

Small-Group Interaction among Professional Librarians

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Libraries are using small groups to make decisions, and it is important that the decisions these groups make are effective. Small-group scholars argue that group processes and interactions play an important role and influence effective decision-making. Randy Y. Hirokawa developed a theory called Vigilant Interaction Theory which maintains that group interaction affects decision-making performance by directly shaping the quality of vigilance that leads to a final choice. Small groups consisting of professional librarians were used to test Hirokawa's theory, and the results showed that group decision performance is directly related to the group's efforts to perform critical vigilant decision-making functions. Specifically, groups that show a pattern generating more alternative solutions are more likely to develop effective decisions.



Librarians work in a world that is in constant change, accompanied by increasing demands for accountability. Decisions made within the library are complex, costly, and visible to the public, making it crucial that good decisions are made. Along with other organizations, libraries are looking to small groups to solve problems. Library administrators are using small-group techniques such as quality circles, total quality management, nominal group techniques, and self-management team techniques to help with decision-making. In this environment, it is imperative that library professionals develop their understanding of the process of communication and group decision-making, and develop their ability to work effectively within new environments. The need for effective decision-making requires library professionals to

communicate efficiently and creatively with ever-increasing sophistication.

Little research has been done on communication among librarians. Studies have explored interpersonal communication between librarians and patrons during the reference interview,¹ effects of nonverbal communication on the patrons' perceptions of the library and librarians,² communication between librarians and faculty,³ communication between public and school librarians,⁴ written communication between music librarians,⁵ and the type of communication activity in which librarians find themselves involved, such as with whom they communicate, by what channels, and how frequently.⁶

Group processes and interactions play an important role and greatly influence effective decision-making and problem-solving. A large number of studies in

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small-group communication have been concerned with group performance, group productivity, and group decision-making effectiveness.⁷ Small-group scholars are suggesting that interactions that occur among group members as they work on a task or problem represent an important key to understanding why certain groups are more successful than others in meeting their goals and objectives.⁸ "Organizations are only as good as the decisions they make."⁹

Communication is one of the most abstract, pervasive, important, and complex cluster of behaviors which can be defined as a message that is transmitted from sender to receiver.¹⁰ The term *small-group communication* refers to the theory and practice relating to one or more meetings of a small group of people who communicate face-to-face in order to fulfill common purposes and to achieve group goals.¹¹

The 1980s saw the development of three distinct small-group communication theories.¹² One of these was developed by Randy Y. Hirokawa, who conducted a number of studies in small-group communication. Hirokawa researched group decision-making effectiveness in an effort to identify the factors that influence effective group performance and developed a theory he calls Vigilant Interaction Theory.¹³ His theory argues that the manner in which group members establish operating procedures, analyze a problem, establish criteria for evaluating it, and evaluate suggested alternatives affects the quality of the solution presented by the group.

This theory maintains that group interaction affects decision-making performance by directly shaping the quality of vigilance (or critical thinking) that leads to a final choice. In short, the theory argues that the manner in which group members talk about the problems, options, and consequences facing the group

affects the way they think about those problems, options, and consequences, which in turn ultimately determines the quality of final choices they make as a group.¹⁴

Hirokawa's theory grew out of a need to explain inconsistent findings in research relating communication to group performance.¹⁵ He set out to identify qualities of groups that are most associated with effective decision-making.¹⁶ His theory takes a comprehensive look at the variety of error sources in group decision-making with an eye toward identifying the kinds of things groups must address to become more effective. The sequence of activity identified by Hirokawa mirrors John Dewey's problem-solving sequence, which, since the publication of *How We Think* in 1910, has greatly influenced twentieth-century pragmatic thought.¹⁷

Hirokawa's research was conducted to learn about the differences in group procedures when members make "good" and "bad" decisions, thus studying "best" and "worst" groups.¹⁸ He concluded that members of the effective groups examined the validity of one another's opinions and assumptions; people in the more successful groups compared alternatives to a set of criteria they believed a good decision should meet; and both groups based their choices on premises. The premises of the successful groups followed directly from facts that the members possessed about each option and that the premises of the ineffective groups did not have a good basis in fact.¹⁹

According to Hirokawa's theory, the most important characteristics of effective groups are:

1. Groups assess and understand the problem.
2. Groups identify alternatives.
3. Groups assess positive and negative alternatives vigorously

evaluating the validity of each other's opinions and assumptions.

