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# Process and Outcome Expectations for the Dialectical Inquiry, Devil's Advocacy, and Consensus Techniques of Strategic Decision Making

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This study examined expectations of cognitive conflict, social conflict, decision confidence, and postdecision group affect in the dialectical inquiry, devil's advocacy, and consensus decisionmaking techniques. Expectations show some congruence with the affective, but not objective, outcomes found in prior empirical studies. Expectations were found to discriminate among dialectical inquiry, devil's advocacy, and consensus.

**D**ecision makers face ambiguous problems when there are multiple paths to solve a problem and when it is difficult to verify the "correctness" of a possible solution prior to making the decision. One group of decision makers who appear to confront problems of this nature consistently are strategic decision makers. The descriptive research of Mintzberg, Raisinghani, and Theoret (1976), for example, suggests that the strategic decision process is "characterized by ambiguity, novelty, complexity, and open-endedness" (p. 250).

In solving strategic problems there has been a continual search for decision aids to increase the likelihood that the "best" solution will be adopted. Two methods of structuring group interaction, dialectical inquiry (DI) and devil's advocacy (DA), are frequently cited in strategic-decision-making literature as decision aids for solving complex, strategic problems (Cosier, 1982; Cosier & Schwenk, 1990; Mitroff, 1982; Schwenk, 1982b).

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Both of these techniques seek to facilitate the adoption of the best solution by optimizing the level of cognitive conflict during group discussion. Structurally, both techniques use subgroups to increase cognitive conflict. DA allows limited face-to-face interaction in which one subgroup critiques the assumptions and recommendations of the other subgroup without presenting their own recommendations. DI allows a full interactive debate in which one subgroup presents a set of diametrically opposed assumptions and recommendations to those generated by the other subgroup. A description of both of these decision aids as well as consensus decision making can be found in the Appendix.

Early research examining the efficacy of DI and DA consisted of noncomparative field studies reporting the effectiveness of DI interventions as perceived by the executives involved (Mason, 1969; Mitroff, Barabba, & Kilman, 1977) or experimental laboratory studies in which DI was compared in effectiveness with the DA or expert (E) methods of decision making (Cosier, 1978, 1980; Cosier & Aplin, 1980; Schwenk, 1982a; Schwenk & Cosier, 1980). Schweiger and Finger's (1984) review and Schwenk's (1989) recent meta-analysis indicate that support for the relative superiority of either DI or DA is equivocal. However, research findings have been consistent when comparing DI and DA with the frequently used consensus (C) approach. Schweiger, Sandberg, and Ragan (1986), for example, conducted a laboratory experiment in which small groups of MBA students were trained in the DI, DA, or C approaches to group decision making and asked to develop recommendations for a complex strategy case study using their assigned approach. Results indicated that both DI and DA were superior to C on the subjectively judged quality of assumptions and recommendations. C groups, however, exhibited greater acceptance of the group decision and greater satisfaction with the group process. Schweiger, Sandberg, and Rechner (1988) found similar decision-quality relationships using a sample of middle managers. In each of these studies, few differences were found between the DI and DA approaches on either quality or affective dimensions.

#### THE ROLE OF EXPECTATIONS

Research to date has focused on the outcomes of DI, DA, and C decision making. Studies have tended to ignore antecedent conditions that could influence the efficacy of these techniques. One antecedent condition to consider is the expectations of the decision makers who will be using the DI, DA, and C techniques. Expectations regarding process and outcomes of these decision aids could be influential in determining the obtained processes and outcomes.

The importance of expectations has been demonstrated in a variety of situations. Behavioral expectations associated with organization culture, for example, affect decision making (Beyer, 1981) and strategy formulation (Shrivastava, 1985). Both social norms, an aspect of culture that involves the expectations of others, and personal expectancies have been found to influence subsequent behaviors (Miller & Grush, 1988). Such expectations can influence the behavior of the person who holds the expectations. Additionally, the expectations and corresponding behavior of one group member may influence the behavior of others in the group. Social psychologists call these sequences of events self-fulfilling prophecies. Numerous empirical studies have demonstrated the self-fulfilling prophecy (e.g., Eden & Shani, 1982; Snyder & Swann, 1978). Thomas (1976) reviewed the work of Merton (1957) and others on the self-fulfilling prophecy. In developing a process model of conflict Thomas (1976) included the self-fulfilling prophecy as one factor among others that may be related to the escalation of conflict. The selffulfilling prophecy suggests that if one expects hostility when attempting to resolve conflictual situations, one may interpret and respond to the other party in a hostile manner. This may escalate the conflict, because it may elicit behavior that is consistent with one's expectations, even if such behavior was inconsistent with the original orientation of the other party. Thus expectations have been found to influence processes and outcomes in a variety of different situations. Consequently, expectations may be important in determining processes and outcomes when specific decision aids are used in small groups.

