

Acceptance and Quality of Solutions As Related to Leaders' Attitudes Toward Disagreement in Group Problem Solving¹

Norman R. F.
Maier

Department of
Psychology
The University
of Michigan

L. Richard
Hoffman

Graduate School
of Business
The University
of Chicago

An experiment was designed to test the hypotheses that (1) disagreement in a discussion can lead either to hard feelings or to innovation depending upon the attitude of the discussion leader; and (2) acceptance will depend upon the leader's perception of disagreement as well as upon the decision reached. The test situation utilized a role-playing format in which a foreman attempted to induce three subordinates to accept a change in work methods. Measures of the negative vs. positive effects of disagreement were obtained by the frequency with which the discussion leader reported having problem employees vs. idea men in his group.

The results showed that when the foreman most often reported having problem employees, solutions were least likely to be innovative and acceptance was relatively low. When the foreman perceived his subordinates as idea men, innovative solutions increased and satisfaction with the solution was greatest for all concerned, despite the fact that all persons involved had to change their initial positions. Although previous research has indicated that satisfaction is a function of influence over the decision, regardless of its quality, this experiment supplies evidence that the quality of the solution can introduce a further source of satisfaction. This occurs when a solution is one that resolves differences and integrates differing viewpoints to form a new and better product.

Disagreements among group members often lead to innovation or creative solutions to problems (Hoffman, Harburg, & Maier, 1962), but they also often lead to submission by one side or another with resulting hard feelings. Maier (1958, 1963) has suggested that the group leader's attitude toward such disagreements will determine which of these outcomes occurs. The person with different ideas, especially if he is a subordinate, can be

¹The research reported here was supported by Grant Number MH-2704 from the United States Public Health Service.

seen either as a problem employee and troublemaker or as an idea man and innovator, depending on the leader's attitude. The following hypothesis derives from this line of thinking: In a standardized problem situation, the persons who are seen as troublemakers by some discussion leaders will be seen as idea men by other leaders.

The acceptance and support of solutions by group members are likely to be influenced by several factors: the members' relationship with the leader, their influence on the decision, and the quality of the decision itself. Thus acceptance should be lower in groups in which the leader reports problem employees than in groups having no reported problem employees, and greater in groups where the leader perceives idea men than in groups having no perceived idea men. Thus the leader's perception of his subordinates will influence the type of discussion he will conduct, and the nature of this leadership will determine the degree to which they can constructively (vs. negatively or passively) contribute to the discussion. The workers' contributions, therefore, will influence both the quality of the decision and their acceptance of it. The effect of the decision on the men should show their acceptance to be lowest for the leader's favored decision, greatest for innovative decisions, and intermediate for decisions in which the members successfully resist change and continue as before.

The purpose of the present study is to test these hypotheses and in general to explore the relationship among the leader's perceptions (seeing members as problem employees or idea men), the character of the group decision, and the participants' acceptance or rejection of the solution. The question of the quality of the solution must also be kept in mind so that solutions that insure acceptance and good interpersonal relations do not sacrifice quality. It is assumed that an effective decision requires both objective quality and high acceptance (Maier, 1963). Thus the most effective solution for one group might not be the same as for another group. The major question is whether the leader's attitude operates to maximize acceptance and quality for each group.

Procedure Problem Four-person groups role played the case, *Changing Work Procedures* (Maier, 1952).² This problem has been found to be very sensitive for measuring leadership skills and permits a variety of solutions ranging from obvious choices to innovative resolutions of conflict. Each person in a group is assigned one of the following roles: Gus, the foreman; Jack, a good worker; Walt, the fastest worker; and Steve, the slowest worker. The three men work as a team assembling fuel pumps, each man having a work position and a supply of parts to add to the casting. They are told that inasmuch as the work is monotonous it was decided several years before to change positions hourly. Pay is based on a group piece rate.

The foreman's role requires him to call a meeting to discuss a change in work methods. He is supplied with time-study data which suggest that production (and pay) could be increased if each of the men worked in the position in which he showed the best times: Jack on Position 1, Steve on Position 2, and Walt on Position 3.

