). In addition, participants responded to the statement, “I/ The group member to the left/right of me feel/is competent at determining the better cholesterol-lowering drug.”

Participants also rated themselves on (-3) to (3) scales on the personality dimensions of dominance, assertiveness, and forcefulness. These items were intercorrelated (Cronbach’s $\alpha = .78$) and were averaged to form a composite score of trait dominance for each person. In addition, participants reported how they responded to novel information, whether they cared about the task, and their happiness with their group. A final page requested demographic information.
C. **Procedure**

When participants in both conditions signed up for the study, they saw they were part of a very small group of participants that were eligible to participate. Participants were not initially told why they were part of such a small list upon signing up for the study. Students participated in the session in groups of 3, and each session was video recorded. Each session only ran three subjects at a time, and each group was randomly assigned to a condition upon arrival. The exact script used for the study is included in Appendix E.

Participants in the Validation Condition were told that they were eligible for the study because, according to their responses on a mass-testing questionnaire, we believed that they may possess a special talent for this type of decision-making, and that the study was being conducted to explore this further. The students having already consulted a small list of eligible participants reinforced this claim. Participants in the Control Condition were told nothing about why they were eligible for the study.

After these initial instructions, participants worked on the collective recall task. On this task, participants in the Control Condition were given information to recall that differed from their groupmates’ information. In the Validation Condition, participants shared the to-be-recalled information with their groupmates. After the collective recall task, participants completed the initial impression ratings. Groups in both conditions then completed the hidden profile task. After making the group decision, participants completed the final questionnaire privately. Finally, all participants were thanked and dismissed.

D. **Coding Group Discussion**

Both the collective recall task and the hidden profile tasks were video-recorded. The experimenter along with research assistants blind to the study’s hypothesis coded the video
recordings made of each group discussion. These video recordings were made from a digital video camera in plain view of the participants. For both the collective recall task and the hidden profile task, the experimenter coded 100% of the interactions, while research assistants coded 50% of the interactions.

1. **Collective recall task**

   The first task that was coded was the collective recall task. Mutual enhancement requires that the behavior of social validation, when one member confirms and/or elaborates on the information of another, takes place (Wittenbaum & Bowman, 2004). However, groups were free to vary on the number of times they participated in this behavior during the task. Therefore, this coding was used to determine how much social validation actually happened during the task. Showing that impressions are correlated with social validation behavior would also serve as a direct replication of the mutual enhancement effect (Wittenbaum & Bowman, 2004). In addition, this continuous variable could be related to group performance measures.

   Social validation was coded as any verbal utterance that communicated to the group that a member also held a piece of information that was just mentioned. Because groups were told to focus on being accurate and recording the information verbatim from what they read previously, this behavior would mostly consist of both verbal acknowledgements of the validity of the information provided (“Yes!” or “Yeah, I got that too.”), and/or providing suggestions of a different wording pattern of the information (“Professor A enjoys teaching.” “I think it was ‘Professor A clearly enjoys teaching.’”).

   If the group member that recorded the comments the group recalled ever fell behind and asked the speaker to repeat a piece of information introduced previously, the original pattern of validation was usually also repeated, but the validation was only recorded once. This was
because this type of group interaction was thought of as only a reiteration of what was already said rather than any new information being given to the group members. In the same vein, pointing out to the speaker that the introduced piece of information had already been recorded was also not counted as a validation. The group validation score was computed as the total amount of social validation in which the group participated. Coding was shown to be reliable between raters (single measure ICC = .86).

2. **Hidden profile task**

   The hidden profile task was also video recorded. Coding identified every time one of the 18 pieces of information was mentioned and by whom. A piece of information was coded as *mentioned* when a group member introduced a novel item that had not been discussed before. The discussion between groupmates about that piece of information was considered as part of the initial mention until the group moved on to a different topic. A single *repetition* was coded if the group returned to that piece of information after another topic had been discussed. Likewise, further repetitions were only coded after additional returns to the item after changes in topic. In this coding system, a repetition was scored every time one of the 18 pieces of information was returned to (meaning that a group could get multiple repetitions for the same item). Who repeated the item was also coded. Coding was shown to be reliable between raters (all single measure ICC’s >.69).

   This style of coding is different than past techniques that have been used to code group discussion (see Larson et al., 1996), in which the discussion of the piece of information could be counted as a repetition as long as it was uttered by a different member than the one who introduced it. The current method is a more stringent definition of repetition. Discussion about a given topic by multiple members does not necessarily mean that the information has been
encoded into the long-term memory of the members who did not originally hold such information. Only when a piece of information has been repeated later in discussion by another member has evidence been uncovered that the information has been encoded into memory.

A total of ten scores were computed from this coding. Four variables were coded at the group level and indicated how many times the group (1) mentioned shared information, (2) mentioned unshared information, (3) repeated shared information, and (4) repeated unshared information. Six other scores were coded on an individual basis and indicated the amount of times any given individual (1) mentioned shared information, (2) mentioned unshared information, (3) repeated shared information, (4) repeated their own unshared information, (5) repeated the unshared information first mentioned by others, and (6) had their unshared information repeated by others. Note that it is not expected that the last two measures would be independent.

III. RESULTS

This section will be split into four parts; the first part of this section will discuss the analyses conducted to test hypotheses between groups. Specifically this refers to Hypothesis 1-3, which state that groups will differ between conditions in positive impressions, repetition of unshared information, and decision-making performance. Second, the section will transition to correlational tests of individual responses and behavior (Hypotheses 4 and 5). Third, details will be given about the analyses using characteristics of only the third member of each group (Hypothesis 6). Lastly, the section will explain analyses conducted to ascertain if the current study replicates past results. It should be noted that as Hypotheses 1, 4, and 5 deal with data extracted from the initial questionnaire, these analyses were not conducted using all groups as some groups are missing data on this measure.
A. **Impression Ratings following Collective Recall**

It was expected that the manipulation would make the groups’ impressions of each other more positive. Specifically, Hypothesis 1 was that groups in the Validation Condition would make higher credibility and accuracy ratings of themselves and each other than those in the Control Condition. Unfortunately, this did not seem to be the case. For the 31 groups (14 Control, 17 Validation) that completed impression measures, groups in the Validation Condition did not provide higher average self-impression ratings, \( t(29) = .53, \text{n.s.} \), or higher average impressions of the group, \( t(29) = .53, \text{n.s.} \), than groups in the Control Condition following the collective recall task (see Table 1). This shows that the manipulation did not affect the impressions group members had in themselves and one another and disconfirms the hypothesis.

In addition, Table 1 shows all other questionnaire measures; these measures included participants’ impressions of their group’s performance on the collective recall task, the effort put forth by their groupmates, and their enjoyment of both the task and the people they were working with. None of these added measures differed between groups (all \( p’s > .30 \)).

