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THE RELATIONSHIP BETWEEN COHESIVENESS AND EFFECTIVENESS
IN SMALL ISOLATED GROUPS: A FIELD STUDY

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The Relationship between Cohesiveness
and Effectiveness in Small Isolated Groups:
A Field Study*

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Abstract

The relationship between cohesiveness and group effectiveness among groups of men at U.S. Antarctic research stations was investigated. Cohesiveness indices based upon positive intermember attraction were negatively correlated with incidence of emotional symptomatology within station groups, but were, for the most part, unrelated to supervisors' and group members' perceptions of performance. Indices based upon negative intermember attraction (conflict), in contrast, were significantly related to perceptions of performance, particularly those of supervisors, but were unrelated to symptomatology. The differential importance of positive and negative intermember attraction for different aspects of group functioning was discussed, and the probable moderating role of task versus social-relations orientations in the cohesiveness-effectiveness relationship was suggested.

The Relationship between Cohesiveness
and Effectiveness in Small Isolated Groups:
A Field Study*

Cohesiveness is one of the most widely investigated concepts in the study of group dynamics. Yet, despite the interest in this concept, conclusions regarding the role and importance of cohesiveness in group functioning are somewhat equivocal. A major reason for this state of affairs is the divergent conceptual and operational definitions given to this construct. In its most general sense, cohesiveness refers to the "resultant of all forces which act on a member to remain in a group" (Festinger et al., 1950). Beyond this, however, cohesiveness is defined in various ways that reflect differing theoretical perspectives and domains of interest. In the present research, certain indices of cohesiveness and their relationships to group functioning were examined in a field setting. More specifically, groups of men who spend a year at U.S. Antarctic scientific research stations were studied in order that relationships between group cohesiveness, measured in several ways, and criteria of group member adjustment and performance at these stations might be clarified.

Perhaps the most popular approach to cohesiveness is to assess group members' attraction for one another. In a critical review of the group cohesiveness literature, Lott and Lott (1965), for example, define cohesiveness as "that group property which is inferred from the number and strength of mutual positive attitudes among the members of a group." This conceptual approach to

cohesiveness has intuitive appeal. A group in which members are attracted to one another should be able to realize effective communication within the group, elicit member support for its goals, and spend a relatively small proportion of its time and energy resolving the group maintenance problems which arise from interpersonal tensions (Nelson, 1964a).

It is important to note, however, that intermember attraction and satisfaction with the group as a whole are not conceptually synonymous. In fact, there is evidence that these phenomena are unrelated to one another in some situations and may relate in different ways to various aspects of group functioning (cf. Cartwright and Zander, 1968; Hagstrom and Selvin, 1965; Scott, 1965). Moreover, it can be argued that under some conditions strong "mutual positive attitudes" among members of a group will interfere with efficient group functioning. This seems particularly likely, for example, in relatively large groups where there are forces working toward subgroup formation. Strong mutual attraction within a subgroup may be associated with disinterest, or possibly antagonism, toward members of other subgroups. Such a state of affairs is hardly conducive to efficient group functioning, particularly if group functioning requires cooperation between members of different subgroups.

At the very least, such considerations argue for intermember attraction indices of cohesiveness that reflect the distribution as well as the density of attraction choices. More generally, it is important to consider the influence of moderator variables when examining the relationship between intermember attraction and group functioning. In addition to the possible influence

of group size, the degree to which a group is task versus social-relations oriented would seem to be of significance. In a socially oriented group, intermember attraction should be strongly related to attraction to the group as a whole as well as to individual adjustment and motivation. In a task-oriented group, on the other hand, strong interpersonal attraction may be dysfunctional to various criteria of group effectiveness. Stogdill (1959:269) has suggested that "the effort that is devoted to the development of integration might be conceived as a subtraction from the efforts that are devoted to productivity." Fielder (1953) has expressed an essentially similar point of view.

The problem of cohesiveness and its relation to group functioning has particular relevance for situations requiring individuals to work and live together over prolonged periods of time. The present study involved such a setting -- small Antarctic scientific research stations. These stations were manned for twelve continuous months by groups of scientists and Navy personnel. During the first three months, station members have periodic face-to-face contact with individuals from outside the station; the men work outdoors and have relatively wide physical boundaries within which to move. During the next nine months, activities are confined almost exclusively to the indoors, and, except for occasional radio communication, the station members have no contact with anyone from outside the station.

