Does Information Sharing Always Improve Team Decision Making?
An Examination of the Hidden Profile Condition in New Product Development

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Abstract

This research examines the effects of information sharing and information use on team decision making. While past studies are based on an implicit assumption that information sharing always leads to information use and optimal decision outcomes, the authors argue that this assumption is applicable only when information is equally distributed among decision makers in a team. By adopting the hidden profile paradigm, the authors suggest that when information is unequally distributed, information sharing does not facilitate optimal decision making. In the meantime, they find that team functional diversity is a main factor worsening the hidden profile situation – that is, when decision makers are diverse in terms of their functional backgrounds, the facilitating effect of information sharing decreases. Results indicate that information use, rather than information sharing, is the ultimate gateway that leads decision makers to optimal decision outcomes.

Key Words: team decision making, information sharing, information use, hidden profile, information distribution, functional diversity
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"Team members frequently discuss the information that they are aware of... and fail to seek unique information from others. That dysfunctional pattern undermines the very reason that organizations form diverse teams."

-----Bazerman and Chugh (2006, p. 96)

1. Introduction

A well-recognized advantage of teamwork is the combined pool of information shared by team members in the decision making process (e.g. Mesmer-Magnus & DeChurch, 2009; Troy, Hirunyawipada, & Paswan, 2008). To realize such an advantage requires team members to effectively share and further collectively use the information. While information sharing is often viewed as a critical facilitator for team decision making, a number of empirical studies suggest that it may not be as impactful as supposed under certain circumstances (e.g. Larson, 2009; Henard & Szymanski, 2001; Stasser & Titus, 1985). Given the importance of better understanding managerial decision making, exploration on when and why such inconsistency exists is vital and meaningful.

Prior decision making research is often based on an implicit assumption that the sharing of information necessarily results in the actual use of that information. Empirical evidence in this research suggests that this assumption is not always applicable. Specifically, we endorse the assumption that information sharing leads to information use when information is equally distributed among team members – that is, they possess the same set of information. However, we challenge this assumption when information is unequally
distributed – that is, they possess different information. When team members hold their own information (i.e. unique information) in addition to overlapping information (i.e. common information), they often focus on common but not unique information (e.g. Lightle, Kagel, & Arkes, 2009; Toma & Butera, 2009). In such a situation, information sharing is unlikely to serve as a catalyst for optimal decision making (Larson, 2009; Mojzisch & Schulz-Hardt, 2010). This study compares the two conditions, equal information distribution (EID) and unequal information distribution (UID), addresses the question of when and why information sharing gains or loses its impact on team decision making, and meanwhile calls for attention to the role of the actual use of information for team decisions.

Adopting the hidden profile paradigm (e.g. Larson, 2009; Lightle, et al., 2009; Lu, Yuan, & McLeod, 2012; Mojzisch & Schulz-Hardt, 2010), we examine relationships among information sharing, information use, and team decision outcomes, and argue that information sharing does not ensure optimal decisions. The hidden profile is a phenomenon where each team member possesses common information and also his or her own unique information. Under this circumstance, teams prioritize common information over unique information in the decision making process, which in turn leads to suboptimal decision outcomes (Lightle, et al., 2009; Stasser & Titus, 1985). The hidden profile has been documented in real-world business practice where information is unequally distributed among team members due to their different information sources, expertise, knowledge, education, training, and so forth. For example, new product development teams in high-technology industries over-rely on common information and making “safe” decisions devoid of new insights and vision (Jassawalla & Sashittal, 2000).
Moreover, firms often adopt functionally diverse teams for decision making. This type of team is credited for providing various knowledge and supposedly fostering decision quality (Qiu, Qualls, Bohlmann, & Rupp, 2009). For example, in cross-functional new product development teams of John Deere (a leading manufacturer of agricultural machinery), marketing and technology staff work together in order to collect customer insights and then use them to improve the technical design of new products (Cable, 2008). Despite merits of the cross-functional team discussed in extant literature, its dark side, such as narrow focus on own background knowledge (Bazerman & Chugh, 2006) and inconsistent opinions on best solutions (Cronin & Weingart, 2007), could aggravate the hidden profile problem. In line with this view, we argue that functional diversity easily harbors the hidden profile because teammates have unique information that is not owned by others and only common information serves as a base of social validation (Phillips, Mannix, Neale, & Gruenfeld, 2004). In this regard, functional diversity distracts the team’s attention to unique information even more dramatically, and negatively moderates the relationship between information sharing and unique information use. When information is equally distributed to team members, however, team functional diversity will not hurt team decision outcomes because it is easy for a team to socially validate all information and make optimal decisions.