4. Groups select the alternative (makes a decision).²⁰

Hirokawa's theory says that effective groups clarify, modify, and test opinions of their members and that ineffective groups gloss over the opinions of their members. Members of effective groups carefully test their decision alternatives and match them against the group's pre-established decision criteria, and critically evaluate each alternative in the same manner that they evaluate the opinions and assumptions of their fellow members, forcing themselves to consider all aspects of an alternative. They ask whether the alternative is fair, warranted, appropriate, or reasonable to ensure that they have examined it adequately. Hirokawa and his associates found that high-quality groups use facts and inferences that are accurate and reasonable.²¹

Hirokawa identified factors that contribute to a faulty decision-making process. The first is improper assessment of the problem. This involves inadequate or inaccurate analysis of the problem or situation in which the decision-making occurs. A second source of error in decision-making is inappropriate goals and objectives. The group may neglect important objectives that ought to be achieved, or it may work toward unnecessary objectives. A third problem is improper assessment of positive and negative qualities. The group does not see the advantages and/or disadvantages of various proposals, or it may overestimate the positive or negative outcomes. Fourth, the group may develop an inadequate information base, and finally, the group may be guilty of faulty reasoning.²²

There appears to be a relationship between interaction behavior and group performance outcomes. The purpose of the study the author presents here was to investigate if this would be the case with groups whose members are profes-

sional librarians. Like other organizations, libraries are populated by staff with varied interests and attitudes.²³ How do librarians as professionals communicate among themselves in small groups?

Hirokawa indicates that studies similar to his are needed to provide internally valid data establishing the importance of vigilant interaction for organization group decision-making. The questions explored in the study presented here were: (1) Do relationships exist between the frequency of certain communicative

There appears to be a relationship between interaction behavior and group performance outcomes.

behaviors and group decision-making effectiveness among professional librarians? (2) Are the communication patterns of interaction within effective decision-making groups different from those within ineffective decision-making groups made up of professional librarians?

For this study, a *small group* is defined as three or more people interacting with one another face-to-face in such a manner that each person influences, and is influenced by, each other working together to reach a common goal. An effective small group is one whose activity leads to a positive, workable decision and whose activity produces a desired effect.

Methodology

This study employed an experimental design where small leaderless groups of volunteer subjects participated in thirty-minute discussions that were videotaped and tape-recorded. Each group consisting of four professional librarians worked on the same problem-solving task and was asked to develop a solution that was a consensus of the group. The librarians were recruited by contacting library directors at various institu-

tions. No attempt was made to manipulate the makeup of the groups. Group membership was developed at the individual libraries by the library director or one of his or her representatives.

Each group was presented with the group task. Each received an identical presentation of background information and was told that its members would be given thirty minutes in which to discuss the problem and come up with specific

Group members were to assume that the library director was committed to the project

recommendations. The groups were informed that the entire discussion would be videotaped and tape-recorded. One member of the group was asked to be responsible for submitting written recommendations reflecting the views of the entire group. After addressing any procedural questions, the researcher left the room and allowed the group to discuss the problem for the entire thirty-minute period. After thirty minutes, the researcher reentered the room and collected the recommendations proposed by the group, at which point subjects were informed of the true purpose of the research. The entire data-gathering process was repeated until all ten videotaped and tape-recorded discussions and group proposals had been obtained.