Jack's role shows that monotony bothers him and that changing positions is important in reducing it. He dislikes speed-ups and time study and is satisfied with his pay. When he is on his best position and has time, he helps Steve a little.

Walt's role shows him to be a team worker who protects Steve and helps him out. He handles monotony by talking, daydreaming, and changing his pace. His main gripe is the time-study man.

Steve's role shows his appreciation of the help he gets from Jack and Walt and his desire to please them. He recognizes that he performs better on one of the positions than on the others, and he likes this position best. Since his preference coincides with the time-study data there is no conflict in the information supplied. He has anxiety about the time study because he is the slowest worker.

² Role-playing cases permit the careful research of interpersonal behavior because they utilize the same factual circumstances involving a variety of individuals who differ in personality and leadership skills. Thus the situation is kept constant while only the interpersonal factors vary. Real-life situations do not permit the replication of the same factual aspects of a situation.

Subjects More than 600 executives in middle-management positions from several industries participated in this study. Groups of 24 to 36 were divided into 4-person groups (persons who were left over participated as observers) until data from 150 groups were obtained. All participants were exposed to a discussion on group problem solving and the values of participation in gaining acceptance. The extent of exposure ranged from one-half day to two days. Varied degrees of exposure to group processes were essential in order to obtain innovative types of solutions from this type of population (Maier, 1950, 1953; Maier & Hoffman, 1961).

Data Collected All groups were given sufficient time (about 30 minutes) to reach a decision. However, four groups were deadlocked and the workers decided to walk out. For our present purposes these four groups are not included in the analyses. The Guses were asked to report their decisions and to give the names, if any, of any Problem Employees (PEs) and of the men who contributed ideas (Idea Men or IM). They were permitted to name the same people in both categories if they wished.

The decisions reached may be divided into three classes:

1. Old Method: Continue the rotation method, including minor variations such as helping each other, additional training, and so on.
2. New Method: Each work his best position, including minor variations such as rest pauses, music, and the like.
3. Integrative Method: Includes solutions such as two men rotate; all rotate between their two best positions; all rotate but spend more time on best position; and so forth.

All four participants were asked to indicate whether they felt production would increase (+), remain the same (0), or decline (—) as a result of the discussion and the decision. This judgment served as a measure of acceptance of the decision by the workers and as a measure of Gus's judgment of the cooperation he would receive.

Results The percentages of the three types of solutions obtained

from the 150 groups were as follows: Old, 25.2%; New, 45.7%; and Integrative, 29.1%. The individual estimates of production changes (+, 0, or -) are shown for each role and type of solution in Table 1.

The appearance of the Old type of solution represents a victory for Jack and Walt, who get Gus, the foreman, to abandon his plan for a change either by convincing him that they will try harder to increase production by the Old method or that the New method is unsound. A surprising number of Guses (78.4%) estimated that production would improve without a change in method, and nearly the same number of Jacks and Walts agreed; apparently their optimism reflected their influence over Gus. Steve was somewhat less optimistic, estimating improvements in 59.5% of the cases and declines in 18.9%. He was aware of his limitations and portrayed his role accurately.

Table 1. Production Estimates of Each Participant for Each Type of Solution (Percentages for Each Solution)

Solution Type	Number of Groups	Gus's (Foreman's) Estimate			Jack's Estimate			Walt's Estimate			Steve's Estimate		
		+	0	-	+	0	-	+	0	-	+	0	-
Old	37 (25.2%)	78.4	18.9	2.7	73.0	24.3	2.7	75.7	21.6	2.7	59.5	21.6	18.9
New	69 (45.7%)	89.9	4.3	5.8	49.3	24.6	26.1	55.1	30.4	14.5	66.7	20.3	13.0
Integrative	44 (29.1%)	97.9	2.3	0.0	79.6	15.9	4.5	86.4	4.5	9.1	86.4	11.4	2.2

Note: The only significant chi-square test of the foremen's and workers' production estimates for each solution was obtained for the New solution (chi square = 29.90, $p < .01$, 2 d.f.).