B. **Repetition of Unshared Information during Decision Task**

It was predicted that the manipulation would have an effect on the repetition of unshared information. Specifically, Hypothesis 2 was that groups in the Validation Condition would repeat more unshared information during the hidden profile task. The data supported this hypothesis. Groups in the Validation Condition, did repeat more unshared information, \( t(37) = 2.36, p < .05 \), however, they also repeated more shared information, \( t(37) = 2.36, p < .05 \) (see Table 2). It was expected that the manipulation would increase the amount of repetitions of unshared information, but the results showed that the manipulation simply increased the amount of
Table 1  
*Means and Standard Deviations of Initial Measures by Condition*

<table>
<thead>
<tr>
<th>Questionnaire Item/ Rating(^{a})</th>
<th>Control (SD) N = 14</th>
<th>Validation (SD) N = 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impressions (Group Average)</td>
<td>6.43 (.99)</td>
<td>6.48 (.69)</td>
</tr>
<tr>
<td>Impressions (Self-rated)</td>
<td>6.56 (1.07)</td>
<td>6.38 (.77)</td>
</tr>
<tr>
<td>Impressions (Average Ratings of Others)</td>
<td>6.36 (1.01)</td>
<td>6.53 (.80)</td>
</tr>
<tr>
<td>Overall, I am happy with my group’s performance on this task.</td>
<td>7.16 (1.95)</td>
<td>7.18 (1.97)</td>
</tr>
<tr>
<td>My groupmates tried to perform well on this task.</td>
<td>8.25 (1.40)</td>
<td>8.20 (1.40)</td>
</tr>
<tr>
<td>My group performed better than the average group in this experiment.</td>
<td>5.93 (1.65)</td>
<td>5.66 (1.35)</td>
</tr>
<tr>
<td>I enjoyed working on this task.</td>
<td>7.20 (1.69)</td>
<td>6.90 (1.85)</td>
</tr>
<tr>
<td>I wanted my group to do well on this task.</td>
<td>8.16 (1.21)</td>
<td>7.96 (1.55)</td>
</tr>
<tr>
<td>If my group were to meet up in the future, I am confident that we would do well on tasks such as these</td>
<td>7.23 (1.84)</td>
<td>7.35 (1.74)</td>
</tr>
<tr>
<td>I like the other people in my group</td>
<td>7.64 (1.99)</td>
<td>7.43 (2.06)</td>
</tr>
</tbody>
</table>

\(^{a}\) All items recorded on a 1 to 9 scale.

information that was repeated, without a particular focus on unshared information. The results of all 10 discussion measures are shown in Table 2.

C. **Decision-Making Performance**

It was expected that the manipulation would improve decision making. Hypothesis 3 was that groups in the Validation Condition would allocate more resources to the optimal alternative
Table 2

*Means and Standard Deviations of Individual and Group Discussion by Condition*

<table>
<thead>
<tr>
<th></th>
<th>Group Discussion Scores</th>
<th>Individual Discussion Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control (SD)</td>
<td>Validation(SD)</td>
</tr>
<tr>
<td></td>
<td>N = 18</td>
<td>N = 21</td>
</tr>
<tr>
<td>Shared Information Mentioned</td>
<td>4.17(1.43)</td>
<td>3.96(1.51)</td>
</tr>
<tr>
<td>Unshared Information Mentioned</td>
<td>5.94(2.67)</td>
<td>6.81(1.97)</td>
</tr>
<tr>
<td>Shared Information Repeated&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.44(3.26)</td>
<td>5.67(4.95)</td>
</tr>
<tr>
<td>Unshared Information Repeated</td>
<td>2.11(3.91)</td>
<td>5.24(5.52)</td>
</tr>
</tbody>
</table>

|                          | Control (SD)            | Validation(SD)              |
|                          | N = 54                  | N = 63                      |
| Shared Information Mentioned | 1.39(1.20)             | 1.33(1.14)                  |
| Unshared Information Mentioned | 1.98(1.22)             | 2.27(1.41)                  |
| Shared Information Repeated | .81(1.54)              | 1.89(2.14)                  |
| Repeated Own Unshared Information | .57(1.55)              | 1.60(2.18)                  |
| Repeated Other's Unshared Information | .11 (.32)              | .30 (.75)                   |
| Had Own Unshared Information Repeated by Others | .11 (.37)              | .30 (.73)                   |

<sup>a</sup>“Repeated” refers to the number of times the information was repeated in discussion.

relative to the less optimal alternative. The data did not support this hypothesis. Performance was measured by subtracting the percentage of a hypothetical fund of money a group allotted to Chol-BLUE (the less optimal answer) from the percentage the group allocated to Chol-RED (the optimal alternative). Groups in the Validation Condition ($M = -0.10$, $SD = 19.27$) performed
similarly to groups in the Control Condition ($M = 4.44, SD = 22.74$), $t(37) = .68, n.s.$ Contrary to predictions, the manipulation had no effect on group decision-making performance. Actual group allocations are shown in Table 3.

Table 3

*Means and Standard Deviations of Percentages of Fund Allocated to each Alternative*

<table>
<thead>
<tr>
<th>Group Allocations</th>
<th>Control (SD) N = 19</th>
<th>Validation(SD) N = 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chol-BLUE</td>
<td>25.83(14.84)</td>
<td>32.95(12.99)</td>
</tr>
<tr>
<td>Chol-RED (The Optimal Alternative)</td>
<td>30.28(16.04)</td>
<td>32.86(12.03)</td>
</tr>
<tr>
<td>Not Invested (Saved)</td>
<td>43.89(19.97)</td>
<td>34.19(15.99)</td>
</tr>
</tbody>
</table>

D. **Individual-Level Correlations**

On an individual level, it was expected that impressions of credibility and accuracy would predict the ability to discuss unshared information. These ratings were only available for 93 individuals (51 Validation Condition- 17 groups, 42 Control Condition- 14 groups). Hypothesis 4, which predicted that self-impressions would be positively correlated with the number of times the individual repeated their own unshared information, was not supported, $r(93) = .04, p = .71$. This shows that having more positive impressions in oneself did not increase in the number of times that the individual repeated their own unshared information. Hypothesis 5, which predicted that the rest of the group’s impressions of an individual would be positively correlated with the number of times the other members of the group repeated that person’s
unshared information, was also not supported, $r(93) = .02, p = .80$. This shows that as the impressions the rest of the group had in an individual became more positive, the amount of times the group repeated that individual’s unshared information did not increase.

E. **Analysis of Third Member**

Because member 3 held most of the unshared information prior to discussion, Hypothesis 6 was that the self-rated dominance of the 3rd member of each group would be positively related to group performance. This hypothesis was not supported by the data, $r(39) = .26, p = .11$. There was no significant relationship between the dominance ratings of the 3rd member of each group and group decision-making performance. This shows that groups did not perform better when their 3rd member was more dominant.