The task selected for discussion was a problem that librarians would encounter in a working situation. The problem was one that could be discussed and a decision reached in the time allotted. For this study, each group was to develop a program for training library staff in new technologies and for keeping them up-to-date. Library staff included those who worked in the library—librarians, support staff, and student workers. The program was not to include training or teaching patrons. The technologies could be new CD-ROM products, changes in

the CD-ROM products already in the library, changes on the online catalog, the use of Internet, and the use of locally created databases. Groups were not to limit their plan. Group members were to assume that the library director was committed to the project and had guaranteed the funds and staff time for implementation of the program that was developed.

Once all the group discussions had been videotaped and tape-recorded, and their respective group proposals collected, steps were taken to determine the quality of the training program developed by each group to ascertain effective and ineffective groups. Three judges, who possessed the knowledge and expertise necessary to evaluate the proposals properly and fairly, were asked to evaluate the training programs. The judges were given identical instructions. Each judge worked independently and gave each program ratings as to appropriateness, workability, completeness, and timeliness.

Inappropriate	1	2	3	4	5	6	7	Appropriate
Workable	7	6	5	4	3	2	1	Unworkable
Incomplete	1	2	3	4	5	6	7	Complete
Timely	7	6	5	4	3	2	1	Not timely

In awarding scores, the judges were told to be as consistent as possible and to keep in mind that the groups had only thirty minutes to discuss the problem. The groups were not told in advance what topic they would be discussing, nor were they given any time to research the problem before the discussion.

A summation of the four scores for each of the training programs proposed by a group thus served as the measure of group decision-making effectiveness. In order to have adequate degrees of freedom for the statistical tests in this study, the groups were classified in two subsets—“high effective” and “low effective.”

Content analysis was used to analyze the group interactions. Content analysis

was used to facilitate the objective analysis of the discussions and to eliminate bias in the investigative process and to decrease subjectivity. Without knowledge of the results of the three judges' scoring, utterances were coded using the Function-Oriented Interaction Analysis System (FOIAS) designed by Hirokawa.²⁴ Hirokawa developed the system to organize group interaction process in terms of those communication behaviors that performed functions essential to successful task performance. He identified these functions as follows:

1. Establishment of operating procedures;
2. Analysis of the problem facing the group;
3. Establishment of criteria for evaluating alternative solutions;
4. Generation of alternative solutions to solving the problem;
5. Evaluation of each suggested alternative with the eventual selection of the best available alternative(s). (Hirokawa, 49)

Hirokawa's FOIAS identified sixteen interactive categories. Eleven are organized under the heading of "assertions," which are comments that present information, and five under the heading of "requests," which are comments that ask for information (Hirokawa, 49).

I. Assertions

1. Introduction of a fact
2. Introduction of an opinion
3. Restatement of a fact
4. Restatement of an opinion
5. Development of a fact
6. Development of an opinion
7. Substantiation of a fact
8. Substantiation of an opinion
9. Stated agreement
10. Stated disagreement
11. Summary/synthesis

II. Requests

1. Ask for facts

2. Ask for opinions
3. Ask for consent/approval
4. Ask for clarification
5. Ask for summary/synthesis (Hirokawa, 49-51)

In order to organize the five general functional categories and sixteen specific behavior categories into a workable system for analyzing group interaction, Hirokawa developed a two-level analysis system (Hirokawa, 51). The first level consists of the five general task-achievement functions. A sixth "miscellaneous" category was created to accommodate any verbal behaviors that performed a function other than the five being examined. The second level consists of sixteen interaction categories that represent specific types of verbal behaviors which can perform any of the five task-achievement functions. The eighty-one-behavioral-category system was assumed to contain behaviors most likely to be related to group decision-making or problem-solving effectiveness (Hirokawa, 51-52). It assumes that the basic unit of analysis is the *functional utterance* that is defined as "an uninterrupted utterance of a single group member which is perceived to perform a specific function (or action) within the group interaction process" (Hirokawa, 63). Once the ten-group proposals had been evaluated and the corresponding group discussions had been coded, the data were analyzed using three different statistical models: Chi-square analysis, correlation analysis, and multiple discriminate analysis.