This study has multiple objectives. First, it examines whether individuals do expect differences in process and outcome variables among the DI, DA, and C techniques and whether such expectations are consistent with the previous empirical and theoretical literature. If the expectations examined in this study, which are based solely on the techniques themselves, are found to be consistent with the processes theorized and the outcomes reported in prior empirical studies, then expectations may play a role in the actual processes and outcomes that are obtained. Alternately, however, if one finds a pattern of inconsistency between expectations and previous empirical outcomes, one may argue that that decision-making technique itself is exerting the dominant influence on process and outcomes, and expectations play only a minor role. Thus examining expectations may be helpful in increasing our understanding of factors influencing the efficacy of the currently advocated problemsolving techniques.

Second, in examining expectations this study also seeks to broaden the base regarding potential process and outcome variables that might be considered when using DI, DA, and C decision aids. Our interest is in determining whether subjects can differentiate among cognitive and social conflict during the decision process and differentiate among decision quality, decision acceptance, and group-member affect after the decision process. At times, these measures of group-member affect and decision outcomes have been grouped together (see Schweiger et al., 1986). In other instances critical process variables have gone unmeasured. The literature (e.g., Cosier, 1982; Cosier & Schwenk, 1990; Schweiger et al., 1986) suggests that cognitive conflict is a critical intervening process that accounts for the efficacy of DI and DA. However, conflict as a process variable has gone unmeasured in previous studies that involve strategic decision making. Positive findings of differences in expectations would indicate decision makers may be able to differentiate among these sources of conflict and would suggest that these variables be considered in future studies.

# **DEVELOPMENT OF WORKING HYPOTHESES**

Individuals' expectations concerning the DI, DA, and C decision-making techniques were examined in this study along dimensions including cognitive conflict and social conflict during the decision-making process, and decision quality, decision acceptance, and postdecision group-member affect. Hypotheses concerning each of these variables were derived from findings of studies using similar subjects and techniques or are theoretically based where there is an absence of findings for a particular dependent measure.

# COGNITIVE AND SOCIAL CONFLICT DURING DECISION MAKING

The advocates of both DI and DA posit that these techniques encourage cognitive conflict during the decision process, resulting in increased evaluation of assumptions and alternatives and better decision outcomes for illstructured decisions. Cognitive conflict is aroused in DI through a formal, interactive debate of two opposing sets of assumptions and recommendations. DA requires a formal critique of one set of recommendations and assumptions. C attempts to legitimize conflict but does not provide an explicit structure designed to do so. Because DI requires a formal interactive debate of opposing assumptions and recommendations, one might hypothesize:

- Hypothesis 1: Individuals will expect different levels of cognitive conflict to occur during decision making in groups using the DI, DA, and C techniques.
  - a: More cognitive conflict will be expected in DI groups than in DA or C groups.
  - b: More cognitive conflict will be expected in DA groups than in C groups.

Cognitive conflict is task related, involving the degree of disagreement over the interpretation of a common stimulus (Cosier & Rose, 1977). Socialemotional conflict is interpersonal, involving competition for payoffs or personal disagreements (Cosier & Rose, 1977; Riecken, 1952; Torrance, 1957). Cook and Hammond (1982) suggest that social conflict may be related to the cognitive complexity of the judgmental task. They argue that decision makers often have a poor understanding of their own decision processes. For example, decision makers may not be accurate judges of how they combine and weigh various dimensions or cues in making a decision. What they do not understand cannot be communicated clearly. According to this perspective, social conflict may be a consequence of an inability to communicate accurately the basis for one's decisions. Social conflict may be likely when DI and DA are used because of the types of tasks to which these decision aids are applied.