F. **Replications of Past Studies**

As many of the main hypotheses of the study were not supported by the data, it is important to show that the paradigm was leading to typical performance similar to past research. One of the core features of the hidden profile paradigm is that shared information is more likely to be mentioned than unshared information (Stasser & Titus, 1985; 1987). In the current study, groups mentioned a greater percentage of their shared information ($M = 67\%, SD = 23\%$), than their unshared information ($M = 54\%, SD = 20\%$), $t(38) = 3.64, p < .05$ (one-tailed). This replicates past work that has directly measured the discussion of shared and unshared information (e.g., Larson, Foster-Fishman, & Franz, 1998; Winquist & Larson, 1998). Another commonplace feature is that unshared information should be less likely than shared information to be repeated after it was mentioned (Stasser, Taylor, & Hanna, 1989, Larson et al., 1996). The difference between the percentage of shared items that were repeated ($M = 34\%, SD = 26\%$) was
found to be significantly higher than the percentage of unshared items that were repeated ($M = 20\%, SD = 20\%$), $t(38) = 4.64, p < .05$ (one-tailed).

Finally, it is typically found that the mentioning of unshared, but not shared, information positively correlates with group performance. Similar to the results of Winquist and Larson (1998), the percentage of unshared information that was mentioned was positively correlated with group performance, $r(39) = .44, p < .01$, whereas the percentage of shared information that was mentioned was not related to performance, $r(39) = -.01, n.s.$ Thus, the hidden profile discussions in this study showed the typical features of the paradigm.

**IV. DISCUSSION**

The purpose of this study was to explore how performance on a hidden profile task would be affected by prior opportunity to form a positive impression of other group members. Hypothesis 1 predicted that groups in the Validation Condition would give higher impression ratings of themselves and each other after the collective recall task than those in the Control Condition. However, groups in the Validation Condition did not make more positive impression ratings about themselves and their groupmates after the collective recall task. Unfortunately, this means that any effects found in the study cannot be attributed to the more positive impressions group members had about themselves and each other in the Validation Condition relative to the Control Condition, but instead must be attributed to another effect of the manipulation.

Hypothesis 2 predicted that groups in the Validation Condition would repeat more unshared information during the hidden profile task, and Hypothesis 3 predicted that they would also perform better on the hidden profile task than would groups in the Control Condition. It was found that groups in the Validation Condition did repeat more information (shared and
unshared). However, groups in the Validation Condition did not actually make more optimal decisions than did groups in the Control Condition.

Furthermore, Hypothesis 4 predicted that initial impression ratings of one’s self would be positively correlated with the repetition of one’s own unshared information during the hidden profile task, and Hypothesis 5 predicted that the group’s initial impressions of each group member would be positively correlated with how many times that group member’s unshared information would be repeated by other members of the group. Neither of these hypotheses were supported by the data.

Finally, Hypothesis 6 predicted that the dominance rating of member 3 would be positively related to group performance. This hypothesis was not supported, suggesting that the dominance of the 3rd member was not related to performance.

Although the manipulation did not have an effect on group impressions or allocation decisions, the manipulation did have an effect on the repetition of information, and although performance on allocation decisions did not differ between groups, the repetition of information was correlated with decision making across both conditions. This begs the question of what the manipulation affected, if not positive impressions, to cause an increase in the repetition of information.

One possibility is that the manipulation affected the expectations of the group members in regards to whether the information given in the hidden profile task would be shared or unshared. Specifically, because of the set-up of the collective recall task, participants in the Control Condition were trained to expect to disagree with their groupmates (having all different information), while participants in the Validation Condition were trained to expect to agree. In this study, group discussion was timed, and it was found that groups in the Control Condition (M
took longer (measured in seconds) to begin discussing information than those in the Validation Condition ($M = 26.33, SD = 9.78$), $t(37) = 2.91, p < .05$. This suggests that groups in the Control Condition were possibly reluctant to begin discussion, expecting awkward moments of disagreement. Groups in the Validation Condition, expecting to agree with each other, tended to “dive right in” to discussion. Because of this expectation, when unshared information was presented during the hidden profile task, groups in the Control Condition may not have had as much of a problem with unshared information as groups in the Validation Condition, because participants in the Control Condition had already expected their groupmates to have different information. In contrast, unshared information was surprising to participants in the Validation Condition. These participants had to decide whether unique information was information that they did not read, information they read and did not recall, or information that was mistakenly recalled by the speaker. This ambiguity would likely contribute to the greater amount of repetition of all information displayed by groups in the Validation Condition, as they tried to figure out the true nature of the unshared information.

A. **Limitations**

A major limitation of the study was the failure to manipulate positive impressions between conditions. The effects of impressions could still be tested continuously, but not between conditions. Of course, it is possible that impressions among group members differed, but not in the way that was measured. At any rate, these null findings seem inconsistent with several previous studies that have suggested that discussing shared information increases positive impressions among group members (Wittenbaum et al., 1999; Wittenbaum & Bowman, 2004). Some differences between these studies and the current study are that the previous research used implied groups (i.e., the participant falsely believed that they had a partner) or face-to-face dyads
whereas the current research used triads. Another key difference is that participants in the cited research knew that they were studying the information to complete a collective recall task, while the participants in the current study were told that they would have to make a decision based on the information. That is, the collective recall task was a surprise to them. Although this was done to make the resulting mutual enhancement more relevant to a hidden profile task and make participants more likely to study the information in the actual hidden profile task more closely, this minor difference could have contributed to the failure to replicate the mutual enhancement effects of collectively recalling shared information.

Null findings were also seen between conditions in regards to allocations decisions. This could have been in part due to the way performance was operationalized. Consistent with previous studies (e.g., Larson, Sargis, & Bauman, 2004), groups were asked to allocate percentages of a fund to different companies, but unique to this study, they could also save a percentage of the fund. This may have caused groups to decide differently than they would have without having the option to save. Although it is not clear why, groups in the Validation Condition saved marginally less of the fund than did groups in the Control Condition, $t(37) = 1.68, p = .10$. The current data are not able to shed light on how adding the option to save may have altered the basic paradigm.

However, even with this change, this study was able to replicate the discussion patterns first posited by Stasser and Titus (1985) and Stasser, Taylor, and Hanna (1989), in that shared information is more likely to be both mentioned and repeated than unshared information. This is notable because it shows that groups in the current study discussed information much as groups have done in past research.
B. Future Directions

1. Expectations

The possibility that the groups differed in their expectations between conditions is one possible explanation for the differences that were seen in the discussion measures. Manipulating the expectations of participants seems like a promising area to be studied further. Groups that know the topics in which each member holds unshared information are better able to make decisions (Stasser et al., 1995), and it is possible that groups can attain at least close to this level of performance if they simply expect that other members have unique information. Of course, these groups would have the added burden of having to figure out which member has information about which topic (and this is assuming that any member of the group is an expert on any topic), although this may become apparent very quickly.

