

## **Group structure, communication and effectiveness among white and blue-collar employees**

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### **Abstract**

*The moderating effect of interpersonal communication on the relation between group structure and effectiveness was examined in 24 clerical groups and 36 assembly-line groups. Effectiveness was assessed in terms of output and member perceptions of the extent to which their group achieved its goals. The structural variables of cohesiveness, attractiveness and centralization of authority were significantly related to the measures of information accuracy and communication openness, but not to the measures of effectiveness. However, both accuracy and openness were significantly related to effectiveness. Those results suggest that group structure has an indirect impact on effectiveness, through its effect on the accuracy and openness with which information is transmitted among members.*

There are a number of different perspectives from which to approach organizational phenomena. One such perspective is to treat organizations as information-processing entities which, if they are to survive, must accurately sense their environments (Starbuck, 1976), digest or absorb information to make decisions (Cyert and March, 1963), and coordinate or control its various constituent parts including its individual members (March and Simon, 1958; Litterer, 1973). In terms of this perspective, the capacity of organizations to effectively receive, process and transmit information among their various units is crucial for their success or failure. Specifically, it is argued by persons who approach organizations from this perspective, that organizations characterized by effective communication between its members are likely to be more successful than organizations in which interpersonal communication is ineffective (Porter and Roberts, 1976).

Although the effects of information on individual and group decision-making have been researched (Ackoff, 1967; Kaufman, 1973), no single field of study has yet examined the relationships between interpersonal communication and performance among work groups carrying out their normal organizational duties and tasks. The only previous study to have investigated the relationship of communication to performance, that by

O'Reilly and Roberts (1977), was conducted upon sociometrically-created 'teams' and not upon actual work groups, and did not measure performance directly. Instead it assessed performance indirectly, by getting the members of each team to indicate how effective they *considered* their particular team to be. The authors themselves admit that there are serious difficulties in employing sociometric teams, as opposed to genuine work groups, and utilizing subjective judgments of effectiveness instead of output measures. As they state: 'Because of possible method bias in this study, it is not clear how strongly related communication and group effectiveness would be, if independent measures were used' (p. 681).

The present study represents a continuation of the line of research started by O'Reilly and Roberts (1976), but with two major improvements over their study. First, unlike the study by O'Reilly and Roberts (1977), the present study employs actual work groups, consisting of persons who formally 'belong together' in that they are jointly responsible for executing certain duties and tasks. Second, in contrast to the study by O'Reilly and Roberts (1977), the present study employs objective measures of output or productivity as indicators of performance, and not the members' subjective estimates of how well they think their group has performed. Like its predecessor, the aim of the study is to examine the relations among group structure, communication and effectiveness. The guiding hypothesis of the study is that structural differences are related to differences in communication and that such differences, in turn, relate to variations in effectiveness.

## **Method**

### ***Subjects***

The subjects of the present study consisted of two groups of employees performing very different jobs. The first group (Clerical Group) comprised 172 female employees doing routine clerical operations, in 10 different regional branches of a large federal agency. These employees were members of 24 work teams or units, each consisting of between six to eight members. The second group (Assembly Group) comprised 240 male assembly-line workers employed in four sections of a large manufacturer of motor-car components. These workers were members of 36 autonomous work groups, each consisting of between five to seven members that had been formed the previous year as part of a company-wide programme of job enrichment. For present purposes, there are four features of these work groups that need to be stressed, as they enable us to use standard output as a measure of performance.

First, the groups constituted official units or sections in the organizational structure, each responsible for performing a specific set of operations. Secondly, the duties and requirements of each of the groups were identical; in the case of the Clerical Group of employees, it consisted in

the checking, updating and filing of customer record cards; in the case of the Assembly Group of employees, in the assembly of motor-car batteries from their component parts. Thirdly, the amount of help or assistance given to the groups in the performance of their jobs did not differ in the various branches, as judged from two separate investigations conducted at each branch, in which two members of each group were interviewed and the group actually observed during a normal working period. Finally, the nature of the job done by each group was such that it was possible to derive an objective measure of performance or productivity for each group. In the case of the clerical employees, the output measure was the number of record cards processed per day over the eight-week period of the study, divided by the number of persons in the particular unit or group. In the case of the assembly-line employees, the output measure was the number of batteries assembled per day, also over the eight-week period of the study, divided by the number of persons in the particular unit or group.