In addition, there is reason to believe that DI and DA processes may differentially influence the level of social conflict. The DI process involves a structured and thorough evaluation of assumptions during which each subgroup of the decision-making team is allowed to present and defend their assumptions and recommendations in the form of an interactive debate. This is a formal, task-centered approach with considerable balance in the activities of the two subgroups. DA is also task centered, with one subgroup critiquing the assumptions and recommendations of the other group. DA does not, however, allow face-to-face resolution of disagreements by subgroup members, and one subgroup offers a critique of the other subgroup's assumptions and recommendations without making specific recommendations themselves. The lack of continual face-to-face interaction may make it physically difficult to integrate different opinions and resolve disagreements constructively. From a social judgment perspective, when face-to-face interaction is limited, it may be (a) more difficult to communicate the reasons for specific judgmental decisions and (b) more difficult to compromise on principles when the reasons for such judgments are clearly communicated. In addition, because each group presents assumptions and recommendations in DI, it may be easier to tie assumptions (cues) to recommendations than in the DA technique. One may therefore expect that the potential for social/emotional conflict is greater in DA than in DI, leading to the hypothesis:

Hypothesis 2: Individuals will expect different levels of social conflict to occur during decision making in groups using the DI, DA, and C techniques.

- a: More social conflict will be expected in DA groups than in DI or C groups.
- b: More social conflict will be expected in DI groups than in C groups.

## DECISION QUALITY, ACCEPTANCE, AND GROUP AFFECT FOLLOWING THE DECISION

Support for the constructive influence of cognitive conflict on decision making can be found in the work of Hoffman, Harburg, and Maier (1962); Cosier and Rose (1977); and Schweiger et al. (1986). Although cognitive conflict may be constructive, it may lead to arousal of social conflict. Evan (1965) has suggested that group effectiveness may decline if social conflict is aroused. Although DA may induce levels of cognitive conflict similar to those induced by DI, the potentially greater level of social conflict in DA may reduce DA effectiveness. However, the decline in effectiveness of DA may not reduce it to the level of the C technique, which lacks a specific structure for generating cognitive conflict. One may therefore hypothesize:

- Hypothesis 3: Individuals will expect differences in decision quality for groups using the DI, DA, and C techniques.
  - a: Higher-quality solutions will be expected from DI groups than from DA and C groups.
  - b: Higher-quality solutions will be expected from DA groups than from C groups.

Gero (1985) found that individuals expect a friendlier climate and have greater confidence in decisions reached through consensus than in decisions reached through the higher-conflict majority-rule technique. Schweiger et al. (1986) found higher satisfaction and commitment in consensus groups than in either DI or DA groups. It is also possible that the potentially higher levels of social conflict in DA compared to DI may negatively influence decision acceptance and group-member affect. Thus the final two research hypotheses are

*Hypothesis 4*: Individuals will expect differences in decision acceptance in groups using the DI, DA, and C techniques.

a: Greater acceptance will be expected in C groups than in DI and DA groups. b: Greater acceptance will be expected in DI groups than in DA groups.

- Hypothesis 5: Individuals will expect differences in their feelings toward group members following the decision in groups using the DI, DA, and C techniques.
  - a: Greater postdecision friendliness will be expected in C groups than in DI and DA groups.

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b: Greater postdecision friendliness will be expected in DI groups than in DA groups.

# **METHOD**

Subjects were 55 graduate (MBA) and 117 undergraduate business students at a large southwestern university. All of the subjects participated in this study during the final week of a 16-week capstone business policy course or a senior-level international management course. The mean age of the subjects was 26.6 years (SD = 5.4). Their mean years of full-time work experience was 4.9 (SD = 4.7), and their mean years of managerial experience was 1.7 (SD = 2.5). A total of 99 males and 69 females participated in the study.

# **OVERVIEW OF PROCEDURES**

Subjects were approached during their regularly scheduled class period and, with the permission of their instructor, asked to participate in an experiment. Subjects who declined to participate (7 students declined) were asked to leave the room and return in 30 min. Subjects who agreed to participate were handed an informed consent form to read and sign and a booklet containing the experimental materials. All participants completed the materials in coacting groups, where subjects worked independently on the task but in the physical presence of other people. These groups ranged in size from 17 to 45 people.

On the first page of each booklet was a brief description of the novelty, complexity, and ambiguity of the strategic-decision process (Mintzberg et al., 1976) and the people, top managers, who are frequently involved in such decisions. Written instructions informed the subjects that they would be asked to read descriptions of three different problem-solving techniques that have been recommended for use by groups making strategic decisions. A series of questions followed each description. These questions were to be answered as if each subject was scheduled to participate in a strategic decision-making group that would use the technique he or she had just read about.

The subjects were instructed not to read ahead or look back in the experimental booklet. The order of presentation of the techniques (six possible orders) was counterbalanced to remove any order effects. Subjects were given 30 min to complete the materials. After all members of a coacting group completed their materials, the experimenter debriefed the subjects.