Results

An objective of the study was to assess the relative effectiveness of the solutions developed by the ten groups. The evaluation process was accomplished with the assistance of three judges who possessed the knowledge and expertise necessary to evaluate the proposals properly and fairly. The sum of the individual scores for each of the recommendations pro-

TABLE 1
Group Decision-Making Effectiveness Scores

	Judge 1	Judge 2	Judge 3	Total	Mean	Rank
Group 1	20	23	22	65	21.6667	2
Group 2	21	16	20	57	19.0000	5
Group 3	22	22	19	63	21.0000	3
Group 4	27	12	21	60	20.0000	4
Group 5	25	10	20	55	18.3333	8
Group 6	27	15	26	68	22.6667	1
Group 7	19	13	19	51	17.0000	10
Group 8	20	11	21	52	17.3333	9
Group 9	22	17	17	56	18.6667	6
Group 10	21	15	20	56	18.6667	7
Total				583	194.34	
Mean				58.3	19.43	
Standard Deviation (SD)				5.579	1.86	
Mean (Judge 1) = 22.40		S.D. (overall) = 1.86				
Mean (Judge 2) = 15.40		Kurtosis (overall) = -.74				
Mean (Judge 3) = 20.50		Skewness (overall) = .50				
				Mean (overall) = 19.43		

posed by the groups served as quantitative measures of the groups' decision-making effectiveness. Table 1 summarizes the results of the judges' evaluation. The mean scores ranged from a low of 17.0000 (group 7) to a high of 22.6667 (group 6), with a standard deviation of 1.86. The distribution of scores approximated the "normal" distribution (kurtosis = -.74) being a little more peaked than normal and somewhat skewed to the right (skewness = .50).

After obtaining a quantitative index of the decision-making effectiveness of the groups, an attempt was made to determine the reliability of the judges. The three judges independently rated each of the ten-group solutions such that each solution received separate scores for appropriateness, workability, timeliness, and completeness. Estimates of interrater reliability was established using Pearson product-moment correlation statistics (*r*). The forty scores from Judge 1 were compared with the forty scores from Judge 2; the forty scores from Judge 1 were compared with the forty scores from

Judge 3; and the forty scores from Judge 2 were compared with the forty scores from Judge 3. The resulting Pearson product-moment *r*'s of .2646 ($p < .099$), .6709 ($p < .001$), and .2949 ($p < .065$) at the .10 level indicated that the three judges basically agreed with one another regarding their evaluations of the group proposals. Table 2 summarizes the results of the correlation.

Having established each group's rank and the judges' reliability, the groups' evaluation scores and coded discussions were utilized in a series of nonparametric and parametric statistical models. The first was Chi-square analysis (χ^2). The purpose of using this model was to determine whether a relationship existed between the performance of the five general discussion functions and group decision-making effectiveness. The ten groups were divided into two subsets on the basis of their effectiveness scores. Those with scores above the mean (20–22.6667) were classified as "high effective" and those with scores below the mean (17.3–19) were classified as "low ef-

TABLE 2
Judges Scores for Appropriateness, Workability,
Completeness, and Timeliness

Appropriateness				Completeness			
Group	Judge 1	Judge 2	Judge 3	Group	Judge 1	Judge 2	Judge 3
1	6	6	6	1	4	6	4
2	6	6	6	2	5	3	4
3	7	6	6	3	4	4	4
4	7	4	6	4	7	3	5
5	7	4	6	5	6	1	4
6	7	6	7	6	7	2	7
7	6	4	5	7	5	3	5
8	6	4	6	8	6	2	5
9	6	4	5	9	4	5	3
10	6	4	5	10	5	4	4

Workability				Timeliness			
Group	Judge 1	Judge 2	Judge 3	Group	Judge 1	Judge 2	Judge 3
1	6	6	6	1	4	5	6
2	6	5	6	2	4	2	4
3	7	6	5	3	4	6	4
4	7	4	6	4	6	1	4
5	6	4	5	5	6	1	5
6	7	6	6	6	6	1	6
7	6	4	5	7	2	2	4
8	6	4	6	8	2	1	4
9	6	6	5	9	2	2	4
10	6	3	6	10	6	4	5