The New solution appeared most often. Here Gus was overoptimistic in that he estimated an increase in production much more frequently than Jack and Walt ($p < .01$), who frequently predicted a fall in production. Of the three workers, Steve supported this solution most frequently, and his role shows him least bothered by giving up rotation.

The Integrative solution was the most acceptable for each of the three workers, and a drop in production was seldom anticipated. Even Gus was most optimistic with

this decision, which is of interest because, typically, he initially favored the New solution.

In order to obtain cooperative effort in implementing a solution, it is essential to have the support of the three workers. The acceptance value of each solution for the workers was assessed by the algebraic summation of the judgments. The judgment of Gus was not included because he cannot influence the production directly. Table 2 shows the distribution of the acceptance scores for the three types of solutions as well as the mean acceptance score for each type.

An F test of the mean acceptance scores for the three types of solutions is significant at the .01 level of confidence. Workers were least optimistic about possible production increases for the New solution as well as most likely to suggest possible negative consequences of its adoption (chi square = 16.12, $p < .01$ with 4 degrees of freedom). The workers' estimates for the Old and Integrative solutions were not significantly different.

Table 2. Distribution of Workers' Acceptance Scores for 3 Types of Solutions (Percentages for Each Solution)

<i>Solution Type</i>	<i>N</i>	<i>+3</i>	<i>+2</i>	<i>+1</i>	<i>0</i>	<i>-1</i>	<i>-2</i>	<i>-3</i>	<i>Mean</i>
Old	37	54.1	10.8	18.9	13.5	0	2.7	0	+2.0
New	69	29.0	15.9	27.5	13.0	1.5	2.9	10.2	+1.1
Integrative	44	68.2	18.2	4.5	2.3	4.5	2.3	0	+2.6

Notes: Chi square = 16.12, $p < .01$ with 4 d.f.; acceptance scores divided: +3, +2 and +1, 0 and negative.
 F test of mean acceptance for 3 solution types: $p < .01$ with 2, 147 d.f.

The New type of solution, which was the most frequent decision, clearly had the lowest acceptance value (+1.1). It was characterized by the greatest spread in values, and a bimodal distribution is suggested. Negative values amount to opposition and arise when there is a failure to resolve differences. If we add the four cases of walkouts (see procedure for collecting results) to this group, it becomes clear that this solution frequently was adopted without

gaining essential acceptance. The Integrative type of solution had the most support, although its acceptance value of +2.6 is not significantly greater than that for the Old type of solution with an acceptance value of +2.0.

The question of which decision is the "best" can now be raised. An effective decision requires a consideration of the time-study facts, the facts of monotony, and the degree of acceptance of the decision. The New solution fully respects the time-study facts but ignores the monotony. The Old solution respects monotony and receives adequate acceptance but violates the time-study facts. The Integrative solution, it may be argued, utilizes less fully the time-study facts, but it respects the facts of monotony, as revealed in the roles of Jack and Walt, and receives high acceptance. Thus the Integrative solution becomes a strong candidate for the "best" decision. This does not mean that the New solution, if highly accepted, might not be the "best" solution for some groups, but this occurs infrequently. The Old solution, even with fair acceptance, is a poor competitor for the status of "best" solution because it does not effectively deal with the time-study facts. Thus it tends to be the product of resistance to change. In the sense that the Integrative solutions are not obvious or given as background information, but must be generated in the discussion, they can justifiably be called innovative.

Let us next examine the relationship between the solution types and Gus's perception of the workers. When Gus has trouble in getting his men to change their work methods he is likely to classify one or more of the workers as troublemakers or Problem Employees (PEs), but when he feels he receives cooperation or helpful suggestions he is likely to classify one or more of them as Idea Men (IM). Table 3 shows the percentage of groups in which Gus reported PEs only, IM only, both, or neither in connection with each type of solution. This table shows a strong relationship between the type of solution adopted and how the foreman classified the workers (chi square = 16.64, $p < .02$ for 6 degrees of freedom). The presence of PEs

was reported by almost three-quarters of the foremen in groups which supposedly agreed to try the New solution, Gus's preference. Only 15.9 per cent of the foremen of such groups reported IM only. In contrast, in groups with Integrative solutions PEs were reported in 47.7% of the groups, but in almost all cases the foreman also reported the presence of IM (43.2%). Further, 43.2% of the foremen reported having had only IM in their groups.