# MANIPULATION OF THE INDEPENDENT VARIABLE

The independent variable was the type of decision-making technique: DI, DA, or C. It was manipulated by having each subject read a detailed explanation of each technique, approximately one single-spaced page in length. These descriptions were adapted from those used by Schweiger et al. (1986). Only minor changes were made, based on pilot testing, to clarify procedural steps. Each description contained a brief justification of the technique and detailed information about the steps to be followed in using the technique. The actual instructions can be found in the Appendix.

#### **MEASUREMENT OF DEPENDENT VARIABLES**

Each subject answered a series of 20 questions assessing their expectations for each problem-solving technique. All questions were answered using a 7-point rating scale ranging from *strongly agree* to *strongly disagree*. The same questions were answered three times, once after reading about each technique. Eighteen of the 20 questions used in this study were based on prior research. Questions measuring cognitive conflict, social conflict, decision quality, decision acceptance, and group affect were adapted from Gero (1985), Rahim (1983), and Schweiger et al. (1986). The remaining 2 questions were developed by the researchers.

The first 10 questions assessed expectations for the decision-making technique during the decision-making interaction. Subjects were asked to describe what they believed would occur as their group met to solve the problem. These questions are shown in Table 1. Five items (2, 4, 5, 7, and 9) were intended to measure cognitive conflict. The remaining 5 items (1, 3, 6, 8, and 10) were intended to measure social conflict. The second 10 questions asked subjects to describe how they believed they would feel after their group had reached a decision. These questions are shown in Table 2. Five questions (13, 14, 17, 18, and 20) were intended to assess perceptions of decision quality. Three questions (12, 15, and 19) were intended to measure postdecision group affect. The remaining 2 questions (11 and 16) were intended to assess expectations of group acceptance.

#### EXPERIMENTAL DESIGN AND ANALYSIS

Principal components factor analysis with varimax rotation was used for analyzing both the "during" and "after" sets of questions. The purpose of the factor analysis was to identify the underlying constructs measured by each set of questions and to determine if subjects could differentiate between the

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Que	estions	Social Harmony Factor	Cognitive Conflict Factor	Commonalities
1.	There will be harmony within my group.	.60ª	27	.43
3.	There will be friendliness among the members of my group.	.80	19	.66
4.	The members of my group will be supportive of differing ideas.	.67	09	.46
6.	The members of my group will cooperate with one another.	.85	06	.73
8.	There will be a "we" feeling among the			
	members of my group.	.76	17	.61
10.	We will work together in reaching a decision.	.79	03	.61
2.	There will be clashes.	03	.74	.54
7.	There will be dissension concerning ideas			
	within my group.	26	.60	.43
9.	There will be differences in opinion			
	within my group.	02	.78	.60
5.	In my group, we will have lots of bickering.	50	.52	.52
	Eigenvalue	3.67	1.92	5.59
	Percentage of total variance	36.73	19.21	55.94

# TABLE 1 Principal Components Factor Analysis for Expectations During the Decision-Making Process

a. Factor loadings >.5 are italicized.

dimensions of cognitive conflict and social conflict, and also differentiate among decision quality, decision acceptance, and postdecision groupmember affect. The resulting factor scores were then used as the dependent measures when analysis of variance (ANOVA) procedures were used to test the hypotheses. Because counterbalancing effectively removed any differences due to order of presentation, a one-factor (decision-making technique), within-subjects design was used in the analysis. There were three levels (DI, DA, and C) of the decision-making factor.

# **FACTOR ANALYSIS**

For the 10 questions concerning expectations of cognitive and social conflict during decision making, a two-factor solution was indicated by both

the eigenvalue and scree test criteria (Hair, Anderson, & Tatham, 1987). The principal components solution using varimax rotation is presented in Table 1.

The factor loadings were generally consistent with our a priori division of dependent measures and, thus, fairly easy to interpret. Questions concerning group harmony, friendliness, cooperation, "we" feeling, and so on, all loaded positively on the first factor, which was labeled "social harmony." This factor represents the converse of social conflict. Questions concerning clashes over ideas, dissension and differences of opinion loaded positively on the second factor, which was labeled "cognitive conflict." Contrary to our expectations, the question concerning supportiveness of differing ideas loaded on the social harmony factor. The respondents may have interpreted this question in a broad, social support sense, rather than in the intended sense of supportiveness for ideas only. The question concerning bickering had a fairly high loading on each factor, indicating that it contributed little to discrimination between the two factors and, thus, was dropped from further analysis.