	Judge 1	Judge 2	Judge 3
Judge 1	1.0000 (40) p = *	.2646 (40) p = .099	.2709 (40) p = .000
Judge 2	.2636 (40) p = .099	1.0000 (40) p = *	.2949 (40) p = .065
Judge 3	.6709 (40) p = .000	.2949 (40) p = .065	1.0000 (40) p = *

*Value could not be computed.

fective." The eighty-one behavioral categories within FOIAS were collapsed into the six major functions, and a 2 x 6 contingency table was created. A "miscellaneous" function was included so as to

utilize all the observable behaviors. The observed frequencies for each of the twelve cells were compared to the theoretical frequencies that would be expected if no relationship existed between

TABLE 3
Contingency Table for Chi-Square Analysis

	Functions						Row Totals
	1	2	3	4	5	6	
High Effect.							
Observed freq.	19	138	14	491	117	9	788
Theoretical freq.	19.68	177.52	8.27	433.75	132.65	16.14	
Low Effect.							
Observed freq.	31	313	7	611	220	32	1,214
Theoretical freq.	30.32	273	12.73	668.25	204.35	24.86	
Column totals	50	451	21	1,102	337	41	2,002
$\chi^2 = 41.814$	$v = 0.145$	$df = 5$	$p < .001$				

the two variables. The resultant χ^2 was found to be significant ($\chi^2 = 41.814$; $df = 5$; $p < .001$). This indicated that a relationship does exist between the performance of the general discussion functions and group decision-making effectiveness. A test of the strength of the relationship using Cramer's V ($V = 0.145$) indicated that the relationship was a weak one. Table 3 summarizes the results of the Chi-square analysis.

Establishing that a relationship exists between the general discussion functions and group decision-making effectiveness, the data were further analyzed to

There appears to be a fairly strong negative relationship between Function 1 ("Establishment of operating procedures") and group effectiveness within the "low" effective groups.

determine the nature of that relationship. An attempt was made to determine the extent to which the general discussion functions were related to group decision-making effectiveness by employing the statistical model of correlation analysis. To compensate for the varying length of the ten-group discussions, the observed frequencies for each of the six general functions were converted into propor-

tions. The discussions ranged from 156 to 247 units of behavior. The "miscellaneous" function was again included in the analysis. Taking one function at a time, the observed frequencies for that function were correlated with the group effectiveness scores using the Pearson product-moment correlation statistic (r). The resulting six correlation coefficients were tested for statistical significance to identify the strongest relationships. A significance level of .10 was established for all tests. Table 4 summarizes the observed frequencies for each of the six general functions, the corresponding effectiveness scores, and the resulting Pearson product-moment coefficients. The results indicate that a statistically significant negative relationship exists between "Establishment of operation procedures" (Function 1) and group decision-making effectiveness. This suggests that the more group members attempted to establish operational procedures, the more likely they were to come up with an ineffective decision.

An attempt was then made to determine which specific communicative behaviors within those functions accounted for the overall relationships observed. The observed frequencies were again converted to proportions. The observed frequencies for each of the eighty-one behavioral categories in FOIAS were cor-

TABLE 4
Correlations between Major Functions and
Group Effectiveness Scores

Group	Score	F1	F2	F3	F4	F5	F6
6	68	.00	.17	.00	.64	.08	.04
1	65	.03	.11	.05	.71	.10	.00
3	63	.01	.30	.02	.43	.23	.01
4	60	.00	.13	.00	.70	.17	.00
2	57	.00	.41	.00	.40	.19	.00
5	55	.00	.17	.00	.64	.18	.00
9	56	.05	.16	.00	.51	.22	.05
10	56	.02	.33	.01	.55	.06	.04
8	52	.06	.25	.02	.49	.17	.02
7	51	.06	.21	.00	.41	.30	.02