2. Decision-making strategy

It is possible that some groups were better able than others to pool together information to come to a conclusion, rather than simply aggregating which alternatives the individual group members preferred prior to discussion (or pre-discussion preferences). In the past, this has been measured by comparing the final group result with the pre-discussion preferences of the members (e.g., Davis, 1973; Gruenfeld et al., 1996). The current study did not ask participants to record their pre-discussion preferences, however, group discussion was recorded. An analysis of the group discussion could offer a more direct route of determining whether groups pooled information or simply aggregated preferences than would inferring which strategy was used based on the study of pre-discussion preferences. It will be interesting to test if positive impressions, expectations, or any other factors have an effect on the decision-making strategy employed by the group. For example, if group members in the Control Condition did
indeed expect to have different information than their groupmates, it is possible that they did not
form an individual opinion of the alternatives, knowing that they needed to hear new information
from their groupmates. In this way, groups in the Control Condition may have been able to
approach the task with a level of objectivity uncommon to this line of research, and this may
have effects on how well information was pooled. Indeed, it has been found that critical thought
norms in groups produces better performance than maintaining consensus norms (Postmes,
Spears, & Cihangir, 2001). Expecting to disagree with your groupmates could create a critical
thought norm within the group.

3. **Expert recognition**

Another informal observation involves the tendency of some groups to verbally
identify the 3rd member as an expert about one option. Many participants asked the 3rd member
to say anything he/she remembered about this option. In other groups, the 3rd member was either
ignored or he/she did not contribute to discussion. In the future it will be interesting to code
group behavior in relation to the 3rd member, as well as testing whether the behavior of the 3rd
member has any effect on group performance. It is expected that the results of this investigation
would replicate the results of previous lines of research that have found links between expert
behavior and whether or not that expert is recognized by the group (e.g., Littlepage & Mueller,
1997), and that the recognition of expertise contributes to better group decision making (Stasser,
Stewart, & Wittenbaum, 1995).

**V. CONCLUSION**

It was expected that increasing positive impressions among group members via a social
validation manipulation would affect the quality of group discussions and decision making.
Although a social validation manipulation failed to affect group impressions or decision making,
it did impact the quality of group discussions. Some possible explanations for the present findings are worth further research, including exploring the expectations that group members hold regarding whether their group members hold the same information, and whether that may have an impact on group performance. Roles of the strategy taken by the group and whether or not the member with the most unshared information was recognized as an expert may also be important.
CITED LITERATURE


Appendix A

Information about the professors given to participants. Participants in Confidence Condition all received only the first list, while each member in Control Condition received different lists.

Student Evaluation Comments

The following are various comments about each of the two professors. The comments were categorized and edited to produce the general versions of the comments that you see here. Please read each comment carefully.

1. Professor A’s lectures are fun and interesting.
2. Professor A encourages class discussion during lectures.
3. Professor A’s class is quite funny; there is rarely a dull moment.
4. Professor A takes as much time as it takes to answer all questions thoroughly.
5. Professor A clearly enjoys teaching and shows interest in whether or not students actually learn.
6. Professor A is often late to class.
7. Professor A is always available after class to answer any questions students may have.
8. Professor A holds an optional study session before each exam.

9. Professor B is extremely knowledgeable about the field.
10. Professor B has very interesting and engaging lectures.
11. Professor B provides helpful feedback on homework assignments.
12. Professor B has a helpful and intricate class website.
13. Professor B’s class moves quite fast.
14. Professor B is very well organized.
15. Professor B is arrogant and sometimes intimidating.
16. Professor B is genuinely concerned with student interest.
Student Evaluation Comments

The following are various comments about each of the two professors. The comments were categorized and edited to produce the general versions of the comments that you see here. Please read each comment carefully.

17. Professor A gives study guides for all the exams.
18. Professor A is famous within the field.
19. Professor A’s lectures are presented very clearly and understandably
20. Professor A assigns clear and interesting readings.
21. Professor A writes neatly on the board.
22. Professor A always returns homework assignments promptly.
23. Professor A sometimes shows interesting films during class.
24. Professor A does not offer any chance for extra credit.

25. Professor B is kind and sympathetic to students.
26. Professor B includes real-life stories in lectures.
27. Professor B is a fair grader.
28. Professor B is always patient with students.
29. Professor B is open to changing deadlines if deemed appropriate.
30. Professor B is young and connects with students well.
31. Professor B has messy handwriting and has trouble operating the overhead projector.
32. Professor B challenges the students to be creative during assignments.
**Student Evaluation Comments**

The following are various comments about each of the two professors. The comments were categorized and edited to produce the general versions of the comments that you see here. Please read each comment carefully.

33. Professor A appears enthusiastic about the topic.
34. Professor A allows students to work in groups.
35. The exams in Professor A’s class are easy.
36. Professor A’s course moves at a reasonable pace.
37. Professor A is inflexible in regards to required class attendance.
38. Professor A grades a test or assignment on a curve if everyone does poorly.
39. Professor A takes a class trip during the year.
40. Professor A learns the students’ names very quickly.

41. Professor B assigns lots of homework and gives weekly quizzes.
42. Professor B’s exams are difficult.
43. Professor B does not assign term papers.
44. Professor B has enough experience to teach well.
45. Professor B gives clear instructions for assignments.
46. Professor B allows absences without penalty.
47. Professor B drops the lowest exam grade.
48. Professor B wastes class time teaching information unrelated to the class.
Appendix B

*Questionnaire given to participants directly after collective recall task*

Your Thoughts…

Please rate your agreement with the following statements (please indicate your agreement with a number 1-9; 1 = Strongly Disagree, 5 = Neither Agree nor Disagree, 9 = Strongly Agree):

(1) I am a credible source of information about the professors. ____

(2) The group member to the left of me is a credible source of information about the professors. ____

(3) The group member to the right of me is a credible source of information about the professors. ____

(4) The information I contributed was accurate. ____

(5) The information the group member to the left of me contributed was accurate. ____

(6) The information the group member to the right of me contributed was accurate. ____

(7) Overall, I am happy with my group’s performance on the task. ____

(8) My groupmates tried to perform well on the task. ____

(9) My group performed better on the task than the average group in this experiment. ____

(10) I enjoyed working on this task. ____

(11) I wanted my group to do well on this task. ____

(12) If my group were to meet up in the future, I am confident that we would perform well on other tasks such as these. ____

(13) I like the other people in my group. ____
Appendix C

Drug information given to participants.

B+1

**SUMMARY**  
A clinical study of *Chol-BLUE* was conducted in a university medical center in California. In this study, 47 college-aged patients with high cholesterol were given *Chol-BLUE* for 9 months. It was found that LDL (bad) cholesterol was reduced by an average of 22% compared to pre-treatment levels.

**CONCLUSION**  
*Chol-BLUE* is effective when used to treat active, college-age patients.

**KEY PHRASE**  
Was effective in college-age patients.

**GIST**  
*Chol-BLUE* was effective in reducing LDL (bad) cholesterol when used to treat college-age patients.

B+2

**SUMMARY**  
The initial theoretical research and test-tube experiments done on *Chol-BLUE* recently received the "Excellence in Research Award" given by the American Association of Pharmaceutical Scientists (AAPS). The AAPS award announcement stated that "*Chol-BLUE* is a model example of rational drug design, and is one of the first drugs ever to have been designed exclusively via computer. The approach taken in designing *Chol-BLUE* is at the cutting edge of therapeutic drug development research."