For the 10 questions concerning expectations of decision quality, decision acceptance, and group affect, a two-factor solution was indicated by both the eigenvalue and scree test criteria (Hair et al., 1987). The principal components solution using varimax rotation is presented in Table 2.

Questions concerning the expected correctness, soundness, desirability, and so on, of the decision all loaded positively on the first factor, as expected. The questions concerning the expected commitment to and satisfaction with the decision also loaded positively on this factor. Thus decision quality and decision acceptance were seen by the subjects as relating to the same underlying dimension. This is consistent with Gero (1985), who reported a similar factor in a study examining expectations of majority vote versus consensus decision making. Following Gero (1985), this factor was labeled "confidence" in the decision. The remaining three questions, concerning the friendliness, perceived enjoyment, and the degree of group liking expected after decision making, loaded on the second factor labeled "group affect." <sup>1</sup>

After factor analysis, estimates of reliability for each of the four factors were calculated using coefficient  $\alpha$ . Because each subject responded to the same set of questions three times (once for each decision aid), three estimates of reliability were computed for each factor. For social harmony the three estimates of  $\alpha$  were .79, .86, and .84; for cognitive conflict the three estimates of  $\alpha$  were .70, .64, and .59; for the confidence factor the three estimates of  $\alpha$ were .91, .94, and .93; for the group affect factor the three estimates of  $\alpha$ were .81, .85, and .88.

Questions	Social Harmony Factor	Cognitive Conflict Factor	Commonalities
11. I will be committed to the group decision.	.66ª	.42	.61
13. Our decision will be a desirable one.	.83	.27	.77
14. Other group members will agree that our			
decision is correct.	.73	.22	.58
16. I will be satisfied with our decision.	.78	.43	.79
17. I will think our decision is correct.	.84	.35	.83
18. Our decision will be sound.	.82	.28	.76
20. I will feel we made the best decision.	.83	.34	.80
12. I will feel friendly toward the members of			
my group.	.39	.79	.78
15. I will have enjoyed working with my group.	.39	.79	.78
19. I will like the other members.	.21	.87	.80
Eigenvalues	4.67	2.80	7.48
Percentage of total variance	46.74	28.01	74.76

# TABLE 2 Principal Components Factor Analysis for Expectations After the Decision Is Made

a. Factor loadings >.5 are italicized.

#### ANALYSIS OF DEPENDENT MEASURES

The four factors were then treated as dependent measures. Analysis of variance procedures were used to examine the influence of decision-making technique (DI, DA, and C) on the dependent variable factor scores using a within-subjects design. Planned t tests were used to test the specific hypotheses if significant ANOVAs were found. The results of the factor analysis allowed direct testing of Hypotheses 1, 2, and 5. However, the factor analysis did not differentiate expectations of decision quality and decision acceptance. A single factor, labeled confidence, was identified in this study combining both decision-quality and decision-acceptance questions. The "confidence in decision" dependent variable was tested using the relationships specified in Hypothesis 4, and Hypothesis 3 was eliminated from consideration. This was done because the confidence factor appears to be more consistent with the development of Hypothesis 4, which was based on research that used perceptual measures rather than the more objective measures of performance that formed the basis for Hypothesis 3. Findings are presented in Table 3.

Dependent Measures	Results			
Cognitive conflict				
ANOVA (decision-making technique)	F(2, 339) = 1.32			
Social harmony				
ANOVA (decision-making technique)	$F(2, 339) = 27.80^{***}$			
t tests				
DI vs. DA	$t(339) = -3.76^{**}$			
DI vs. C	$t(339) = 2.95^*$			
DA vs. C	$t(340) = 6.57^{***}$			
Confidence in Decision				
ANOVA (decision-making technique)	$F(2, 339) = 4.77^*$			
t tests				
DI vs. DA	t(339) = 0.65			
DI vs. C	$t(399) = 2.68^{**}$			
DA vs. C	$t(340) = 1.79^{+}$			
Group affect (postdecision)				
ANOVA (decision-making style)	$F(2, 339) = 23.18^{***}$			
t tests				
DI vs. DA	$t(339) = -3.68^{**}$			
DI vs. C	t(339) = 1.10			
DA vs. C	$t(340) = 4.89^{***}$			

# TABLE 3 Results of Decision-Making Technique Comparisons

	Factor Score Means							
	Cognitive Conflict		Social Harmony		Confidence		Group Affect	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
DI	-0.08	0.95	0.04	0.92	-0.11	0.98	0.01	0.98
DA	0.02	0.96	-0.37	1.09	-0.04	1.12	-0.31	1.04
С	0.06	1.08	0.33	0.84	0.15	0.86	0.21	0.91

p < .05; p < .01; p < .001; p < .001; p < .0001.

