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DEVELOPMENT TECHNIQUES AND ORGANIZATIONAL CLIMATE: AN EVALUATION OF THE COMPARATIVE IMPORTANCE OF TWO POTENTIAL FORCES FOR ORGANIZATIONAL CHANGE

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This technical report builds upon an earlier report and looks more closely at the relationships among development activities, organizational climate change, and change in work group behavior. Survey Feedback and Interpersonal Process Consultation emerge as beneficial treatments, Laboratory Training and Task Process Consultation as non-beneficial strategies.

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Task Process Consultation						
Organizational Climate						
4-Factor Theory of Leadership						
Cost-Benefit Ratio in Organizational Development						

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DEVELOPMENT TECHNIQUES AND ORGANIZATIONAL CLIMATE: AN EVALUATION OF THE COMPARATIVE IMPORTANCE OF TWO POTENTIAL FORCES FOR ORGANIZATIONAL CHANGE

David G. Bowers

An earlier report presented a broad, overview analysis of the results which different development techniques employed in the Michigan Intercompany Longitudinal Study during the five-year period of that study's formal existence. That analysis included comparisons, using the sign test, of pre- and post-intervention measurements obtained from all persons present in each organization at the time of each particular wave of data collection. All organizations from which multiple data waves have to date been collected and which conducted efforts at planned change were included in those comparisons. By its nature, therefore, that earlier report maximized breadth of coverage, but avoided depth and detail in probing the relationships which it uncovered. The summary of that report states its findings in capsule form:

> "The results indicate that Survey Feedback was associated with a significant frequency of improvement, that Interpersonal Process Consultation was associated with questionable improvement, that Task Process consultation was associated with little or no change, and that Laboratory Training was associated with significant deterioration in organizational functioning...In addition, organizational climate emerges as a potentially extremely important conditioner, if not a cause, of organizational development success." (Bowers, 1971, p.35)

In the present report, we propose to probe in a depth that was not undertaken in the earlier one, the nature of the relationships among treatments (organizational development or intervention techniques), organizational climate conditions, and leadership behaviors for the focal groups that comprise the organization. Whereas the basic data unit of the earlier report was the individual respondent, and comparisons could be drawn from tabulations previously prepared in conjunction with the projects themselves, the focus of this present report is the work group, consisting in each case

of the supervisor and his immediate subordinates. The Longitudinal Study data bank, from which these data were drawn contains, as the previous report indicated, thousands of respondents in hundreds of work groups and many organizations. For this reason a great deal of time and careful work have been required to build the file and to conduct the complicated statistical analyses necessary for the present report. Efforts began, in fact, nearly two years ago. This report therefore includes only those organizations whose repeat measurements were in hand early in 1970; as such, it represents a sub-set, albeit a relatively large sub-set, of the greater array included in the earlier report.

Our purpose in this present paper is to shed as much light as is possible upon some seemingly simple, yet truly complex, issues:

1. Do treatments (i.e., organizational development activities) produce organizational change? If they do, what are their comparative magnitudes and directions?

2. Is change in organizational climate itself an effect of treatment, an independent, additional cause of behavior change in work groups, a conditioner of change success, or a coincidental variable?

Following a brief description of the sample, measures, and analytic procedures, we shall turn first to a presentation of possible models and then to evidence which will hopefully aid us in selecting among those models and elaborating their explanatory power.

The Sample

The earlier report drew upon data from 23 organizations in 10 companies. For seven organizations, in three companies, second waves of data collection did not occur until well into 1970, and they are for this reason not included in the present analysis. Another organization, from another company, had indeed had its repeat data collection, but an extensive reorganization of its reporting structure removed any basis for matching work groups from the first wave to those from the second. It also has been

discarded. The data for this present report are therefore drawn from 15 organizations in six companies, and the basic data units are the 888 work groups present on both occasions in that array. As in the earlier report, many different kinds of functions and industries are represented. Some of the work groups perform tasks which are white-collar in nature; others perform blue-collar tasks. The organizations themselves are in the continuous process manufacturing, assembly line manufacturing, components fabrication, marketing, and research and development functional areas. They are drawn from many different industries: paper, chemicals, petroleum refining, automobiles, household products, and insurance.