Table 3. Frequency of Groups with Problem Employees, Idea Men, Both, or Neither by Type of Solution

<i>Type of Solution</i>	<i>Groups with PEs Only</i>		<i>Groups with PEs and Idea Men</i>		<i>Groups with Neither</i>		<i>Groups with IM Only</i>	
	N	%	N	%	N	%	N	%
	Old (37)	7	18.9	13	35.1	7	18.9	10
New (69)	16	23.2	35	50.7	7	10.1	11	15.9
Integrative (44)	2	4.5	19	43.2	4	9.1	19	43.2

Note: Chi square = 16.64, $p < .02$ with 6 d.f.

The smallest proportion of groups with PEs occurred when the conflict was resolved and an Integrative solution was reached. It was also in these cases that Gus most frequently indicated the presence of IM. Thirty-eight of the 44 Integrative solutions fell into the second and fourth columns. When the Integrative solution was achieved, Gus recognized the influence of IM; but in 19 groups he did not forget the men who initially opposed the New solution and caused conflict, while in the other 19 he retained no negative feelings about the opposition. When the conflict was not resolved and either the views of the men or Gus dominated (Old or New solutions respectively), PEs were reported. In other words, Gus, in these instances, tended to see the people who disagreed with him as a source of trouble. Thus the hypothesis which states that disagreement leads either to hard feelings or to innovation, depending on the discussion leader's perception, receives strong support.

Gus's feelings about PEs vs. IM were also reflected in the degree to which the men accepted the decisions. Accept-

ance should be related both to the types of solutions and to the nature of the interaction. Table 4 shows the results of these analyses. A three-way chi-square analysis of data from this table was performed; comparing the three types of solutions, the four classifications of groups for the presence or absence of IM and PEs, and production estimates of +3 (all workers agree production will rise) vs. less than complete agreement. This analysis showed that the foremen's perception of PEs or IM affected the workers' acceptance scores ($p < .01$). In all types of solutions the presence of IM only (column 4) was associated with high acceptance, with no negative scores appearing in any of the groups. In contrast, the presence of PEs only (column 1) was associated generally with relatively lower acceptance scores, and instances of groups with negative acceptance scores occurred for two types of solutions.

Table 4. Acceptance Scores As Related to the Presence of Problem Employees and Idea Men

<i>Solution Type</i>	<i>Groups with PEs Only</i>	<i>Groups with PEs & IM</i>	<i>Groups with Neither</i>	<i>Groups with IM Only</i>	
<i>Old</i>					
N	7	13	7	10	
Mean	+ .57	+ 2.00	+ 2.88	+ 2.30	
Range	-2 to +3	0 to +3	+2 to +3	0 to +3	
<i>New</i>					
N	16	35	7	11	
Mean	+ .25	+ 1.14	+ 1.00	+ 2.18	
Range	-3 to +3	-3 to +3	-3 to +3	+1 to +3	
<i>Integrative</i>					
N	2	19	4	19	
Mean	+ 2.50	+ 2.21	+ 1.75	+ 2.63	
Range	+2 to +3	-1 to +3	-2 to +3	+1 to +3	
Partition of Chi Square					
<i>Comparison</i>			d.f.	χ^2	p
Worker Classification by Acceptance ^a			3	11.79	.01
Solution Type by Acceptance			2	17.70	.01
Worker Classification by Solution Type			6	16.64	.02
Worker Classification by Solution Type by Acceptance			6	6.50	—
Total			17	52.63	.01

^a Acceptance scores were dichotomized into +3 vs. less than +3.

Evidence for the influence of the solution achieved on acceptance, independent of the foremen's perceptions of PEs or IM among the workers, is also shown in Table 4. Highest acceptance was evident in all of the Integrative solutions regardless of Gus's estimate of the men's contribution ($p < .01$). In these solutions it is evident that the men have had an influence, and this felt influence has been shown to be the basic factor in participation that enhances acceptance (Hoffman, Harburg, & Maier, 1962).