In summary, we contend that the ultimate factor that alters team decisions is information use rather than information sharing. While information sharing has been underlined as an important stream of business research, we question the effectiveness of information sharing and suggest that sharing unique information in hidden profile does not warrant actually using that information. Accordingly, we compare the relationships of
information sharing, information use, and decision outcomes between two information distribution conditions: EID vs. UID. Our conceptual framework is displayed in Figure 1.

Manipulating the two conditions in our experiment, we found that in the EID condition, information sharing affects decision outcomes and this relationship is fully mediated by information use. In the UID condition, although information use affects decision outcomes, information sharing and decision outcomes are not related. While taking team functional diversity into consideration, we found that the situation becomes worse. This study provides valuable insights into the prism of team decision making, underlining the fact that information sharing does not always improve team decisions. Managers form cross-functional teams based on the delusion that uniquely held information by each team member will lead to better decision outcomes. We suggest that this is not necessarily the case.

2. Theory and Hypothesis

2.1 Team Decisions in Equal Information Distribution (EID)

Information sharing is the attempt that team members deliberately and consciously make to mention information related to decision making (Parayitam & Dooley, 2009). It has been viewed as a critical antecedent of decision outcomes in academic research and corporate practice (Mesmer-Magnus & DeChurch, 2009; Neilson, Martin, & Powers, 2008). However, close scrutiny of past empirical studies reveals rather mixed results. In a study of new product development teams, Henard and Szymanski (2001) find that information sharing across different functions is not correlated with better team decisions. Frishammar and Hötte (2005) maintain that information sharing on technology and industry environment is not positively
related to new product decisions. Recently, Shin and colleagues (2012) obtain mixed findings on the relationship between information sharing and team performance.

Prior research reveals an underlying assumption that information sharing ensures the utilization of “all cognitive resources available to the group” and “thus increase group performance” (Bezrukova, Jehn, Zanutto, & Thatcher, 2009, p. 39), implying that information sharing leads to information use, which in turn improves decision quality. We suggest that this assumption may not be applicable under certain circumstances, concerning those inconsistent findings with respect to information sharing in prior research.

Different from information sharing, information use refers to “taking information into account when making decisions” (Diamantopoulos & Souchon, 1999, p.2). Information use has been well studied in individual decision context, but not much in team dynamics. Shared information is valuable only when it is actually used, and the extent to which information is used rests upon how information is distributed among team members (Stasser & Titus, 1985). We maintain that information use needs to be examined separately from information sharing, and its role is crucial for decision outcomes. As a result, in this research we compare effects of information sharing and information use between EID and UID conditions.

In the EID condition, each team member holds the same set of information. All of the information can be shared and therefore socially validated. Thus, the team can fully use all available information to discover that in total there is more information favoring one particular, superior outcome than other alternatives (Zhang, Basadur, & Schmidt, 2014). Since team members have consistent information, ignorance, distortion, hiding, and overemphasis of information are less likely to occur. When information is shared, teams in
the EID condition are able to more readily improve their understanding of available alternatives and therefore use the information more effectively. Correspondingly, the use of correct information in team decision making increases as a result of increasing information sharing. Only when teams correctly use information, the full picture of available options will be clear and optimal decisions can be made. Therefore, information sharing does lead to optimal decisions, and this relationship is mediated by information use.

**H1:** In the equal information distribution (EID) condition, information use fully mediates the relationship between information sharing and the decision outcome.

**H1a:** Information sharing affects information use.

**H1b:** Information use affects the decision outcome.

### 2.2 Team Decisions in Unequal Information Distribution (Hidden Profile)

The role of information sharing and information use differs in the UID condition. Previous business research rarely clarifies whether information is equally or unequally distributed. However, such clarification is critical to both academic research and real-world practice (Zhang, Basadur, & Schmidt, 2014). UID suggests that although team members hold some information in common, each of them has his or her own unique information due to different information sources, knowledge, training, and so forth. When information is unequally distributed, unique information often plays a critical role in making optimal decisions (Larson, 2009; Lu, et al., 2012; Stasser & Titus, 1985). This phenomenon is referred to as “hidden profile,” as illustrated in Figure 2. The hidden profile depicts a phenomenon where “a superior decision alternative exists but its superiority is hidden from individual members because they each have only a portion of information that supports the superior alternative” (Stasser & Stewart, 1992, p. 426). It underscores a tendency that teams prioritize common information over unique information while making decisions. Overcoming
hidden profiles – which occur when team members fully use the unique information held by each of them – results in better decision outcomes.