In recent years, a series of investigations has examined relevant aspects of individual and group functioning at these Antarctic stations utilizing various self-report measures as well as supervisor ratings and peer evaluations of individual adjustment and performance (cf. Gunderson, 1973). Sociometric data

have been the focus of only a few studies of group structure and interpersonal relations in this setting, however (Nelson, 1964a,b; Vallacher, 1972). Sociometric data were employed in the present study to derive indices of group cohesiveness based on attraction among group members. These indices, which reflect "negative" feelings (conflict) as well as "positive" attraction, were correlated with both self-report and supervisor ratings of individual adjustment and performance. Given the prescribed task orientations of these groups, only moderate relationships were expected between intermember attraction and performance criteria, although attraction was expected to be strongly related to the measures of adjustment.

METHOD

Subjects and Setting

The subjects were 326 men who were assigned to U.S. Antarctic stations for one year during the period 1964-1972. Sixty-one percent of these men were Navy personnel; the remaining 39 percent were civilian scientists and technicians. The Navy personnel acted primarily in a support capacity for the civilian scientists who conducted research in fields such as meteorology, ionospheric physics, and seismology. Only subjects from two stations, Byrd and South Pole located in remote interior areas of the Antarctic continent, were included in the present research. During the 9-year span of the study, 17 station groups were operational through the winter; group size ranged from 18 to 30 men.

Procedure

Toward the end of the winter isolation period (late winter), station mem-

bers completed a sociometric questionnaire in which they nominated fellow station members whom they perceived as exceptional on several dimensions. On one of these items (the "Friend" item), station members indicated their closest friends while at the station. Typically, a station member nominated more than one person on this item but rarely more than five persons. Based on responses to this item, three indices of cohesiveness, corresponding to indices suggested by Proctor and Loomis (1951), were derived:

$$1. \text{ Group cohesion (CO)} = \frac{\text{number of mutual pairs}}{N_1 (N_1 - 1) / 2}$$

where N_1 = the number of station members who completed the sociometric questionnaire. (In all cases N_1 was only slightly less than the total station N .) This index reflects the definition of cohesiveness given by Lott and Lott (1965), namely, the proportion of mutual positive relationships within a group.

$$2. \text{ Group integration (I)} = \frac{N}{N_2}$$

where N = the total number of station members, and N_2 = the number of members who received no "Friend" choices. This index reflects the degree to which friendship choices are distributed evenly among station members.

$$3. \text{ Group expansiveness (E)} = \frac{\text{total number of choices made}}{N_1}$$

This index measures the degree to which station members felt friendly toward a large number of their fellow station members.

Another item from the sociometric questionnaire has been shown to yield valid unobtrusive measures of conflict within these groups. On this item, members indicated those individuals for whom their first impressions had changed ("Conflict" item) and gave reasons for their choices. In an earlier

study, Seymour (1971) found that at stations where a large percentage of members nominated others negatively on this item (negative choosers), there was a significantly greater amount of conflict, as measured by station mean scores on attitude scales assessing group compatibility and hostility, than at stations where fewer members made negative nominations. Similarly, there was a significant negative relationship between the percentage of station members chosen negatively on this item (negative chosen) and group compatibility mean scores. Both percentages of negative choosers and negative chosen were used in the present research as indices of intermember conflict.

At the late winter administration, each station member completed an attitude inventory comprised of items which assessed his perceptions of the Antarctic experience and his impressions of how well the station functioned. Thirty-four statements were rated on a 6-point scale of "Strongly Agree" to "Strongly Disagree." Factor analysis of these items yielded five scales: Egalitarian Atmosphere, Group Compatibility, Motivation (Job Satisfaction), Group Accomplishment, and Usefulness. Mean scores were obtained for each station on each scale. While the sociometric indices reflected cohesiveness in terms of interpersonal attraction or intermember conflict, the questionnaire scales measured perceptions of group relations and effectiveness as well as individual satisfaction and feelings of usefulness.

Also, at the time of the late winter administration, both the Navy officer-in-charge and the civilian station scientific leader rated each station member on several dimensions along an 8-point scale. The dimensions were: emotional stability, acceptance of authority, motivation, likability, leadership ability, industriousness, cheerfulness, satisfaction with assignment, consideration for

others, and proficiency in occupation. Each station member received a score on each dimension which represented the average rating given by the supervisors. These scores were then averaged for all station members to yield a group mean score on each dimension.

Finally, at the late winter administration station members rated each of 10 "common complaints" on a 4-point scale according to how intensely they had experienced each symptom while in Antarctica. These items were combined into four scales: Depression, Insomnia, Anxiety, and Hostility. Mean scores were obtained for station groups on the four scales.