**CONCLUSION**  
This award will be very advantageous in future efforts to market *Chol-BLUE* to physicians, who generally favor drugs that receive this type of scientific recognition.

**KEY PHRASE**  
Received an award for research excellence.

**GIST**  
The initial research done on *Chol-BLUE* received an award for research excellence. This award will help in future efforts to market this drug to physicians, who generally favor drugs that receive this type of scientific recognition.
SUMMARY

Cholesterol levels were examined in 234 laboratory rats following several types of experimental vascular surgery (involving major arteries, the heart, lungs, and/or pancreas). It was hypothesized that recovery from such procedures may be improved if blood cholesterol levels during the post-operative recovery period are tightly controlled. To test this idea, half of the animals in this study were treated with Chol-BLUE following surgery, and half were not treated. After four weeks, only one of the animals treated with Chol-BLUE showed signs of high cholesterol, whereas high cholesterol was evident in 31 (26%) of the untreated animals. Further, long-term survival was significantly better among animals treated with Chol-BLUE.

CONCLUSION

Chol-BLUE may be beneficial to human patients as a post-operative treatment following many types of surgical procedures.

KEY PHRASE

Improved post-operative recovery in rats.

GIST

Chol-BLUE improved post-operative recovery following experimental vascular surgery in rats, suggesting that this drug may benefit humans as a post-operative treatment following many types of surgical procedures.

SUMMARY

381 stroke victims from four different regional hospitals (Atlanta, Cincinnati, Denver, and Seattle) were treated with Chol-BLUE for a minimum of 1 year following an initial mild stroke. Overall, these patients were 18% less likely to suffer a second stroke during the follow-up period compared to a control group.

CONCLUSION

Chol-BLUE reduces the likelihood of secondary strokes.

KEY PHRASE

Reduced the risk of secondary stroke.

GIST

In one study, Chol-BLUE reduced the likelihood of secondary strokes.

SUMMARY

A study conducted at the Heart Institute of Miami examined the effect of Chol-BLUE in elderly patients (age 75-85; 68% female). A total of 349 patients with various heart disease diagnoses were treated for six months. It was found that blood levels of LDL (bad) cholesterol decreased in 72% of the patients. Men and women appeared to benefit equally from treatment with Chol-BLUE.

CONCLUSION

When used to treat elderly patients, Chol-BLUE is helpful a majority of the time.

KEY PHRASE

Helped a majority of elderly patients.

GIST

In one study, Chol-BLUE decreased LDL (bad) cholesterol in a majority of the elderly patients treated.
B-1

**Summary**
In order to produce *Chol-BLUE* in the quantities needed to sell it to the general public (via local pharmacies), Bluestone Pharmaceuticals (the maker of *Chol-BLUE*) will have to build a new manufacturing plant. Existing facilities do not have the capacity or equipment necessary to manufacture *Chol-BLUE*.

**Conclusion**
A new manufacturing facility would take up to 18 months to build. This would likely delay the product's launch date, and could lower short term profits.

**Key Phrase**
A new manufacturing plant would be needed.

**Gist**
A new manufacturing facility would need to be built in order to produce *Chol-BLUE*. It would take up to 18 months to build such a facility. This would likely delay the product launch date, and lower short-term profits.

B-2

**Summary**
A study of organ abnormalities (liver, kidney, and pancreas) was conducted at Northwestern Memorial Hospital's MRI research facility in Chicago. 45 volunteer patients who previously had been treated with *Chol-BLUE* were examined. Length of treatment with *Chol-BLUE* ranged from 6 to 30 months. It was found that nearly one-third of these patients showed some type of liver abnormality. These abnormalities were slightly greater among those treated with *Chol-BLUE* for a longer period of time.

**Conclusion**
Patients treated with *Chol-BLUE* may be susceptible to liver damage.

**Key Phrase**
An MRI study revealed liver abnormalities in some patients.

**Gist**
An MRI study revealed that patients treated with *Chol-BLUE* had an unusually high incidence of liver damage.

B-3

**Summary**
40 laboratory mice were given *Chol-BLUE* for 26 weeks. The offspring of these mice were then observed for three generations (20 months). Their first-generation offspring seemed normal. However, their second-generation offspring (i.e., their grandchildren) showed evidence of reproductive problems. Specifically, the second-generation offspring of these mice had fewer than average pups per litters, and their pups had lower than average birth weight.

**Conclusion**
*Chol-BLUE* may cause hidden reproductive problems in mice that appear in subsequent generations. It is unknown whether similar problems might also occur in human.

**Key Phrase**
Mice showed signs of hidden reproductive problems.

**Gist**
*Chol-BLUE* caused hidden reproductive problems in mice that appeared in subsequent generations (specifically, offspring that had fewer-than-average pups per litters, and pups of lower-than-average birth weight). It is unknown whether similar problems might also occur in human.
SUMMARY
The blood cholesterol of 39 postmenopausal volunteer patients (ages 52-66) from Dallas was monitored on a weekly basis for 10 months. The first month was used as a baseline, after which Chol-BLUE was administered for 9 months. A disturbing finding from this study was that after six months of treatment, HDL (good) cholesterol dropped significantly, eventually reaching half its baseline level, on average. This suggests that Chol-BLUE may have an undesirable effect on certain normal metabolic processes.

CONCLUSION
Chol-BLUE may have the unwanted effect of depressing HDL (good) cholesterol in some female patients.

KEY PHRASE
Depressed the production of normal HDL (good) cholesterol.

GIST
In a study of female patients, Chol-BLUE had an adverse effect on the production of HDL (good) cholesterol.

R+1
SUMMARY
A summary analysis of the results of 9 studies conducted by Reddington Pharmaceuticals (the maker of Chol-RED) using four species of animals (cats, hamsters, rabbits, and rats) found that Chol-RED is absorbed into the bloodstream very rapidly and almost completely (94% on average). Its absorption characteristics are significantly better than those for other cholesterol-lowering drugs currently on the market.

CONCLUSION
Chol-RED is fast-acting in animals, and is likely to be equally fast-acting in humans. Physicians who prescribe cholesterol-reducing drugs will find this characteristic very desirable.

KEY PHRASE
Was absorbed fast and completely.

GIST
Chol-RED is fast-acting in animals, meaning that it is absorbed quickly and completely. It should be equally fast-acting in humans. Physicians who prescribe cholesterol-reducing drugs will find these characteristics very desirable.
**R+2**

**SUMMARY**
Several cholesterol-lowering drugs currently on the market cannot be used by patients who also suffer from kidney disease. To determine whether this is also true for **Chol-RED**, the impact of **Chol-RED** on kidney functioning was examined in 58 patients diagnosed as simultaneously having high cholesterol and kidney disease. Following six months of treatment with **Chol-RED**, total blood cholesterol levels fell by an average of 23%, LDL (bad) cholesterol fell by 27%, and there were no clinical signs of worsened kidney functioning.

**CONCLUSION**
Unlike other drugs currently on the market, **Chol-RED** can be safely used by patients suffering from kidney disease.