------ Figure 2 is inserted about here ------

Studies of the hidden profile have suggested a number of explanations as to why this situation is difficult to overcome, including pre-discussion preference (Gigone & Hastie, 1993), social desirability and consensus seeking (de Dreu, et al., 2011), social loafing (Chidambaram & Tung, 2005), group decision procedure (Greitemeyer, Schulz-Hardt, & Brodbeck, 2006), and epistemic motivation (Reimer, Reimer, & Czienskowski, 2010). Overall, common information has more influence than unique information during group discussion because the former, rather than the latter, can elicit social validation between team members in the decision making process (Mojzisch & Schulz-Hardt, 2010; Stasser & Stewart, 1992).

Extant hidden profile literature has focused on information sharing but not addressed the explicit difference between sharing and use. We posit that people share but may not use unique information. In other words, in the UID condition, the key question is whether or not team members actually use the unique information even if they share that information with each other. Such exploration is also in need to understand the fundamental causes of (sub)optimal decisions.

We suggest that in situations where information is unequally distributed, information sharing alone does not warrant better decision outcomes for the following reasons. First, the probability of common information being accepted by others in group discussion is higher because common information can be easily confirmed in each team member’s own
information pool (Larson, 2009). Further, the accepted common information serves as a reference point for decision makers (Stasser & Titus, 1985), because it has been socially validated (Mojzisch & Schulz-Hardt, 2010; Stasser & Stewart, 1992). Since unique information is often critical for optimal decision making, the dominant focus on common information results in suboptimal decisions.

Information use, as part of information processing, reflects whether a specific item of information serves as basis for the group’s final decision based on a joint task. Information use emphasizes the actual reasoning of decisions. Since in the UID condition team members base their reasoning primarily on common information (Lightle, et al., 2009), such information is more likely to be used for decision making and thus hinders the eventual utilization of unique information. Even if unique information is shared, the team may not use that information for decision making. In other words, sharing information – especially unique information – does not determine team decisions; instead, actually using specific information does.

**H2:** In the unequal information distribution (UID) condition, while (a) information sharing is not related to the decision outcome, (b) information use determines the decision outcome.

### 2.3 Functional Diversity and Hidden Profile

Extant literature generally agrees that functional diversity is important for team decisions (Troy, et al., 2008), as cross-functional teams are suggested to bring diverse knowledge beneficial for optimal decisions. While such teams are commonly used in real-world decision tasks, some researchers have revealed a dark side of diversity: It limits team members to their own specialty-related information rather than information held by team members with other functional backgrounds (Bazerman & Chugh, 2006). The lack of
appreciation on the information shared by fellow team members has been shown to incur a negative impact on team performance (Jehn, Northcraft, & Neale, 1999). Agreement is especially harder to reach when unique information exists, because that information is unfamiliar to others (Cronin & Weingart, 2007). Then it is “difficult for expert members to demonstrate the correctness of their perspective prior to the completion of the group’s task” (Thomas-Hunt & Phillips, 2004, p. 1585). Accordingly, we argue that in the UID condition, although functional diversity broadens a team’s knowledge scope, it lessens the relationship between information sharing and unique information use.

An agreed decision by team members is hard to reach because they are from different functions and interpret problems from diverse perspectives. In cross-functional teams, people reduce the cognitive demand of evaluating all of the shared information but instead focus mainly on self-relevant information (Cronin & Weingart, 2007). In such a situation, they tend to have more disagreement since the information they focus on varies. Hence, more conflicts could occur between members regarding which information to use. Common information, which is held by every team member, can be easily validated (Phillips, et al., 2004) and thus lessens the disagreement and conflict. On the contrary, unique information is even less likely to be accepted as it is difficult to demonstrate the usefulness of a unique perspective (Thomas-Hunt & Phillips, 2004). Consequently, in high-diversity teams, even if unique information is shared, teams will still use common information to reach a final agreement in order to avoid conflicts. On the other hand, in low-diversity teams, similar backgrounds and information-processing styles make it easier for team members to appreciate and thus use unique information shared with each other. As such, functional diversity negatively
moderates the relationship between information sharing and unique information use.