^t(F1/Score) = -.5715 (p<.084) ^t(F4/Score) = .4120 (p<.237)
^t(F2/Score) = -.2701 (p<.450) ^t(F5/Score) = -.5231 (p<.121)
^t(F3/Score) = .3415 (p<.334) ^t(F6/Score) = -.1648 (p<.649)

stepwise criterion. The two subsets ("high" and "low" effective groups) served as the "groups" variable in the analysis. Table 6 summarizes the results of the multiple discriminant analysis. The results reveal one discriminant function with a canonical correlation of .8599 ($p < .3471$). Based on the calculations of Wilk's lambda, the best discriminating variable appears to be Function 4 ("Generation of alternative solutions") (Wilk's lambda = .260573; $p < .3471$). The discriminant function was found to successfully classify 90 percent of the known cases. It appears that "high" and "low" effective groups can be discrimi-

nated by a linear combination of Function 4.

related with the group effectiveness scores using the Pearson product-moment correlation statistic (r). Table 5 summarizes the results of the correlation analysis. A .15 level of significance was established for all tests. Only those correlation coefficients that were significant, or close to it, are reported in the table.

Having discovered that Function 4 can be used to predict "high" and "low" effective groups, multiple discriminant analysis was again used to attempt to determine whether the relationship was consistent enough to allow Function 4 to serve as a "predictor" of decision-making effectiveness. This time, the discriminant function correctly classed 80 percent as "predictors" of decision-making effectiveness. To make this determination, the data were analyzed using the statistical model of multiple discriminant analysis. The six major discussion functions were the discriminating variables and were entered in the analysis in a stepwise fashion based on the discriminating power of the variable. Wilk's lambda was used as the

TABLE 5
Expanded Correlation Analysis between Behavioral
Categories and Group Effectiveness

Behavioral Code	Major Description	Function	r	p
101	Introduction of fact	1	-.6674	.035
112	Ask for facts	1	-.6369	.048
114	Ask for consent/approval	1	.7848	.007
208	Substantiate an opinion	2	-.5065	.135
209	Stated agreement	2	-.7514	.012
408	Substantiate an opinion	4	.4870	.153
411	Summary/synthesis	4	.7862	.007
511	Summary/synthesis	5	-.5166	.126
516	Ask for summary/synthesis	5	-.6835	.029

TABLE 6
Summary of Multiple Discriminant Analysis

Step Number	Variable Entered	Wilk's Lambda	Probability			
1	F4	.72563	.1202			
2	F1	.65458	.2269			
3	F3	.50824	.2252			
4	F2	.31490	.1510			
5	F6	.26058	.2236			
6	F5	.26057	.4169			
Number Removed	Eigenvalue	Canonical Correlation	Wilk's Lambda	x ²	df	p
0	2.8377	.8599	.260573	6.724	6	.3471
Variable	Standard Discriminant Function Coefficient		Unstand. Discriminant Function Coefficient			
F1	2.54245		105.0800612			
F2	2.26023		24.1930890			
F3	-1.59288		-100.1188734			
F4	1.67319		15.6536852			
F5	-.04120		-.5517650			
F6	-.70543		-34.0934141			
Constant			-14.6372858			
Actual Groups			Predicted Group Membership			
Subset	Code	No. of Cases	Subset 1	Subset 2		
High	1	4	4 100.0%	0 0.0%		
Low	2	6	1 16.7%	5 83.3%		
90 percent of the known cases were correctly classified.						

of the known classes. The results indicate that Group 3 should fall in the "low" effective subset, and Group 5 should fall in the "high" effective subset. Table 7 summarizes the results of the multiple discriminant analysis.