Product-moment correlations were computed among all variables over the 17 station groups.

RESULTS

Table 1 presents the intercorrelations among the five sociometric indices of cohesiveness and conflict. The high intercorrelations among the three cohesiveness indices no doubt reflect some statistical confounding in addition to strong relationships among the underlying concepts. For example, the greater the number of friendship choices made at a station (E), the greater the likelihood that mutual choices will occur (CO). Given the conceptual and methodological differences between these indices, however, it did not seem appropriate to pool them into one composite index of ambiguous meaning nor to arbitrarily retain one index and eliminate the others. The correlation between the two conflict indices was considerably lower, probably because there is no necessary statistical relationship between negative choosers and negative chosen. For example, it is conceivable that everyone at a station could make negative choices (high negative choosers) but that all of these choices could

be concentrated on one or two persons (low negative chosen). In fact, the negative correlation between these indices indicates that when many persons expressed negative feelings, they tended to be directed toward a few group members.

(Insert Table 1 about here.)

The correlations between the cohesiveness and conflict indices were not significant. Apparently, stations in which there were many mutual friendship choices, an even distribution of friendship choices across station members, or a tendency to make a large number of friendship choices, were not necessarily stations marked by an absence of intermember conflict.

The correlations between the sociometric indices and the group attitudinal measures are presented in Table 2. The conflict indices, which reflect negative attraction, are more often related to the group satisfaction measures than are the cohesiveness indices. Of the 10 correlations between the conflict indices and the group effectiveness and satisfaction measures, four are statistically significant, while only two of the 15 correlations between the cohesiveness indices and the attitude measures reach significance. All of the statistically significant relationships were in the expected direction. Thus, stations in which there were large proportions of negative choosers tended to be low in egalitarian atmosphere ($p < .05$), and motivation ($p < .01$). Alternately, stations in which a large proportion of members were chosen negatively were low in compatibility ($p < .01$) and accomplishment ($p < .05$). Both mutuality of friend choices (C0) and the tendency to make a large number of friend choices (E) were associated with feelings of usefulness ($p < .05$).

(Insert Table 2 about here.)

The conflict indices also demonstrated more significant relationships with the supervisor ratings of adjustment and performance than did the cohesiveness indices. In fact, none of the cohesiveness indices (CO, I, E) demonstrated significant relationships with any of the supervisor ratings, while both of the conflict indices were significantly correlated with all of the supervisor rating dimensions ($p < .005$), but in opposite directions. Specifically, the percentage of negative choosers at a station was negatively correlated with supervisor ratings (mean $r = -.71$) while the percentage of negative chosen was positively correlated with supervisor ratings (mean $r = .70$). In other words, supervisors were likely to perceive relatively good performance among group members when few members made negative choices (low negative choosers) or when negative choices were distributed among many members (high negative chosen) rather than being concentrated among a few.¹

The positive relationship between negative chosen and the supervisor ratings is of interest because it conflicts with the negative correlations (see Table 2) between negative chosen and certain station member attitudes (Compatibility and Accomplishment scores). This apparent anomaly is probably attributable to the differing perspectives of supervisors and members. In groups with relatively high proportions of negative chosen, antagonism from fellow members appears to influence members' perceptions of group social relations (Compatibility) and perceptions of group performance as well (Accomplishment). From the supervisor's point of view, however, the concentration of negative choices upon a few members tends to bring into sharp focus sources of antagonism that are considered disruptive to performance of the group as a whole. The dispersion of negative choices across many members, on

the other hand, may attenuate the potentially disruptive influence of interpersonal antagonism on group performance. To the supervisors, then, less intense antagonism dispersed over many members is apparently perceived as less dysfunctional to performance than a relatively high level of antagonism concentrated on a few members.

Direct evidence that members and supervisors differ in their criteria for evaluating group performance is provided by the generally nonsignificant correlations obtained between members' attitudes and supervisors' ratings. As indicated in Table 3, only one of the attitude scales -- Egalitarian Atmosphere -- correlated significantly with the supervisor ratings. The implication of Table 3 is clear: Station groups in which members were satisfied with their performance and saw the group as a whole in a positive manner were not necessarily stations in which members were judged by supervisors to be effective or well-adjusted. The correlations further indicate that self-reported attitudes concerning group satisfaction bear a weaker relationship to effectiveness, as measured by supervisor ratings, than do indices of cohesiveness based on negative interpersonal attraction.