#### RESULTS

Analysis-of-variance techniques did not reveal any significant effect of the decision-making technique (DI, DA, or C) on the cognitive conflict factor. Thus no support was found for Hypothesis 1. A significant effect due to decision-making technique was found for the dependent variable measuring social harmony, F(2, 339) = 27.8, p < .0001. Planned (protected) t tests

indicated that during decision making, subjects expected social harmony to be greater in the C technique than in either the DI or the DA technique, and greater in the DI technique than in the DA technique. This provides strong support for Hypothesis 2. A significant effect was found due to decisionmaking technique for the variable measuring confidence in the decision, F(2, 339) = 4.77, p < .01. Planned t tests indicated that confidence was expected to be highest following the C technique, and lower with either DI or DA. There were no significant differences between DI and DA on the confidence measure. These results provide partial support for Hypothesis 4. Finally, postdecision group affect was found to vary significantly as a function of decision-making technique, F(2, 339) = 23.18, p < .0001. Planned t tests revealed that group affect was expected to be higher after using the C and DI techniques than after using the DA technique, with no significant differences between DI and C. This pattern of findings partially supports Hypothesis 5.

## DISCUSSION

This study suggests the possibility that expectations may influence both process and outcomes when the DI, DA, or C techniques are used in strategic decision making. Results indicate that subjects expected higher levels of social harmony to result during the C technique, moderate levels during DI, and lower levels during DA, as predicted. This suggests the possibility that participant expectations may result in self-fulfilling prophecies. Members of groups using the DA technique, for example, may act and react to others in ways that foster high levels of interpersonal conflict. Over the long run this may lead to a cycle of deteriorating interaction within the group as past interactions set the stage for future interactions. Because social harmony has not been explored in previous research on strategic decision making, this process dimension may be useful in differentiating between DI and DA, where few differences have been uncovered in the past.

Expectations may also be important in determining perceptions of postdecision group-member affect regarding other members of the group. Subjects expected more positive feelings among group members in C compared to DA, consistent with the findings of Schweiger et al. (1986). Subjects did not differentiate between C or DI in terms of affect. They did, however, expect higher levels of affect in DI than DA. These expectations are inconsistent with the findings of Schweiger et al. (1986), who reported no difference in affect between DI and DA. This inconsistency may suggest that use of the DI technique may result in reduced positive feelings in the group.

This study also found higher expectations of postdecision confidence in the C compared to both the DI and DA conditions. There were no differences among the DI and DA conditions. Because the confidence variable contains questions about both decision quality and decision acceptance, direct comparisons with other empirical studies are difficult. If one does contrast these findings with the Schweiger et al. (1986) findings concerning quality of recommendations, however, the findings of this study are the obverse. This suggests that the structure/process associated with a technique may be more important than expectations in influencing objective decision quality. In comparison with the Schweiger et al. (1986) finding concerning decision acceptance, there is greater similarity among studies. This suggests the possibility that expectations may play a role in perceptions of decision acceptance.

There were no differences by decision-making technique on expectations of cognitive conflict. Theoretically, one would expect that there should be such differences because cognitive conflict has been posited as a key factor in producing higher-quality decision outcomes in DI and DA than in the C technique. One possible explanation may be that each technique description leads to similar expectations of conflict in the minds of the subjects. Thus, if future studies uncover differences in conflict during decision making, such differences may be due to the influence of the techniques and not expectations of the subjects.

The results of the factor analysis suggest that subjects do differentiate between social conflict (labeled social harmony in this study) and cognitive conflict that may occur during the process of decision making. This suggests that future studies may want to measure both sources of conflict. Additionally, perceptual measures of social and cognitive conflict might be considered, as used in this study, if behavioral measures are unavailable or difficult to obtain. The use of such measures may allow more precise statements concerning factors that may influence the efficacy of DI, DA, and C techniques. After making a decision, subjects differentiated between groupmember affect and confidence in the decision. However, the confidence variable combined items thought to measure decision quality and decision acceptance. Previous research (Schweiger et al., 1986) and models (Vroom & Yetton, 1973) have tended to treat the components of the confidence factor independently. Differentiation among decision quality and acceptance may be more likely to occur when direct information is available regarding adoption of a solution. Here acceptance may not solely hinge on a link between quality and acceptance but on other factors, such as political considerations.