### *Operationalisation of Structure*

In his text on organizational behaviour, Mitchell (1978) argues that differences in structure between groups can be accounted for largely in terms of variations along three dimensions, viz. communication, attraction, and power. In the present study, this point of view was adopted, and measures thus obtained of the pattern or structure in each of the six groups, in respect of each of these variables. As in the study by O'Reilly and Roberts (1977), these three variables were assessed by means of a specially-devised sociometric questionnaire, which required subjects to indicate persons in their work group with whom they had various relations. Specifically, each subject was provided with the names of every other person in the group and asked to complete the following three items: (a) "Indicate which of the persons in the list you talk to frequently during their hours at work" (communication); (b) "Indicate which of the persons in the list you like or regard positively" (attraction); (c) "Indicate which of the persons in the list exerts an influence over how you think and act" (power).

From the subjects' answers to these questions, the following structural attributes of the groups were developed:

- *Group connectedness* : This measure of the cohesiveness of the group, was based on responses to the communication item. It was given by dividing the total number of direct links possible by the actual number of such links (number of persons all members said they talked to frequently).
- *Group attractiveness* : This measure of the regard of members for their group, was based on responses to the attraction item. It was given by dividing the total number of possible attractions by the actual number of attractions (number of persons all members said they liked or regarded positively).

- **Group centralization** : A measure of the dispersion of authority or power throughout the group was given by the total number of persons in the group divided by those with power or authority (number of persons who were regarded by others as exerting an influence over them).

### *Operationalisation of Communication*

Based on the pioneering work by O'Reilly and Roberts (1974) relating facets of communication to individual performance, two aspects of communication regarded as of central importance were assessed; these were (a) information accuracy and (b) communication openness. The five-item scales developed by these researchers to measure these two aspects of interpersonal communication, were used in the present study. Specifically, each subject was asked to indicate the extent of his agreement or disagreement (on seven-point scales) with 10 items assessing these dimensions in their work groups. Examples of items from the scale of information accuracy are 'I sometimes feel that others don't understand the information they have received' and 'It is often necessary for me to go back and check the accuracy of information I have received'. Examples of items from the scale of communication openness are 'It is easy to talk openly to all members of this group' and 'When people in this group talk to each other, there is a great deal of understanding'.

### *Operationalisation of Effectiveness*

Two measures of group effectiveness or productivity were obtained from each group. First, as mentioned earlier, objective measures of performance were obtained for each group, by computing their output over the eight week period of the study (number of cards or batteries processed per average day). Second, subjective measures of performance were obtained for each group, by getting subjects to complete the eight-item scale of perceived effectiveness developed by Mott (1972). This scale requires subjects to indicate the extent to which they feel their group is effective in reaching its goals, and includes items dealing with productivity, adaptability, and flexibility. A perceptual index of effectiveness for each group was given by the mean score of the group members on the eight-item scale.

### *Procedure*

The various scales were built into a single questionnaire that was completed (anonymously) by each subject during a specially-sanctioned work break.

### **Results and discussion**

Zero-order correlations of the three structural variables, the two communication measures, and the objective and subjective measures

of performance are given in Tables 1 and 2. Table 1 presents the results obtained from the female clerical employees, and Table 2 those obtained from the male assembly-line workers.

**Table 1**

**Correlations among Structural, Communication, and Effectiveness Measures among Clerical Groups**

Measures	$\bar{X}$	SD	Measures							
			1	2	3	4	5	6	7	
1 Cohesiveness	14.11	3.12	-							
2 Attractiveness	18.76	2.11	.44*	-						
3 Centralization	7.36	1.10	.21	.39*	-					
4 Information Accuracy	15.52	2.86	.41*	.42*	.43*	-				
5 Communication Openness	14.98	3.01	.44*	.39*	.23	.26	-			
6 Output	53.21	9.12	.26	.13	.10	.50**	.45*	-		
7 Perceived Effectiveness	25.21	2.10	.17	.10	.09	.46*	.27	.40*	-	

$N$  = 24 groups

\*  $p < .05$

\*\*  $p < .01$

There are a number of the findings that deserve special mention because of their implications for the hypotheses guiding the present study. First, in both groups of subjects, the structural variables were related to the two aspects of interpersonal communication. For instance, among the clerical female employees, significantly positive relationships ( $p < .05$ ) were obtained between the structural variables of cohesiveness, attractiveness, and centralization and perceptions of information accuracy, and between cohesiveness and attractiveness and perceptions of communication openness. Similarly, among the male assembly workers, significantly positive relationships ( $p < .05$ ) were obtained between information accuracy and the structural variables of cohesiveness, attractiveness and centralization, and between communication openness and cohesiveness. In the clerical group, only the relation between centralization and openness was insignificant ( $p > .05$ ), while in the Assembly Group, only those between attraction and openness and between centralization and openness, were insignificant ( $p > .05$ ). These findings indicate that groups consisting of members who like each other, talk frequently to each other, and have just a few persons with influence in the group who are characterized by higher

perceptions of information accuracy. They also show that highly cohesive and attractive groups (to their members) are perceived as having more open communications.