Knowing that Function 4 ("Generation of alternative solutions") can be used to discriminate between "high" and "low" effective groups, an attempt was made to discover why 20 percent of the known cases were incorrectly classified by the discriminate function. Using the frequency proportions, each major discus-

sion function was correlated with the group effectiveness scores within each of the two subsets. The resulting twelve Pearson product-moment correlation coefficients are summarized in table 8. There appears to be a fairly strong negative relationship between Function 1 ("Establishment of operating procedures") and group effectiveness within the "low" effective groups. This was the only relationship found. It appears that the discriminant function incorrectly classified 20 percent of the cases because the direction and strength of the relationships between the

TABLE 7
Summary of Multiple Discriminant Analysis

Step Number	Variable Entered	Wilk's Lambda	Probability			
1	F4	.72563	.1209			
Number Removed	Eigenvalue	Canonical Correlation	Wilk's Lambda	χ^2	df	p
0	.3781	.5238	.72562	2.405	1	.1209
Variable	Standard Discriminant Function Coefficient		Unstand. Discriminant Function Coefficient			
F4	1.0000		9.3556054			
Constant			-5.1268718			
Actual Groups			Predicted Group Membership			
Subset	Code	No. of Cases	Subset 1	Subset 2		
High	1	4	3 75.0%	1 25.0%		
Low	2	6	1 16.7%	5 83.3%		
80 percent of the known cases were correctly classified.						

major discussion functions and group decision-making effectiveness are not consistent across the two subsets.

The results of the investigation indicate a rejection of the null hypotheses. Systematic relationships do exist between the frequencies of certain communication behaviors and group decision-making among professional librarians, and communication patterns of interaction within effective decision-making groups are different from those within ineffective decision-making groups made up of professional librarians. In particular, a negative relationship was discovered between group decision-making effectiveness and communication behaviors that established operating procedures (Function 1). A positive relationship was discovered between group decision-making generating alternative solutions (Function 4). Though these two relationships were found to vary in both strength and di-

rection across the "high" and "low" effective groups, they were consistent

TABLE 8
Correlations between Major Functions and Group Effectiveness Scores within Subsets

Functions	Subsets	
	High	Low
1	r = .1400 p = .860	r = -.7347 p = .096
2	r = -.0348 p = .965	r = .4078 p = .422
3	r = .1257 p = .874	r = -.3444 p = .422
4	r = .0304 p = .292	r = .2290 p = .663
5	r = .7077 p = .292	r = -.5180 p = .293
6	r = .7846 p = .215	r = -.1329 p = .802

enough to allow the two functions to serve as fairly accurate predictors of group decision-making effectiveness.

Discussion

The purpose of the present study was to examine the relationships between certain communicative behaviors and group decision-making among professional librarians, and communication interaction patterns within effective decision-making groups and ineffective decision-making groups consisting of professional librarians. Using content analysis of actual group discussions, the study explored the distribution of interactions found between effective and ineffective decision-making groups.

One finding of the study is that a negative relationship existed between behaviors that function to "establish operating procedures" and group decision-making effectiveness. Specifically, the more group members introduced facts regarding procedural directions and asked for facts regarding procedural directions, the less likely they were to reach an effective decision. The results suggest that although structuring and organizing comments are important, an excessive amount of procedural comments may be counterproductive to effective group decision-making (Hirokawa, 119). This may be an explanation for the observed negative rela-

ing (Hirokawa, 119). This is likely the explanation for groups consisting of professional librarians.

The study found little evidence to support the relationship between group decision-making effectiveness and communication behavior that functions to analyze the problem facing the group. The finding appears to contradict the views of many decision-making scholars. John Dewey, James H. McBurney, Kenneth G. Hance, and Robert F. Bales all suggest that groups need to assess the problem to be effective.²⁵

The results suggest that the lack of relationship between analysis of the problem and effective decision-making does not disprove the importance of group members' attempts to analyze and understand the problem facing them. Scholars offer no evidence to support the assumption that the more group members attempt to analyze and understand the problem under consideration, the more effective the groups' decision is likely to be.²⁶

Because the task presented for the groups to discuss in the present study was one that would typically occur in the work setting, the librarians were aware of the problem. Although none of the groups had developed training programs prior to the discussion, they were aware of the need to develop such a program. It is understandable, then, that the present study found no consistent relationship between the frequency of communicative behavior that functions to analyze the problem under consideration and group decision-making effectiveness.