In summary, this study suggests that group members have different expectations regarding the process and outcomes that may follow when specific decision aids are used in strategic decision making. These expectations, when consistent with previous theory and outcomes, suggest the possibility that prior findings may be influenced by expectations in addition to the decision aid itself. Where expectations are inconsistent with prior findings, however, as in the case of decision quality, one may suggest with greater confidence that the outcomes obtained are a direct result of the particular decision aid used.

Practitioners may face several problems in implementing the DI or DA techniques in actual decision-making situations. First, and most obviously, these techniques are somewhat more complicated than the more frequently used C approach. Second, because the exact factors in DI and DA that contribute to high-quality decisions are unknown, each technique must be treated as a "bundled" sequence of activities to be followed precisely, if the desired results are to be obtained. Finally, the present study found that individuals expect less social harmony, lower group affect, and less confidence in the decision outcomes in the DI and DA techniques than in the C technique. These findings suggest that on an interpersonal level, individuals may approach group decision making using the DI or DA techniques with less enthusiasm than they would C decision making. Further, due to low decision confidence, individuals may exhibit considerably less "gusto" in implementing the decision outcomes of the DI and DA techniques. Our study is only suggestive regarding the effects of expectations; each technique itself may lower social harmony, decision confidence, and postdecision groupmember affect. However, because the link between expectations and behavior in other situations is less tenuous (Jussim, 1986; Rosenthal & Jacobson, 1968), a conservative implementation strategy may have considerable merit.

In using a conservative strategy for implementing DI and DA, practitioners may wish to consider predecision interventions designed to mitigate possible negative expectations or outcomes while maintaining the high decision-quality benefits of these techniques. Such interventions might involve, for example, an attempt to forewarn participants that their expectations of decision quality may be inconsistent with the high decision-quality outcomes obtained through these techniques or that expectations of low group-member affect could result in a self-fulfilling prophecy. In addition, on the behavioral side (e.g., Hilton & Darley, 1985) participants could be trained to present feedback in a nonthreatening manner, to show support for other group members, and so on. Such training could lead to a change in expectations. Future research, based on our findings, should incorporate both expectations and measures of conflict during actual decision making. This would aid in identifying factors that contribute to DI and DA effectiveness and interventions that may mitigate the less desirable outcomes.

# APPENDIX DIALECTICAL INQUIRY DECISION-MAKING INSTRUCTIONS

In this approach to decision making, two subgroups use the same information and must develop two different recommendations based on differing assumptions from the information provided. The two recommendations and their assumptions are then subjected to a debate between the two advocate subgroups. Following the debate the two subgroups decide which assumptions survived the debate and develop a final recommendation. It is believed that sound judgments or recommendations are more likely to result from thorough identification and criticism of proposed decisions and their underlying assumptions. Typical guidelines and procedures used in the dialecticalinquiry technique follow.

1. Your four-person group will be divided into two (2) two-person subgroups (Subgroup A and Subgroup B). After the strategy case is distributed, Subgroup B will move to a different room.

2. Subgroup A should then read the case and develop recommendations and build an argument for them, supported by all key assumptions, facts, and data that underlie each recommendation. Write the recommendations, assumptions, facts, and data on the Subgroup A recommendation form. Then, one member of Subgroup A should go to the room assigned to Subgroup B and give Subgroup B the completed Subgroup A recommendation form. The Subgroup A member should then return to the Subgroup A room.

2b. Subgroup B, while waiting for the recommendation form from Subgroup A, should read the case and discuss it between themselves. When they receive the recommendation form from Subgroup A, they must develop plausible assumptions that negate or nullify each assumption made by Subgroup A, even if they initially agree with their assumptions. Using the new assumptions, Subgroup B must then develop recommendations that are counter to those of Subgroup A and are consistent with the new assumptions, even if they initially agree with Subgroup A's recommendations. Then, complete the Subgroup B recommendation form.

3. Following Step 2b, both Subgroup B members should go to Subgroup A's room. Subgroup A and then Subgroup B present their assumptions and recommendations to the other subgroup. The two subgroups then debate the merit of their recommendations and the validity of the assumptions they have made. The objective of this debate is to arrive at a final list of assumptions that is acceptable to both subgroups. 4. Once the debate is completed, the group should reach agreement on which assumptions survived. Any new assumptions that arise from the debate should also be included.

5. As a four-person group, use the surviving assumptions to develop recommendations. Record your final recommendations, assumptions, facts, and data on the Final Recommendation form.