H3: In the unequal information distribution (UID) condition, functional diversity negatively moderates the relationship between information sharing and unique information use.

3. Methods

3.1 Overall Research Design

We adopted the experiment approach to test our hypotheses for two reasons. First, experiments better establish causal relationships than many other techniques. Second, an argument we attempt to make is the non-significant effect of information sharing in the UID condition, which would be not possible to be identified by a survey. This is because involved managers are unlikely to be aware of the existence of hidden profiles. In other words, even though a hidden profile exists, managers may not be able to acknowledge and deliberate it. Thus, an experimental design is the most suitable approach serving our research goals and allows us to manipulate the two information distribution conditions.

We used a typical managerial decision context for the experimental scenario: new product development. A majority of U.S. firms use idea-to-launch systems to develop new products (Cooper, 2008). In a given project based on such systems, following each development stage a management team makes a go/stop decision based on its forecasted performance. If performance is favorable, the team continues the project; if not, the team stops it to prevent further investment loss (Biyalogorsky, Boulding & Staelin, 2006). Since decision making involves choosing between alternatives, we designed two product development projects and asked participants to select one to continue and another to stop.

Fourteen information items (see Table 1) were used based on research by Hart, Hultink, Tzokas, and Commandeur (2003), which lists widely adopted performance criteria in
new product development. Consistent with Lightle, et al. (2009), we assigned a number/rating to each criterion rather than employ descriptions in text. “This is a standard strategy in experimental economics and, indeed, served to create substantially more homogenous preferences” (Lightle, et al., 2009, p.569) and thus makes the manipulation of the EID and UID conditions more salient. Design of the information distribution conditions was strictly based on instructions in previous studies (e.g. Larson, 2009; Lightle, et al., 2009; Stasser & Stewart, 1992). We purposefully made 9 items favor one project (Vehicle Weight Sensor) and 5 items another (Driver Reflex Sensor). In the EID condition, every team member possessed a consistent set of information (i.e. 14 information items in Table 1). In the UID condition, every team member possessed a partial set of information (see Table 1 and Figure 2). Specifically, all team members held the same 5 information items favoring Driver Reflex Sensor (i.e. common information); and each member was given 3 additional items favoring Vehicle Weight Sensor, which was not held by others (i.e. unique information). Although the team as a whole had all available information, each person had only 8 out of the 14 total information items: 5 common and 3 unique items. We expected that hidden profile and decision bias existed in the UID condition.

-------- Table 1 is inserted about here ---------

3.2 Participants and Procedure

Business students, including MBAs and junior and senior undergraduates, at a large public Midwestern university participated in a new product decision project as in-class exercise. Researchers have frequently used both MBAs (e.g. Biyalogorsky, et al., 2006) and undergraduate students (e.g. Tekleab & Quigley, 2014) in decision making experiments.
Consistent with prior research (e.g. Qiu et al., 2009; Schmidt, Montoya-Weiss, & Massey, 2001), no significant difference ($p_s > .10$) was found between MBAs and undergraduates for test variables, and therefore we grouped their data to report overall results. To follow our experimental design, we only used three-person teams. We removed a number of teams in our later analysis for one of the following reasons: (a) at least one participant in the team missed part of the project; (b) teams contained at least one participant who did not offer us consent for this research; (c) participants engaged in the experiment more than once because of attendance to multiple courses; and (d) teams included more or fewer than three participants. In total, 37 teams were in the EID condition and 58 UID.

During the experiment, participants were first asked to individually read a scenario regarding two new product projects in a fictional vehicle accessory manufacturer. In this scenario, participants were given information about the forecasted performance of each project (see Table 1) and definitions of those information items. In the EID condition, the full set of information was given to participants, but in the UID condition a different set including common and unique information. After reading the information individually, each participant returned the reading material and then was asked to discuss with teammates as a group. In the face-to-face group discussion, teams were not allowed to check the reading materials again. They collectively made new product decisions (i.e. continue vs. stop) without time pressure and listed information they used for decisions. After discussion, participants were asked to individually answer a survey of team performance, including questions assessing information sharing.

3.3 Measures
Decision. We measured the team decision outcome as a dummy variable (1=Vehicle Weight Sensor; 0=Driver Reflex Sensor). The pretest (see the next section) showed that Vehicle Weight Sensor was considered superior to Driver Reflex Sensor, so the optimal decision should be to continue the former project.