(Insert Table 3 about here.)

While the conflict indices were more strongly related to member attitudes and supervisor ratings than were the positive attraction indices, the latter indices demonstrated a larger number of significant relationships with reported symptoms. As shown in Table 4, neither negative choosers nor negative chosen demonstrated significant relationships with any of the symptoms. In contrast, mutual friend choices (CO) was negatively related to all of the symptoms ($p < .005$). Similarly, the tendency for friend choices to be

distributed evenly across station members (I) was negatively correlated with group means for anxiety and hostility ($p < .05$), and the tendency to make a large number of friendship choices (E) was negatively correlated with all of the symptom scales ($p < .05$). These results strongly suggest that the lack of close personal relationships among group members had greater significance than the presence of antagonistic interpersonal relationships for individual members' feelings of well-being.

(Insert Table 4 about here.)

Mean attitude scores were correlated with mean symptom scores, but none of these correlations were significant, indicating that a general lack of satisfaction with the group was not necessarily associated with a high prevalence of anxiety, depression, insomnia, or hostility.

DISCUSSION

The results of the present research indicate quite clearly that sociometric patterns within Antarctic groups are related to the adjustment and performance of group members. Of particular interest was the degree of inter-member conflict and its relationship to supervisor ratings of member effectiveness as well as to member attitudes regarding individual and group functioning. The degree of positive attraction among group members did not demonstrate significant relationships with these measures of adjustment and performance, although indices of positive attraction were negatively related to the incidence of stress-related symptoms within these groups.

In contrast to the sociometric indices, member attitudes regarding the group as a whole did not relate in a significant manner to either supervisor ratings of effectiveness or to incidence of symptomatology. This is somewhat

surprising in view of the prescribed task orientation of the Antarctic stations. That is, in task-oriented groups intermember attraction would seem to be relatively unimportant for effective functioning, while satisfaction with the group as a whole would seem to reflect, and be reflected by, efficient task performance. Why, then, are sociometric patterns of attraction and conflict among group members of greater relevance to effectiveness criteria than self-reported attitudes reflecting individual and group functioning? Several factors seem important.

First, despite the prescribed task orientation at the Antarctic stations, clearly specified group goals are notably absent. The purpose of the Antarctic program is the collection of data relevant to research in such fields as meteorology, ionospheric physics, and geology. Clearly, this endeavor provides goals for the civilian scientists, but these goals are individual rather than group-oriented. The data collected by an individual is often part of his academic program and not explicitly coordinated with the research of other station members. The Navy personnel, on the other hand, simply carry out necessary but routine aspects of station operation and maintenance and, therefore, are divorced from the larger station goals. Their primary rewards are extrinsic in nature: approval for carrying out routine tasks and possible choice of next Navy duty assignment. For neither group, then, are clearly specified group goals present.

The importance of goal clarity for group functioning has been recognized by researchers in group dynamics. Korten (1962), for example, pointed out that when group goals are clearly specified they assume greater importance for group members than do individual goals. However, when goals are unclear

there is less communality of individual goals and attraction to the group tends to be social in nature. In effect, then, the lack of clear group goals at the Antarctic stations changes the focus in these groups from a task to a more social-emotional orientation. Hence, intermember relationships are more closely associated with adjustment and performance than are perceptions of group functioning or the individual's perception of his role in group functioning. In fact, the only station member attitude regarding group functioning that related to adjustment and performance was Egalitarian Atmosphere which primarily reflects leader-member relationships.

Another factor contributing to the importance of intermember attraction for group effectiveness is the nature of the Antarctic setting. Antarctica is the most hostile environment inhabited by man. During the isolation period, survival depends on each station group's ability to handle any emergencies that might arise. This setting, then, is relatively stressful (cf. Gunderson, 1973) and under conditions of stress individuals may tend to become more anxious, interdependent, and affiliative (Schachter, 1959; Gunderson and Arthur, 1966). Moreover, each station is in virtual isolation from the remainder of society. The Antarctic station member is confined to year-long relationships with the other group members, and there is no possibility of escape from conflictful relationships. Therefore, the quality of interpersonal relationships is likely to assume a considerable degree of importance in these groups.