This study found that group decision-making effectiveness was unrelated to the attempts of group members to establish criteria for evaluating the alternative solutions. Hirokawa suggests that the process of establishing criteria for evaluating alternative solutions may not involve the direct discussion of such criteria (Hirokawa, 125). In the present study it

The study found little evidence to support the relationship between group decision-making effectiveness and communication behavior that functions to analyze the problem facing the group.

relationship between procedural comments and group decision-making effectiveness. Once the group has discussed and decided upon an appropriate way to approach the task facing it, additional procedural comments may be counterproductive to effective group decision-making.

is not unreasonable to speculate that the group members generally understood what criteria were appropriate for the evaluations of alternative solutions to problems and discussion of those criteria was not necessary for effective decision-making. Also, it would not be unreasonable to speculate that the groups do not need such criteria to be ranked as effective. The professional librarians were aware of the needs of their particular library and staff, and therefore understood solutions presented during the discussion.

This study found a relationship between group decision-making effectiveness and certain communicative behaviors that function to help a group generate alternative solutions and suggestions. The results of the discriminant analysis showed that Function 4, which is the generation of alternative solutions, could serve as a predictor of decision-making effectiveness 80 percent of the time. Specifically, the more group members substantiated an opinion and "summarized," the more likely they were to reach an effective decision.

The relationship between group decision-making effectiveness and group members' attempts to generate alternative solutions and suggestions, as indicated with the discriminate analysis, is generally consistent with small-group literature (Hirokawa, 128). The function also seems to confirm that the more group members consider alternative solutions, the more likely they are to select the "best" alternative for their final decision. The study supports advocates of "brainstorming" sessions that utilize an idea-generating process which encourages any and all alternatives (Hirokawa, 128).

Although there was an indication that the generation of alternative solutions could be used to predict effective decisions, there is a negative relationship (though not statistically significant) between group decision-making effective-

ness and communicative behaviors that function to evaluate alternative solutions. The possibility exists that a lot of evaluation comments may be counterproductive to effective group decision-making. In this study, there was no significant difference between the two groups. This could indicate that all the participating librarians were aware of the needs of their libraries and staffs.

The purpose of the research was to investigate whether groups consisting of professional librarians would demonstrate the certain communication behaviors and patterns of behavior as set forth in Hirokawa's Vigilante Interaction Theory. The results provide support for Hirokawa's findings that the group decision performance of groups made up of professional librarians is directly related to a group's efforts to perform critical vigilant decision-making functions as investigated in the first question. The findings of the study indicate that communication interaction patterns are uniquely different between "high" and "low" effective groups as investigated in the second question. Specifically, groups that spend more time on attempting to establish operational procedures are less likely to develop effective decisions, and if groups show a pattern generating more alternative solutions, they are more likely to develop effective decisions.

The present study was an exploratory study designed to examine the possible relationship between certain communication behaviors and patterns of behavior and group decision-making effectiveness of small groups consisting of professional librarians. The objective of the investigation was to provide information that would test Hirokawa's Vigilant Interaction Theory. The study examined small groups in the field as suggested by Hirokawa and others. A logical extension of this study would be to examine a larger sample of groups consisting of professional librarians to further substantiate that group decision performance is

directly related to a group's efforts to perform critical decision-making functions. Another extension of this study could be to examine several studies with ten groups each doing a meta-analysis. Another extension would be the comparison of this study with a study of small groups consisting of professionals from different fields. Further research should be conducted to determine whether the observed relationships in

this study will hold up under different research conditions.

The findings of this study help support Hirokawa's theory. They demonstrate that certain communicative behaviors and patterns of behaviors do have an impact on group decision-making effectiveness. As professional librarians, we must be aware of these behaviors and use them to improve group decision-making in our own institutions.

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