When, however, the men settle for the Old method, the satisfaction from influence is limited to successfully convincing or blocking the foreman rather than contributing positively to improved methods. Thus the acceptance scores for this solution were high (+2.00 to +2.88) for three of the four classifications. However, where the foreman reacted completely negatively to the opposition (where he said he had PEs only), the acceptance score was lowest (+0.57).

Acceptance was least for the New type of solution, and in only one condition (groups with IM only) did it reach an average exceeding +2. In the three other columns the acceptance score was low, largely the result of the presence of negative scores for some groups.

Thus the hypothesis that disagreement can lead to either hard feelings or innovation was supported for the workers, too. When (1) they were obliged to submit to the foreman's demand for the New solution and (2) they were reacted to unfavorably (i.e., when seen as PEs), their feelings were unfavorable (as measured by low acceptance scores). When, however, (1) they were allowed to contribute ideas that led to Integrative solutions and (2) the foreman reacted favorably to their opinions (i.e., he perceived IM), their experiences were favorable (as measured by high acceptance scores).

Since the roles of Jack and Walt make them the disagreeers, we should expect them to have been rated as PEs more often than Steve. Further, if Jack and Walt were able to convert the foreman to their point of view or if their disagreement led to an Integrative solution, then

their classification as PEs should have declined. Since Steve's role depicts him as least competent and yet supportive of his co-workers, he should have been least likely to take the initiative in disagreement and, hence, have been mentioned least often as a PE. The results, shown in Table 5, support these assumptions.

Table 5. Classification of Role Players as Problem Employees, Idea Men, Both, or Neither

<i>Role Name</i>	<i>PEs Only</i>		<i>Both PEs and IM</i>		<i>Neither PEs nor IM</i>		<i>IM Only</i>	
	N	%	N	%	N	%	N	%
Jack	150	40 26.7	5	3.3	62	41.3	43	28.7
Walt	150	36 24.0	11	7.3	64	42.7	39	26.0
Steve	150	15 10.0	4	2.7	87	58.0	44	29.3

Note: Chi square = 21.95, $p < .01$ with 6 d.f.

Although roles were assigned to group members randomly, the analysis shows a strong difference in the foremen's perceptions of the members according to the roles they played (chi square = 21.95, $p < .01$). Both Jack and Walt were reported as PEs more often than Steve. Steve, in keeping with his conflict between his loyalty to his co-workers and his insecurity about his job performance, seems rarely to have given the foreman much trouble (classified as neither in 58% of the groups). The classification for which the three roles were most alike is that of IM only (last column). Since contributing good ideas would seem to be a matter of individual ingenuity, this lack of difference could be expected from the random assignment of persons to the different roles. Actually, Steve often was credited for being an idea man because he agreed with the foreman; whereas Jack and Walt could be credited with being idea men only through their disagreement with him. Thus, despite Steve's built-in advantage, he does not score significantly higher as an idea man than do the others. This means that Jack's and Walt's disagreement must have led Gus to perceive them as sources of ideas.

In order for a disagreeer to be seen as an idea man only,

he must not only remove any antagonism he has created but he must also be seen as a contributor. It would seem that the development of the Integrative solution was the condition where Gus would most likely be confronted with an alternative that would be new. Hence, Gus should have indicated the presence of IM only in connection with this solution more often than with either the Old or the New type of solution. Significant critical ratio tests of the percentages of times Jack, Walt, and Steve were classified as IM only for the Integrative solutions (39%, 36%, and 41%, respectively) as compared to the Old and New solutions (24%, 22%, and 24%, respectively) were obtained for all three roles.

Discussion The results clearly support the hypothesis that disagreement can serve either as a stimulant for innovation or as a source for hard feelings, depending largely on the attitude of the discussion leader. Foremen who saw some of their men only as Problem Employees (PEs) obtained innovative solutions least frequently; whereas those who saw some of their men only as sources of ideas obtained innovative solutions most frequently.