**KEY PHRASE**
Worked in humans, with no evidence of kidney damage.

**GIST**
**Chol-RED** reduced LDL (bad) cholesterol, with no evidence of kidney damage. So, unlike other drugs currently on the market, this drug can safely be used by patients suffering from kidney disease.

**R+3**

**SUMMARY**
The effect of **Chol-RED** on coronary (heart) artery functioning was examined. Sixty rabbits were fed a cholesterol-rich diet and were also treated with **Chol-RED**. Sixty other rabbits where fed the same cholesterol-rich diet but without **Chol-RED**. The untreated animals showed a significant decrease in blood flow after 13 weeks, indicating that their coronary arteries were being clogged by a cholesterol buildup. In contrast, animals treated with **Chol-RED** showed no negative effects of the cholesterol-rich diet.

**CONCLUSION**
**Chol-RED** appears to protect arteries against the negative effects of a cholesterol-rich diet. This same benefit may also occur in humans.

**KEY PHRASE**
Prevented clogged arteries in rabbits.

**GIST**
**Chol-RED** prevented clogged arteries in rabbits, thus protecting them against the negative effects of a cholesterol-rich diet. This same benefit may also occur in humans.
Unlike many other drugs currently on the market, *Chol-RED* does not lose its potency when heated. This means that it can be used effectively even when incorporated as an additive in hot foods. The effect of *Chol-RED* when used as an additive in hot breakfast cereal was evaluated in 26 patients (ages 19-41) with genetically inherited high cholesterol. Daily consumption of the breakfast cereal enriched with *Chol-RED* resulted in a 17% reduction in LDL (bad) cholesterol relative to baseline. None of these patients reported being able to taste *Chol-RED* when it was present in the cereal.

**CONCLUSION**  
*Chol-RED* can be delivered in a unique way that some patients will find especially convenient.

**KEY PHRASE**  
Was effective when put into hot breakfast cereal.

**GIST**  
*Chol-RED* remains effective when added to hot foods. This is a unique method of drug delivery that some patients will find both convenient and desirable.

The results of several research studies testing *Chol-RED* were sent to senior officials at the American Heart Association for review. Their reaction was positive. They said that if the FDA approves *Chol-RED* for sale to the general public, the American Heart Association will consider giving the drug its official endorsement.

**CONCLUSION**  
An endorsement by the American Heart Association could be used in advertising to foster consumer confidence in *Chol-RED*. This will improve sales.

**KEY PHRASE**  
American Heart Association may endorse.

**GIST**  
The American Heart Association may endorse *Chol-RED*. This endorsement could be used in advertising campaigns to foster consumer confidence and improve sales.
**R+6**

**SUMMARY**
An on-going, long-term study of the effectiveness of *Chol-RED* is being conducted in 1159 high-risk Welsh men (ages 38-51). "High risk" is defined in this study as "abundant evidence of cardiovascular (CV) disease." The study has been in progress for 3.5 years. Preliminary results from this investigation are favorable. Compared to untreated patients, the death rate due to cardiovascular disease among patients given *Chol-RED* has decreased by about 14%.

**CONCLUSION**
Treatment with *Chol-RED* extends the life expectancy of patients with cardiovascular disease.

**KEY PHRASE**
Reduced the CV death rates in humans.

**GIST**
*Chol-RED* reduced the death rate of patients diagnosed with cardiovascular disease.

---

**R+7**

**SUMMARY**
Two forms of *Chol-RED* (tablet and liquid) were given to 40 children (ages 10-14) over a 12-week period. These children were all diagnosed with genetically inherited high cholesterol. Both forms of the drug were taken three times a day. 62% of the children preferred the tablets to the liquid form, but significant reductions in LDL (bad) cholesterol (21% on average) were observed with both forms.

**CONCLUSION**
*Chol-RED* can be produced in different forms, thereby giving consumers greater choice in how they take it. Consumers will view this as an advantage.

**KEY PHRASE**
Both tablet and liquid forms worked in kids.

**GIST**
Both tablet and liquid forms of *Chol-RED* were effective in reducing LDL (bad) cholesterol in children. This gives consumers the advantage of choosing the form in which they take this drug.

---

**R+8**

**SUMMARY**
A market research firm was hired to conduct a consumer healthcare attitude survey in suburban shopping malls in 16 U.S. metropolitan areas. After hearing a verbal description of *Chol-RED*, as well as descriptions of two cholesterol-lowering drugs already on the market, consumers said they were likely to prefer *Chol-RED*. Specifically, they said they would be more willing to ask their doctor to prescribe *Chol-RED* if they knew they had high cholesterol, and they would be more willing to recommend *Chol-RED* to a friend.

**CONCLUSION**
There is likely to be a strong consumer preference for *Chol-RED*.

**KEY PHRASE**
A market survey suggests strong consumer demand.

**GIST**
A market survey found that there is likely to be a strong consumer demand for *Chol-RED* over other cholesterol-lowering drugs already on the market.
The compounds that make up Chol-RED have a very short shelf life. This means that they cannot be stored for long periods of time or they will go bad. Due to uncertainties in the month-to-month rate of consumption of Chol-RED, and to the long lead time needed to re-order supplies, Reddington Pharmaceuticals (the maker of Chol-RED) will probably end up throwing away nearly 20 percent of all the Chol-RED it produces because the product’s shelf life will have expired.

This shelf-life problem means unavoidable production waste, and makes Chol-RED a more costly drug to manufacture than at first it might seem. It also means that patients cannot purchase large amounts of Chol-RED at any one time, thus forcing them to get more frequent refills. Most patients will view this as an inconvenience.

Has short shelf life and creates production waste.

Chol-RED has a very short shelf life. This makes the drug more costly to produce, because it implies more production waste, and it will force consumers to get refills more frequent, which will likely be seen as an inconvenience.
Appendix D

*Questionnaire given to participants after hidden profile task*

Post-Discussion Questionnaire

Imagine that you had to make the decision on your own. How would you distribute the fund individually?

____ Percentage of fund to Chol-BLUE

____ Percentage of fund to Chol-RED

____ Percentage of fund saved

____ Total (must equal 100)

1) Overall, how well do you feel your groupmates prepared themselves when studying the information about cholesterol-lowering drugs? (Please circle only one number)

0 1 2 3 4 5 6

Not at all          Very Well
Well

Specifically, during the cholesterol-lowering drug task, how confident were you in your ability to…

2) …remember information you read during today’s session:

0 1 2 3 4 5 6

Not at all          Very Confident
Confident

3) …decide which information you read during today’s session was relevant to the group decision:

0 1 2 3 4 5 6

Not at all          Very Confident
Confident
(4) Overall, how confident were you in yourself during today’s session?

0  1  2  3  4  5  6
Not at all   Confident  Very Confident
Specifically, during the cholesterol-lowering drug task, how confident were you in your groupmates’ ability to…

(5) …remember information they read during today’s session:

0  1  2  3  4  5  6
Not at all   Confident  Very Confident

(6) …decide which information they read during today’s session was relevant to the group decision:

0  1  2  3  4  5  6
Not at all   Confident  Very Confident

(7) Overall, how confident were you in your groupmates during today’s session?