Information Sharing. Information sharing refers to team members delivering information with each other, and thus it is individual-based behavior. Accordingly, after the team decision task, we asked participants to individually select which information he or she shared with others in group discussion in a checklist of the 14 information items. We computed the percentages of information favoring Vehicle Weight Sensor and information favoring Driver Reflex Sensor based on the pool of shared information. We used information favoring Vehicle Weight Sensor (i.e. unique information in the UID condition) for data analysis. Since the two types of information total 100%, adopting the other only reverses the sign of each coefficient, but not the significance level. There was discussion in literature on the difference between the majority and minority perspectives. In our case of the three-person team, there could be one or more people sharing a given information item during group discussion. To rule out any alternative explanation, we adopted both the minority perspective (i.e., at least one person shared a given information item) and majority perspective (i.e., at least two persons shared a given information item) to examine how many information items were shared. The findings, discussed in the results section, show strong consistency between the two perspectives.

Information Use. Since information was used based on group discussion for decision making, teams were asked to collectively list the information used (presented in Table 1
depending on the information distribution condition) to make their decisions. Note that participants were not allowed to re-check information once they started group discussion. Likewise, we adopted the percentage of used information favoring Vehicle Weight Sensor for data analysis. To validate the team-level measure, we also measured information use at the individual level. After group discussion we asked each participant to answer whether or not the team used each information item for decision making in group discussion. We found the responses at the two levels highly correlated in the EID condition (r=.620, \( p < .001 \)) and UID condition (r=.581, \( p < .001 \)). Also, the two level of measures yield highly consistent results in model testing. We report the team-level results here, as information use is based on team effort.

**Functional Diversity.** We measured functional diversity by counting the number of majors/functions participants had. As each team consisted of three members, the diversity score of teams ranged from 1 to 3.

**Covariates.** We considered the following variables as covariates: educational level, work experience, new product development experience, automobile expertise, team members’ prior cooperation experience, and sex. We calculated mean scores for the first five covariates. For sex, we coded teams with two or three men as 0 and teams with two or three women as 1. Concerning a set of logistic regression models in this research, ideally we should control for all the covariates in the same model. However, in logistic regression the smaller of the two dependent categories requires sufficient cases for each predictor. The sample size in either information condition did not allow us to control for all covariates. Thus, we split the sample into two subgroups (high vs. low) for the first five covariates, and used the same dummy
coding for sex. We compared dependent variables (information use and decision outcome) between the two subgroups, and did not find any significant difference ($ps>.10$). Hence we disregarded those covariates in the later analysis.

4. Results

4.1 Pretest

To ensure that the information clearly indicates that Vehicle Weight Sensor (favored by 9 information items) is superior to the Driver Reflex Sensor (favored by 5 information items), we pretested 79 business students’ assessment of the two projects according to information given in Table 1. To examine whether or not the serial position of information mattered, we split participants into two groups and reversed the order of information between them. One group included 48 participants and the other 31. Participants were asked to select one project that is more superior (dummy variable) and also rate the potential success of the two projects using a 7-point scale. For each group, participants considered the Vehicle Weight Sensor project superior to the Driver Reflex Sensor project, whether it is dummy coding (group 1: $\chi^2(1, n=48)=21.33; p<.001$; group 2: $\chi^2(1, n=31)=9.32; p<.01$) or ratings (group 1: $t(47)=2.98; p<.01$; group 2: $t(30)=3.50; p<.01$). We further found no difference between the two groups in terms of dummy coding ($\chi^2(1, n=79)=.43; p=.51$) and ratings ($t(77)=-.17; p=.87$ and $t(77)=.90; p=.37$ respectively for Vehicle Weight Sensor and Driver Reflex Sensor). Evidence suggests that the serial position of information is not a concern in our research.

4.2 Manipulation Check

To warrant successful manipulation of the hidden profile, we compared decisions made in the two information distribution conditions. When information was equally
distributed, 30 teams decided to continue Vehicle Weight Sensor, while 7 teams made an opposite decision ($\chi^2(1, n=37)=14.30, p<.001$). When information was unequally distributed, only 5 teams decided to continue Vehicle Weight Sensor, while 53 teams made an opposite decision ($\chi^2(1, n=58)=39.72, p<.001$); and teams used more common information (63.5%) than unique information (36.5%) ($t(57)=3.80, p<.001$). Decisions in the two conditions were significantly different ($\chi^2(1, n=95)=50.97, p<.001$). The hidden profile was successfully manipulated in the UID condition.