Without the presence of effective disagreement, the innovative solutions (Integrative type of solution) are unlikely to arise (cf. Hoffman, Harburg, & Maier, 1962). Instead, either the leader's solution is adopted (New type of solution) or the workers' solution (Old type of solution) is adopted. The innovative solution is the product of the resolution of the conflict, and it can take the form of a compromise or of something not considered at the outset. Disagreement thus can serve as a stimulant to further exploration, but unless it is respected it tends to become the source of interpersonal conflict.

The value of resolving differences through participation in problem solving reveals itself in the support that participants will give solutions. Acceptance (as measured by the participants' estimate of the solution's effectiveness) was invariably higher for the innovative solutions than for either of the two more obvious solutions. This was true for the leader as well as for the workers. Even the

leaders who had their preferred solution adopted were not quite so optimistic as were those who reached an Integrative solution. Likewise, the workers were somewhat more optimistic about the results when they adopted an Integrative solution than when they convinced the leader to adopt their position.

In all cases, the acceptance of a solution was negatively related to the leader's perception of workers' being problem employees and positively related to his perception of their being idea men. Thus the satisfaction of all persons, including the leader, depended upon the leader's ability to deal with opposition and alternative proposals and to use them constructively.

Such sharing of influence, however, must not be confused with completely permissive leadership. In the latter, conflict is reduced or avoided rather than resolved, and the workers might successfully resist change. When this occurs, the participants' influence might be apparent in a solution's acceptance, but the solution's quality might suffer. In leaderless group discussions, the satisfaction of participants has been shown to be related to their degree of influence over the solution but not to the quality (objective goodness) of the decision (Hoffman, Burke, & Maier, 1965). Unless an interest in the quality of a decision can be developed after removing interpersonal conflict, the decision reached by a group may be reduced to personal preferences, with insufficient regard for facts. Since factual considerations are essential to a decision's quality, they can be influential in a discussion only if the leader is sufficiently skillful. The skill areas include abilities for posing the problem, stimulating new ideas, processing information, and so on (Maier, 1963).

The results of the present experiment demonstrate that the facts supplied to the leader (time-study data) were respected in the innovative solutions, especially when he in turn respected the facts supplied to participants (boredom). However, to reach this mutual respect he had to be considerate of feelings (perceive Idea Men) and avoid defensive behavior (not perceive Problem Employees).

Moreover, when factual considerations were taken into account, the satisfaction with solutions was influenced by the nature of the solutions. Thus two sources of satisfaction can be achieved in participative discussion: the satisfaction of having an influence and the satisfaction of finding a resolution to conflicting points of view.

Both the quality of a solution and its acceptance by all concerned are requisites to effective decisions. Participative methods generally achieve the latter, but skilled leadership, which not only permits group decision but also utilizes the problem-solving ability and resources of the group members, is essential to achieve both. Thus a group without adequate leadership might either (1) fail to explore a problem because they agree on a solution at the outset or (2) form irreversible interpersonal conflicts because of their inability to deal with conflicts generated by emotional bias.

- References**
- Hoffman, L. R., Burke, R. J., & Maier, N. R. F. Participation, influence, and satisfaction among members of problem-solving groups. *Psychol. Rep.*, 1965, 16, 661-667.
- Hoffman, L. R., Harburg, E., & Maier, N. R. F. Differences and disagreements as factors in creative group problem solving. *J. abnorm. soc. Psychol.*, 1962, 64, 206-214.
- Maier, N. R. F. The quality of group decisions as influenced by the discussion leader. *Human Relat.*, 1950, 3, 155-174.
- Maier, N. R. F. *Principles of human relations*. New York: Wiley, 1952.
- Maier, N. R. F. An experimental test of the effect of training on discussion leadership. *Human Relat.*, 1953, 6, 161-173.
- Maier, N. R. F. *The appraisal interview*. New York: Wiley, 1958.
- Maier, N. R. F. *Problem-solving discussions and conferences*. New York: McGraw-Hill, 1963.
- Maier, N. R. F., & Hoffman, L. R. Organization and creative problem solving. *J. appl. Psychol.*, 1961, 45, 277-280.