#### **DEVIL'S ADVOCACY DECISION-MAKING INSTRUCTIONS**

In this approach to decision making, one subgroup develops a set of recommendations, and a second subgroup, the devil's advocacy subgroup, subjects those recommendations to an in-depth, formal critique. The second subgroup critiques the assumptions of the first subgroup and attempts to show why the recommendations should not be adopted but does not make any new recommendations of their own. Through repeated criticism and revision, this approach leads to mutual acceptance of a final recommendation. It is believed that good recommendations and assumptions will survive even the most forceful and effective criticism and that this approach is more likely to yield sound judgment or recommendations. Typical guidelines and procedures for using the devil's advocate technique follow.

1. Your four-person group will be divided into two (2) two-person subgroups (Subgroup A and Subgroup B). After receiving the case problem, Subgroup B will move to a different room.

2. Subgroup A should develop recommendations and build an argument for them, supported by all key assumptions, facts, and data that underlie each recommendation. Write the recommendations, assumptions, facts, and data on the Subgroup A recommendation form. Then both Subgroup A members go to Subgroup B's room. They present their recommendations orally and leave their recommendation form with Subgroup B. Then they return to their own room.

2b. Subgroup B, while waiting for the recommendation form from Subgroup A, should discuss the case between themselves.

3. Subgroup B then meets separately and must play the devil's advocate. They must critique Subgroup A's assumptions and recommendations, even if they initially agree with Subgroup A. Then fill out the Subgroup B critique form. After completing the critique form, both Subgroup B members go to Subgroup A's room. They present their critique orally and leave the critique form with Subgroup A, then return to their own room. They do not make any recommendations of their own; they just critique the Subgroup A recommendations and assumptions.

4. Subgroup A then meets separately once again and revises its recommendations to satisfy the valid criticisms of Subgroup B. The revised recommendations are again presented to Subgroup B in written and oral form. Subgroup B again meets separately to develop a critique. This critique is once again presented to Subgroup A in written and oral form.

5. Repeat Step 4 until both groups can accept the recommendations, assumptions, facts, and data. Acceptance occurs when either Subgroup B can offer no additional criticisms or when Subgroup A fully agrees with the criticisms provided by Subgroup

B. Then Subgroup A records the final recommendations, assumptions, facts, and data on the Final Recommendation form.

#### CONSENSUS DECISION-MAKING INSTRUCTIONS

In decision making, group members need to have a thorough, open, and constructive discussion and examination of the recommendations and assumptions developed individually by each of the group members. In the course of the group discussion each group member should have the opportunity to present his or her recommendations, the underlying assumptions, and relevant facts and data in as clear and logical a manner as possible. Consensus is said to exist when all group members can accept the assumptions and recommendations on the basis of logic and see them as feasible. It is believed that better assumptions and recommendations result from a more complete investigation and airing of data and ideas and a logical resolution of differences within the group. Typical guidelines for using the consensus technique follow.

1. You will work in a four-person group. Avoid arguing blindly for your own assumptions and recommendations. Present your position clearly, logically, and persuasively, but consider carefully the comments and reactions of the other group members.

2. Avoid making "win-lose" statements in your discussion. When impasses occur, look for the most acceptable solution for all parties.

3. Avoid changing your mind simply to avoid conflict and reach agreement. Withstand pressures to yield on issues that have no sound logical foundation.

4. Avoid conflict-reducing techniques, such as majority voting, tossing a coin, and the like. Differences of opinion indicate a need for more complete exchanges of information. Press for additional sharing of task or emotional data when it seems appropriate.

5. View differences of opinion as natural and helpful rather than as a hindrance to decision making. Generally, the more assumptions and recommendations expressed, the greater the likelihood of conflict and the richer the resources used in solving the problem at hand.

6. View all quick agreement as suspect. Explore the reasons for the apparent agreement, making sure the same reasons are the source of the agreement.

7. At the conclusion of the group's work, record the group's final recommendations, assumptions, facts, and data on the Final Recommendation form.

#### NOTE

1. Bernstein, Garbin, and Teng (1988) assert that confirmatory factor-analytic techniques are appropriate when prior theory is present. Results (available from the authors) of confirmatory factor analyses using the oblique multiple groups (OMG) method generally support the principal component solutions reported herein. In both the during and after cases, the substantive (theoretical) model was superior to means, variance, and pseudo models. The during substantive model was not, however, superior to an alternate model based on the positive versus negative connotations of question phraseology. High interfactor correlations in the OMG results (.53 and

.69, respectively) also suggest that the principal component factor structures should be viewed with some caution.

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