4.3 Hypothesis Testing

We adopted two methods to test the hypotheses, respectively the causal steps approach by Baron and Kenny (1986) and the PROCESS analysis by Hayes (2013). The two methods yielded consistent results. We report the procedures and findings based on the former method. We summarize results for H1 in Figure 3A. Results show that information sharing had a positive effect on information use (minority perspective: $b=.36, p<.05$; majority perspective: $b=.53, p<.01$), supporting H1a. Following the Baron and Kenny’s (1986) testing procedure, we ran (logistic) regression from both the minority and majority perspectives as follows. First, regressing decision on information sharing indicated that they were highly related (minority: $b=17.12, \text{Wald}=4.12, p<.05$; majority: $b=21.71, \text{Wald}=5.62, p<.05$).

Second, regressing decision on information use indicated that high information use led to a better decision outcome (minority: $b=9.74, p<.05$; majority: $b=9.74, \text{Wald}=8.39, p<.05$).

Third, regressing decision on both information sharing and information use showed a significant influence of information use (minority: $b=9.13, \text{Wald}=7.01, p<.05$; majority: $b=8.34, \text{Wald}=5.91, p<.05$) but a non-significant influence of information sharing (minority:
b=19.23, Wald=1.08, p>.10; majority: b=15.23, Wald=1.78, p>.10). Accordingly, information use fully mediated the relationship between information sharing and the decision outcome from both the minority and majority perspectives. H1 is supported.

--------- Figure 3A is inserted about here ---------
--------- Figure 3B is inserted about here ---------

We followed the same procedure to test H2. Figure 3B summarizes the results. H2 suggests a significant relationship between information use and the decision outcome but a non-significant relationship for information sharing. Detailed results are as follows. First, regressing decision on information sharing indicated a non-significant relationship between them (minority: b=11.54, Wald=1.50, p>.10; majority: b=4.18, Wald=.89, p>.10). Second, regressing decision on information use indicated that information use affected the decision outcome (minority: b=15.22, Wald=5.71, p<.01; majority: b=15.22, Wald=5.71, p<.01). Third, regressing decision on both information sharing and information use showed a significant effect of information use (minority: b=20.65, Wald=3.93, p<.05; majority: b=21.35, Wald=2.74, p<.10), but a non-significant effect of information sharing (minority: b=12.46, Wald=2.52, p>.10; majority: b=18.50, Wald=1.00, p>.10). Results suggest that in the UID condition, information use, rather than information sharing, impacted team decisions. H2 is supported.

We further tested the moderating effect of team functional diversity (H3) in the UID condition. Variables included in the interaction term were mean-centered. The interaction term was not significant from the majority perspective (b= -.21 p>.10), but it was significant from the minority perspective (b= -.31, p<.05). Thus, H3 is partially supported. A possible explanation for the non-significance is that when the majority of a team shares critical
information, decision makers are more likely to pay attention to that information and thus the negative effect of functional diversity on the sharing-use relationship is reduced.

5. Discussion

This research endeavors to answer the question of when and why information sharing does not play an (in)effective role in team decision making. Undertaking this goal, we examine information sharing and information use separately. In line with the hidden profile paradigm, this research sheds light on the matter of information distribution conditions, i.e. EID and UID. We compare how information sharing impacts team decision outcomes between the two conditions. More importantly, we find empirical evidence that information use, rather than information sharing, fundamentally impacts team decisions in both conditions. Specifically, in the EID condition, information use fully mediates the relationship between information sharing and decision outcomes. In the UID condition, unique information disqualifies information sharing alone as the key factor in facilitating decision outcomes; instead, information use plays a fundamental role in the decision making process. When team functional diversity increases, information sharing is even less associated with information use and the hidden profile problem aggravates. These results are examined from both the minority and majority perspectives.

5.1 Theoretical Implications

This study challenges an implicit assumption of previous decision making research that the sharing of information necessarily leads to the actual use of that information. It advances the understanding of how information sharing influences team decisions by incorporating the hidden profile paradigm into the new product decision making context.
Admittedly, information sharing assists decision makers in many ways. Yet, we contend that information sharing fosters decision making when information is equally distributed. Information sharing alone is not the magic key for optimal decisions when information is unequally distributed, and sharing unique information does not facilitate using that information. Our findings suggest that the relationship between information sharing and information use is contingent upon information distribution and team functional diversity. If information sharing does not facilitate information use, then teams end up with suboptimal decisions. Thus, information use is the fundamental gateway to optimal decisions.