The present research demonstrated that intermember conflict was more strongly related to performance criteria (supervisor ratings) than positive attraction while positive attraction was more strongly related to feelings of personal well-being (absence of stress symptoms). This set of findings is

readily interpretable. It was pointed out above that the stressful nature of the Antarctic setting and the lack of group goal clarity tend to produce a social-emotional orientation within the station groups. To the extent that the station is "successful" in this orientation, that is, the greater the degree of positive attraction among members (CO, I, E), the less likely are station members to be affected by feelings of anxiety, depression, etc. Conversely, stations in which few close relationships develop are likely to be plagued by such symptoms of stress. The fact that intermember conflict was not associated with stress symptomatology suggests that an adversary relationship is better than no relationship at all.

Task performance on the other hand is not dependent upon close interpersonal attraction -- in fact, strong attraction between individuals could conceivably interfere with an effective task orientation. Efficient task performance does require a relative absence of intermember hostility, however, particularly in tasks requiring some degree of cooperation. Thus, the greater the proportion of negative choosers at a station, the greater the potential for poor performance of the station group as a whole. Similarly, the concentration of negative choices upon a few members is seen by supervisors as potentially dysfunctional to effective performance.

Taken together, the results of the present research demonstrate the importance of intermember attraction for adjustment and performance in groups which lack clearly specified group goals and which must endure unusual stresses. Of particular interest was the role of intermember conflict in the performance of group members because previous studies of group cohesiveness typically have

considered only indices of positive intermember attraction (cf. Lott and Lott, 1965). Necessarily, the impact of the present findings is somewhat attenuated by the unique setting. However, the conditions which taken together make the Antarctic setting unusual -- stress, unclear goals, and a combination of task and social-emotional orientations -- are conditions that are present, albeit to a lesser extent, in a variety of other natural groups. An understanding of the dynamics of these groups, therefore, may be of relevance for the understanding of group functioning generally.

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Footnotes

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¹The relationship between negative choosers and supervisors' ratings can be partially explained by the fact that when many group members made negative comments, a substantial proportion of these tended to be directed toward the group leaders.

Table 1
Intercorrelations of Sociometric Indices
of Group Cohesiveness^a

<u>Variable Name</u>	<u>Variable Number</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
CO	1				
I	2	72 ^d			
E	3	86 ^d	54 ^c		
Negative choosers	4	-11	-15	03	
Negative chosen	5	-06	04	-11	-41 ^b

^aDecimals omitted.

^b $p < .05$

^c $p < .025$

^d $p < .001$

Table 2

Correlations between Sociometric Indices
and Station Member Attitudes^a

	<u>CO</u>	<u>I</u>	<u>E</u>	<u>Negative</u> <u>Choosers</u>	<u>Negative</u> <u>Chosen</u>
Compatibility	21	-10	32	-10	-47 ^c
Egalitarian Atmosphere	19	10	02	-44 ^b	-28
Accomplishment	24	-01	34	-10	-46 ^b
Motivation	24	01	08	-49 ^c	-02
Usefulness	46 ^b	18	43 ^b	-15	-34

^aDecimals omitted.^b_p < .05^c_p < .025

Table 3

Correlations between Station Member Attitudes and Supervisor Ratings^a

<u>Supervisor Ratings</u>	<u>Station Member Attitudes</u>				
	<u>Compatibility</u>	<u>Egalitarian Atmosphere</u>	<u>Accomplishment</u>	<u>Motivation</u>	<u>Usefulness</u>
Emotional stability	-06	42 ^b	02	30	14
Acceptance of authority	-04	45 ^b	01	34	12
Motivation	-01	49 ^b	06	36	23
Likability	-03	47 ^b	03	33	17
Leadership ability	-04	39	02	29	15
Industriousness	-01	47 ^b	06	34	23
Cheerfulness	-08	46 ^b	-01	34	12
Satisfaction with assignment	01	44 ^b	09	40 ^b	20
Consideration for others	-03	46 ^b	03	31	16
Proficiency in occupation	-04	45 ^b	05	34	18

^aDecimals omitted.^bp < .05

Cohesiveness and Effectiveness

Table 4
Correlations between Sociometric Indices
and Symptom Scales^a

	<u>CO</u>	<u>I</u>	<u>E</u>	<u>Negative</u> <u>Choosers</u>	<u>Negative</u> <u>Chosen</u>
Depression	-62 ^d	-36	-40 ^b	27	05
Insomnia	-60 ^d	-31	-40 ^b	32	20
Anxiety	-65 ^d	-43 ^b	-47 ^c	27	-13
Hostility	-66 ^d	-43 ^b	-47 ^c	29	-07

^aDecimals omitted

^b_p < .05

^c_p < .025

^d_p < .005

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