0  1  2  3  4  5  6
Not at all   Confident  Very Confident
Even more specifically, during the cholesterol-lowering drug task, how confident were you in the group member to your left’s ability to…

(8) …remember information he/she read during today’s session:

0  1  2  3  4  5  6
Not at all   Confident  Very Confident
(9) …decide which information he/she read during today’s session was relevant to the group decision:

```
Not at all       Very Confident
0   1   2   3   4   5   6
Confident
```

(10) Overall, how confident were you in the group member to your left during today’s session?

```
Not at all       Very Confident
0   1   2   3   4   5   6
Confident
```

Specifically, during the cholesterol-lowering drug task, how confident were you in the group member to your right’s ability to…

(11) …remember information he/she read during today’s session:

```
Not at all       Very Confident
0   1   2   3   4   5   6
Confident
```

(12) …decide which information he/she read during today’s session was relevant to the group decision:

```
Not at all       Very Confident
0   1   2   3   4   5   6
Confident
```

(13) Overall, how confident were you in the group member to your right during today’s session?

```
Not at all       Very Confident
0   1   2   3   4   5   6
Confident
```
(14) During the drug task, if another group member tried to talk about an aspect of Chol-RED that you had not heard of before, how likely were you to believe that what he/she was saying was accurate?

0  1  2  3  4  5  6
  Not at all          Cared
    Likely            Very Much

(15) How much did you care about your group’s performance during the cholesterol-lowering drug task?

0  1  2  3  4  5  6
  Did not care        Cared
    At all            Very Much

(16) Overall, how happy were you with your group?

0  1  2  3  4  5  6
  Not at all          Very Happy
    Happy

Please rate your agreement with the following statements (please indicate your agreement with a number 1-9; 1 = Strongly Disagree, 5 = Neither Agree nor Disagree, 9 = Strongly Agree):

(17) I feel competent at determining the better cholesterol-lowering drug. ____

(18) The group member to the left of me is competent at determining the better cholesterol-lowering drug. ____

(19) The group member to the right of me is competent at determining the better cholesterol-lowering drug ____

(20) The drug information I contributed was accurate. ____

(21) The drug information the group member to the left of me contributed was accurate. ____

(22) The drug information the group member to the right of me contributed was accurate. ____

(23) I am a credible source of information about the drugs. ____

(24) The group member to the left of me is a credible source of information about the drugs. ____

(25) The group member to the right of me is a credible source of information about the drugs. ____
Please rate yourself on the following dimensions. To what extent are you:

(26) Assertive

-3  -2  -1  0  1  2  3

Very  Shy

Very  Assertive

(27) Dominant

-3  -2  -1  0  1  2  3

Very  Submissive

Very  Dominant

(28) Forceful

-3  -2  -1  0  1  2  3

Very  Delicate

Very  Forceful

(29) What do you think was the purpose of today’s session?

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

(30) Do you think the two tasks were related?

___ Yes

___ No

If yes, how?

______________________________________________________________________________

______________________________________________________________________________

(31) If you have any other comments, leave them in the space below:
Demographic Questionnaire

Please answer these questions as accurately as possible. If any of the following items make you feel uncomfortable, you may leave it blank.

(1) What is your gender? ___M     ___F
(2) What is your age? _____
(3) Is English your primary language?
   ___Yes
   ___No
(4) How would you classify yourself? (Check all that apply)
   ___ African American
   ___ Arabic
   ___ Asian/ Pacific Islander
   ___ Caucasian
   ___ Hispanic
   ___ Multiracial
   ___ Native American or Alaskan Native
   ___ Other (please specify)__________________
(5) What is your major? ______________________
(6) Have you had any experience or training with cholesterol-lowering drugs?
   ___ Yes
   ___ No
   If yes, describe your experience __________________________________________________
   ______________________________________________________________________________
(7) Were you familiar with any of the subjects who also participated in today’s session before the session began?
   ___ Yes
   ___ No
   If yes, describe how you were familiar ______________________________________________
(8) Please provide your PIN ______
Appendix E

*Instructions given to students during procedure.*

INTRODUCTION

Let’s get started.

My name is _________, and this is Dr. Wiley’s lab, and what we are interested in is group decision making. Specifically, our studies look at various factors that can improve a group’s decision. *Optional Manipulation:* You are all eligible to participate today because, according to a questionnaire you filled out during the mass-testing session, we believe that you may possess a special talent for this type of decision-making, and this study is being conducted to explore the effect of this added variable. You may have noticed when you signed up for the study that a very small number of students were eligible to participate. The reason for this is that you had to fill out the questionnaire in a way that suggested you had special ability, and few students responded to the questionnaire in this manner.

Today you will do two main things:
First, you will read some information about 2 professors here at UIC, one who did and one who did not receive a teaching award. Your task will be to decide which of the 2 was the one who actually received the award.
Your second task will involve information about a couple of cholesterol-lowering drugs. For this task, you will be asked to discuss this information as a group, and as a group decide as a group which of the two drugs seems more likely to become commercially successful.
After the group decision is made, you will fill out some questionnaires.

So that is basically what we are doing today. Are there any questions?

OK, then. Please sign this agreement to participate form after reading it carefully… ...(informed consent process)

PROFESSOR EVALUATION INFO

As stated before, the first task concerns deciding which of two professors won a teaching award. Both of these professors were eligible for the “Silver Circle” teaching award. If you are unfamiliar with this award, I will explain this process. Every year, the graduating seniors vote on the professor that they like best, or that they believe is the most effective teacher on campus. So basically, the award goes to the professor that is the most popular with students. Be sure to keep this in mind as you read the information about these professors. The information that you are going to read consists of comments taken from the end-of-semester course evaluations done in the professor’s classes in a recent semester. You will have 2 minutes for this task, and when the two minutes are up, I will ask you to write down which professor you think won the award. **You may not discuss this information with anyone else during this time.**

(After 2 minutes, have participants note on index card their professor choice- collect materials)
SURPRISE COLLECTIVE RECALL TASK

Now, we would like you to work together to remember every evaluation that was contained in the packets. BUT, I want you to do this WITHOUT mentioning which professor you individually chose. You are only to talk about the comments themselves. I want one of you to write down the evaluation comments that the group recalls. Go ahead and choose now which person will perform this writing task….Thanks- here is a pen and paper. (Give pen and form to scribe.) Notice how the form is laid out. You can number your entries in between these parentheses and then write the evaluation comment on this line. You may use as many sheets of this as you need. One more thing before you begin. Another goal of this task is to remember each comment as accurately as possible. Try to remember and write down each comment verbatim, exactly as you read it. I will be counting how many comments the group can recall, but I’ll only count it as a correct recall if it is word-for-word. Ok, so remember, this is a group task so everyone should pitch in as much as possible, and it’s your (scribe) job to write everything down. You will have 10 minutes to recall as many comments, word-for-word, as you can. Any questions? OK, you may begin.