Second, this study extends the hidden profile paradigm by taking a closer look at the difference between information sharing and information use. Previous social psychology studies focus primarily on the sharing/mentioning of common and unique information (Lu, et al. 2012). Our research goes a step further and examines the two constructs separately. The results suggest that when a hidden profile exits, team members do not sufficiently use the information they share, implying that the hidden profile occurs at least in part because of the missing link between information sharing and information use.

Last, we bring team functional diversity into the hidden profile research. Although functional diversity has been viewed as a facilitator for teams to gain more information, this study points out that it may be a double-edged sword: On the one hand, decision makers from different functions bring a variety of expertise; on the other hand, their attention to own specialty-related information is likely to cause them to overvalue information held in common and thereby neglect the benefits of unique information. As a result, the hidden profile is aggravated when the functional diversity of a team is high. When information is
equally distributed, however, team functional diversity would not moderate the relationship between information sharing and information use. The reason is that team members pre-own the same set of information, and the information can be easily validated within the team.

5.2 Managerial Implications

Our research provides important managerial implications. First, managers responsible for assembling decision making teams should ensure team communication efforts that remove barriers to effective information utilization. We recommend that managers pay particular attention to the hidden profile phenomenon. For example, when each team member is responsible for collecting his or her information, there is a possibility of the hidden profile that impedes unique information use. To enforce the actual use of unique information, managers can ask teams to elaborate the grounds of their decisions. This elaboration process helps teams to ruminate whether shared information is sufficiently taken into account in the decision making process.

Moreover, our findings show that even if unique information is shared during team discussion, it is unlikely to be used for team decisions. Therefore, managers need to be cautious of the illusion that team members will fully utilize information contributed by their teammates with different functional backgrounds. When team members are from the same function, they share common understanding and thus information is not easily missed. However, in a cross-functional team, information biases and the preference for common information due to its ease of social validation can undermine the goals behind the formation of the team.

In highly diverse teams, managers can encourage divergent thinking by asking
teammates to generate multiple alternatives before a final decision is made. Then team members are expected to exhaust all possible alternatives by using available information from different functions. The enforcement of divergent thinking could promote careful scrutinization of available information. Additionally, team leaders can control affective conflicts and monitor cognitive conflicts between team members. Affective conflict is emotional conflict based on personal incompatibilities or disputes. It triggers cynicism and avoidance that damages decision quality (Amason, 1996). Reduction in affective conflicts helps team members to better concentrate on information use and decision tasks. Cognitive conflict is functional conflict focusing on judgmental differences and possible solutions for team tasks. To monitor cognitive conflicts helps synthesize diverse perspectives to identify right information for optimal decisions (Amason, 1996).

5.3 Limitations and Future Research

This study is not without limitations, which represent future research opportunities. Our research relies on the self-report measure of information sharing. Recording methods, such as audio and video, were not adopted due to constraints of operational efficiency for in-class exercise. We used the self-report method as a solution and obtained consistent findings on information sharing with previous hidden profile studies. In addition, we compared both the minority and majority perspectives and obtained consistent results, which validated the measure of information sharing. Future research should consider adopting recording techniques to examine information sharing in lab experiments. Another concern with the self-report method is that the team recall task on information use may have primed individual recall on information sharing. If this is true, the priming effect could be an
alternative explanation for our results. We conducted a post hoc analysis which shows there was not such a confounding effect, so this alternative explanation is ruled out in this study.

We adopt student sample for our research. Given the nature of our research questions and the difficulties associated with simulating actual multi-million dollar product development projects, it had not been very feasible to do other ways than using the student sample. Concerns about our use of student participants should be limited due to several reasons. First, prior research has frequently used students as participants in decision making experiments (e.g. Biyalogorsky, et al., 2006; Dahlin, et al., 2005; Tekleab & Quigley, 2014). Second, some studies using both student and manager participants have found similar results (e.g. Hutchinson, Alba, & Eisenstein, 2010; Mittal, Ross, & Tsiros, 2002). Third, because our experiment assigned real-time tasks for student teams to make decisions, the results reflect team decisions in a reliable manner. Future research should consider using teams consisting of practitioners potentially in field experiments.