**Table 2**  
**Correlations among Structural, Communication, and Effectiveness Measures among Assembly-Line Groups**

Measures	$\bar{X}$	SD	Measures							
			1	2	3	4	5	6	7	
1 Cohesiveness	12.56	2.56	-							
2 Attractiveness	20.11	2.28	.44**	-						
3 Centralization	6.51	1.31	.30	.24	-					
4 Information Accuracy	16.01	3.18	.43**	.40*	.34*	-				
5 Communication Openness	15.52	2.96	.34*	.18	.22	.39*	-			
6 Output	171.11	12.11	.26	.38*	.16	.36*	.27	-		
7 Perceived Effectiveness	30.11	1.96	.17	.18	.09	.45**	.33*	.42**	-	

$N$  = 36 groups

\*  $p < .05$

\*\*  $p < .01$

Secondly, although variations in structural arrangements are associated with the accuracy and openness with which information is transmitted, they do not have a direct impact on group effectiveness itself. For instance, none of the relationships between the structural variables of cohesiveness, attractiveness and centralization and either the objective or subjective measures of effectiveness were significant ( $p > .05$ ) in the female clerical group. Moreover, only one of these relationships, that between attractiveness and the objective measure of effectiveness, was significant ( $p < .05$ ) in the group of male assembly-line workers.

Thirdly, most of the relationships between the measures of interpersonal communication and group effectiveness were significant. For instance, in the Clerical Group, three of the four relations between communication and effectiveness were significant, namely, those between information accuracy and output ( $p < .05$ ), information accuracy and perceived effectiveness ( $p < .05$ ), and between communication openness and output ( $p < .05$ ). Similarly, in the Assembly Group, three of these four relations between communication and effectiveness were significant; between information accuracy and output ( $p < .05$ ) and

information accuracy and perceived effectiveness ( $p < .01$ ) and between communication openness and perceived effectiveness ( $p < .05$ ). Taken together, these three sets of findings suggest that structural variables are not good predictors of effectiveness, whereas the two indices of communication do predict effectiveness fairly well.

These findings are in general agreement with those reported by O'Reilly and Roberts (1977) in their earlier study among sociometrically-created task groups in the United States Navy. Since the present study has employed quite different groups and measured effectiveness in terms of output and not in terms of the perceptions of members, its findings constitute an important extension to the generalizability of the findings of O'Reilly and Roberts (1977). The two sets of findings suggest that interpersonal communications mediate the effect of group structure on effectiveness. This is an important finding for it suggests a possible reason why empirical studies relating structure to effectiveness have produced such mixed results (e.g. Osburn and Hunt, 1974; Pennings, 1975). Specifically, it suggests that whether certain kinds of structures are positively or negatively related to effectiveness, depends on their effect on the transmission and reception of information among members. If the internal arrangement of components in the system impairs information accuracy and decreases the openness of communications, it is likely to be associated with ineffectiveness. However, should it improve accuracy and lead to more open communication, the same structure is likely to be associated with effectiveness.

Although the present findings are consistent with the view that variations in the structure of groups serve to improve or worsen the accuracy and openness with which information is transmitted and thereby exert an impact on performance, they do not enable us to decide between different causal explanations. It could be that the direction of influence is from performance to communication and hence to differences in structure, rather than the obverse. However, this appears unlikely for a number of reasons. First, the tasks done by both groups are not independent ones executed by people in isolation. On the contrary, the jobs of the clerical employees and of the assembly-line workers require the group members to exchange information and to adjust to what each other is doing. It is therefore unlikely that the individual performances of members is a major determinant of communication. Second, it is difficult to argue that it is variations in communication that *cause* differences in structure. For one thing, accuracy and openness are compatible with a wide variety of different structures, not only a single kind of structure (Hage, Aiken and Marrett, 1971). For another reason, because structure is largely determined by exogenous variables, such as the complexity of the wider environment (Woodward, 1971) or the nature of the technology that is employed (Thompson, 1967) or the individual characteristics of members, that they bring with them to the work situation (Blau and Schoenherr, 1970), it is more likely

that variations in structure produce differences in communications, instead of the other way round.

From a practical point of view, the present findings serve to highlight the crucial role of communication processes in the success or failure of groups in work organizations. They suggest strongly that groups in which members communicate openly and accurately with each other are likely to be more effective than those in which communication is neither open nor accurate. In addition the results suggest that whether communication is open and accurate rather than the opposite, is strongly influenced by the structural arrangements of the group. In terms of effectiveness, the optimum internal arrangement appears to be one in which the group members have many direct and positive links with each other but in which authority or influence is vested in a few persons rather than many.

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