(After 10 minutes, collect materials and administer questionnaire.) (Questionnaire not administered in pilot)

DRUG BACKGROUND INFO

For the next task, you will be given information to read about two hypothetical cholesterol-lowering drugs. You will have to use this information to choose which of the companies that produce these drugs is more likely to be commercially successful. Before I give you that, however, I wanted to give you some background information about cardiovascular disease and cholesterol in general, and some specific things you should keep in mind when you are thinking about the drugs. This information will help you to evaluate the drugs themselves.

Cardiovascular disease is the largest cause of death in the United States and has been every year except 1918. More than 2600 Americans die every day from the disease, which averages to one every 33 seconds. 1 in 3 men can expect to develop some form of the disease and 1 in 10 women can expect it.

A major component of cardiovascular disease is clogging of the arteries, and high cholesterol is a major cause of that clogging. If an artery that is feeding the heart becomes clogged, you can have a heart attack. If an artery that feeds the brain becomes clogged you can have a stroke.

According to the American Heart Association, 35% of Americans need to lower their cholesterol. Some people have high cholesterol because of their diet, and some people inherit the problem. Or, it is a combination of these two factors. Regardless, though, high cholesterol levels need to be lowered.

There are two main types of cholesterol, the bad cholesterol, called LDL, and the good cholesterol, called HDL. The bad cholesterol, the LDL, makes up 80% of the cholesterol in your body and is associated with an increased risk of cardiovascular disease. The good cholesterol, the HDL, makes
up the remaining 20% in your body and is associated with a decreased risk of cardiovascular
disease.

So, the purpose of a cholesterol-lowering drug, then, is to lower the bad cholesterol, the LDL, and
raise the good cholesterol, the HDL. Overall, though, it is more important to lower the bad
cholesterol, the LDL.

That was some background information. Are there any questions?

Let me turn now to suggest four specific guidelines that will be helpful to you in evaluating the
cholesterol-lowering drugs.

First, the drug needs to be both safe and effective. It should be safe and effective in both the short-
term and the long-term. In order to assure this, drug companies do extensive testing. First, they try
the drug out on animals. Then, if the animal tests show the drug is both safe and effective, they test
it on humans. It is only after this extensive testing on both animals and humans that the Food and
Drug Administration will approve the drug.

Second, the drug also needs to be easy and inexpensive to produce. For example, raw materials
need to be readily available and there needs to be suitable manufacturing facilities.

Third, the drug should work for all kinds of people. That is, it should work for both men and
women, and younger and older people. It also needs to be something that they can continue to use
for a long time.

Finally, patients should like the drug. If the drug works well, then doctors will prescribe it, but if a
patient doesn’t like the drug, he or she will not take it whether or not the doctor prescribes it. A
patient may like a drug for many reasons. For example, the drug may require only 2 pills a day
instead of 6, come in many forms such as liquid or gel-tabs, or may not require that the patient take
it with food.

So to review, the drug should be:
1- Safe and effective
2- Easy and inexpensive to produce
3- Usable for all kinds of people
4- Well-liked by patients

Those are some specific concerns about cholesterol-lowering drugs. Are there any questions?...

Ok, now let me get the information for you to read. (pass out packets) As you read this
information, I should tell you that you are going to have to make a decision about which company
is more likely to be more successful.

DRUG INFORMATION

You will be reading about two drugs. We’ll call one Chol-Blue and the other Chol-Red. Also, to
keep it simple, we’re calling the company that produces Chol-BLUE Bluestone Pharmaceuticals,
while the company that produces Chol-RED is called Reddington Pharmaceuticals. I’ll give you 15 minutes to read through these. However, there is a specific way I want you to do it. When your time begins, I want you to read the entire packet, front to back. After this, write the key phrase of each piece of information on these key phrase slips. Then, I want to rank them in order of importance—so the top slip should be the piece of information that should sway the group decision the most, while the bottom slip should sway the decision the least. After you are done with this, attach the slips together using the paperclips I have provided.

GROUP DISCUSSION

Is everyone done? Great. If I could just get those back from you… (collect packets).
Here is the form that you must now fill out as a group. Please follow along while I read the information to you. Imagine now that you are all members of a committee in charge of handling a large fund of money (Specifically, $2.6M). The boss wants you to invest the money in the two drug companies. Your job is to decide how much of the fund should be invested in each company. You may, however, save a portion of the fund for later investments. This kind of decision happens a lot in the real world, when companies bring committees together to make an investment decision for the company, so this is what we are trying to simulate. You will have 15 minutes to make this decision.

(After 15 minutes, collect materials and administer final questionnaire.)
Approval Notice
Continuing Review

December 19, 2011

Ryan Leach, BA
Psychology
1007 W Harrison St
Chicago, IL 60607
Phone: (270) 847-3475 / Fax: (312) 413-4122

RE: Protocol # 2009-1096
“Group Decision Making”

Dear Mr. Leach:

Your Continuing Review was reviewed and approved by the Expedited review process on December 15, 2011. You may now continue your research.

Please note the following information about your approved research protocol:

Protocol Approval Period: January 11, 2012 - January 9, 2013

Approved Subject Enrollment #: 500 (limit data analysis for 156 enrolled in study)

Additional Determinations for Research Involving Minors: The Board determined that this research satisfies 45CFR46.404, research not involving greater than minimal risk.
**Performance Sites:**  UIC

**Sponsor:**  None

**PAF#:**  Not Applicable

**Research Protocol(s):**

a. Group Decision Making Protocol

**Recruitment Material(s):**

a. N/A-limited to data analysis only

**Informed Consent(s):**

a. N/A-limited to data analysis only

Your research meets the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific category(ies):

(6) Collection of data from voice, video, digital, or image recordings made for research purposes., (7) Research on individual or group characteristics or behavior (including but not limited to research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

**Please note the Review History of this submission:**

<table>
<thead>
<tr>
<th>Receipt Date</th>
<th>Submission Type</th>
<th>Review Process</th>
<th>Review Date</th>
<th>Review Action</th>
</tr>
</thead>
</table>

Please remember to:
Use your research protocol number (2009-1096) on any documents or correspondence with the IRB concerning your research protocol.

Review and comply with all requirements on the enclosure,
"UIC Investigator Responsibilities, Protection of Human Research Subjects"

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 996-1711. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Alison Jones, MSW, MJ
IRB Coordinator, IRB # 2

Office for the Protection of Research Subjects
NAME: Ryan Courtney Leach

EDUCATION: B.A., Psychology, Murray State University, Murray, Kentucky, 2009


Leach, R., & Waddill, P. J. (2008, May). Personal drinking behavior and the believability of alcohol norm information. Poster presented at the annual meeting of the Association for Psychological Science, Chicago, IL.

Waddill, P. J., Mitchell, C., & Leach, R. (2010, November). Predicting object location memory from simple and complex working memory spans. Poster presented at the 51st Annual Meeting of the Psychonomic Society, St. Louis, MO.


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