While we find that functional diversity can worsen the hidden profile, future research should consider taking into consideration more factors potentially affecting information sharing and use in team decision making. A possibility is technology-assisted teamwork (Brown, Dennis, & Venkatesh, 2010), because remote communication technologies becomes increasingly popular to teams that contain members from different geographic locations. Also, in our study we offered teams a manageable amount of information in both EID and UID conditions (14 items at the team level). Another direction of future research is to examine whether or not different information loads will make a difference in the relationship between information sharing and information use. Moreover, individual pre-discussion preference and
the awareness of preference have been found to cause the hidden profile (e.g. Gigone & Hastie, 1993). These suggest another factor affecting the sharing-use relationship.

Last, an interesting viewpoint associated with the hidden profiles is that each team member holds more common information than unique information, while at the team level each team owns more unique information than common information. Future studies can take a step further to discover how decision outcomes will change based on different ratios of pre-owned unique information (e.g. percentages of unique and common information) at the individual and team levels.
<table>
<thead>
<tr>
<th>Forecasted Performance</th>
<th>New Product Projects</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vehicle Weight</td>
<td>Driver Reflex</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensor</td>
<td>Sensor</td>
<td></td>
</tr>
<tr>
<td>Sales in Unit*1</td>
<td>600,000</td>
<td>450,000</td>
<td></td>
</tr>
<tr>
<td>Revenue Growth*3</td>
<td>12%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Profits* CI</td>
<td>$1 million</td>
<td>$1.2 million</td>
<td></td>
</tr>
<tr>
<td>Return on Investment (ROI)* 2</td>
<td>13%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Product Cycle Time1</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Product Innovativeness* 2</td>
<td>10</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Product Performance CI</td>
<td>6</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Product Quality 3</td>
<td>9</td>
<td>6</td>
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<tr>
<td>Product Advantage CI</td>
<td>7</td>
<td>10</td>
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</tr>
<tr>
<td>Customer Retention CI</td>
<td>6</td>
<td>9</td>
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</tr>
<tr>
<td>Customer Satisfaction* 1</td>
<td>10</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Market Share* 2</td>
<td>17%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Market Size CI</td>
<td>7</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Ease of Manufacturing 3</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

*These items of forecasted performance are absolute values; all others are 0-to-10 (higher is better).

CI = common information provided to all persons in the UID condition.
1 = information provided only to person 1 in the UID condition.
2 = information provided only to person 2 in the UID condition.
3 = information provided only to person 3 in the UID condition.
FIGURE 1. Conceptual Model

Equal Information Distribution (EID)

Information Sharing

Information Use

Decision Outcome

H2a

H1a

H1b/2b

Functional Diversity

Unequal Information Distribution (UID)

H3

Hidden Profile

Hypothesized Relationship

Optimal Decision Outcome

Suboptimal Decision Outcome (Hidden Profile)

Equal Information Distribution (EID)

Unequal Information Distribution (EID)

Relationships Compared between the Two Distribution Conditions
FIGURE 2. Example of the Hidden Profile

Information Pool
(14 information items in total):
Unique information: A1- A9 are in favor of Decision A
Common information: B1-B5 are in favor of Decision B

Teammate 1

Teammate 2

Teammate 3

Notes: The graph reflects a typical example of a hidden profile and also the experimental design of this research.
FIGURE 3. Equal Information Distribution

A: Minority Perspective on Information Sharing

Information Sharing → Information Use → Decision Outcome

Information Sharing: 17.12** (19.28*)
Information Use: 9.74** (9.13**)
Decision Outcome: 0 = Suboptimal; 1 = Optimal

Notes for Figures 3A & 3B:
1) * p<.10, ** p<.05, *** p<.01, n.s. = not significant.
2) Coefficients based on logistic regression are unstandardized.
3) We use the percentage of information favoring Vehicle Weight Sensor for data analysis. Since the total percentage of the two sensors is 100%, using the other type of information would only reverse the sign of each coefficient but not the significance level.
4) Results outside parentheses represent the effects when regressing the decision outcome on information sharing or information use separately; results inside the parentheses indicate the effects when regressing the decision outcome on information sharing and information use simultaneously.
5) — represents significant relationships in the mediation test, --- represents non-significant relationships in the mediation test.

B: Majority Perspective on Information Sharing

Information Sharing → Information Use → Decision Outcome

Information Sharing: 21.71** (15.23**)
Information Use: 15.22** (20.65**)
Decision Outcome: 0 = Suboptimal; 1 = Optimal

Information Sharing: 4.18** (18.50**)
Information Use: .36** (18.50**)
Decision Outcome: 0 = Suboptimal; 1 = Optimal
References