Variables and Measurement Methods

Change Treatments (Interventions) - The change treatments or intervention strategies to be compared within the present report are identical to those described in the earlier report (Bowers, 1971):

Six different forms of intervention may be identified as having gone on within one or more of the 15 organizations. Most of them are not "pure" treatments, since nearly all involved at least some form of return of tabulated survey data. Nevertheless, they are sufficiently different from one another to have generated sometimes intense conflicts among change agents who practice them, and to have been recognized as different by the client systems who experienced them.

Survey Feedback - No authoritative volume has as yet been written about this development technique, although a number of article-length references exist.*

As a result of this absence of detailed publication, the writer is aware, from direct and indirect encounters with others in the field, that many persons mistakenly believe that survey

*For an excellent summary, the reader is referred to Katz, D. & Kahn, R. The social psychology of organization, New York: John Wiley & Sons, Inc., 1966, pp. 416-425.

feedback consists of a rather superficial handing back of tabulated numbers and percentages, but little else. On the contrary, where employed with skill and experience, it becomes a sophisticated tool, using the data as a springboard to development.

In the sites which we shall, in the remainder of the report, classify as having received Survey Feedback as a change treatment, this, and only this, formed the principal substance of the intervention. Data were tabulated for each and every group engaged in the project, as well as for each combination of groups which represented an area of responsibility in the organizational pyramid. Data appeared as they do in Figure 1.

A tabulation of this sort, containing data from the responses of his own immediate subordinates, together with documents describing the measures, their basis and meaning, and suggestions concerning their interpretation and use, was returned to each supervisor and manager. A resource person, sometimes from ISR and at other times from the client system's own staff, usually counseled privately with the supervisor-recipient about the contents of the package and then arranged with him a time when that supervisor might meet with his subordinates to discuss the findings and their implications. The resource person ordinarily agreed to attend that meeting, to provide help to the participants both in the technical aspects of the tabulations and in the process aspects of the discussion.

Procedures by which the feedback process progresses through an organization typically vary

Figure 1

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*********************
* GROUP NUMBER 99999 *
*********************
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ITEM	(1)	(2)	(3)	(4)	(5)	MEAN	STD. DEV.	N
	PERCENTAGE DISTRIBUTION							
7 CO USES NEW WK METHODS	8	0	17	42	25	3.67	1.11	11
8 CO INTEREST IN WELFARE	8	8	17	25	33	3.73	1.25	11
9 CO IMPROVES WKNG CONDS	0	0	17	50	25	4.09	0.67	11
10 WK GP MBRS KNOW JOBS	0	0	17	58	17	4.00	0.60	11
11 CO HAS CLEAR GOALS	0	8	50	25	8	3.36	0.77	11
12 WK ACTIVITY ORGANIZED	0	0	25	58	8	3.82	0.57	11
13 EQUIPMENT ADEQUATE	0	0	0	58	42	4.45	0.50	11
14 CO HELPS EMPL INCOME	8	0	33	42	0	3.30	0.79	10
15 FELT RESP CO SUCCESS	0	8	8	25	50	4.27	0.96	11
16 YOU GET OTH UNIT INFO	8	8	42	33	0	3.00	0.60	11
17 SUPS OPEN TO IDEAS	8	8	25	42	0	3.[illegible]	0.99	10
18 TOLD ENOUGH TO DO JOB	0	0	42	42	8	3.66	0.64	11
19 WKGP MBRS INFORM EACH	0	8	42	33	8	3.45	0.79	11
20 EMPLS TRY TO COMM UP	0	0	42	33	17	3.73	0.75	11
21 YOU FEEL LOYAL TO CO	0	8	8	33	42	4.18	0.94	11
22 DISAGREEMTS WKED THRU	0	8	50	17	8	3.30	0.71	10
23 SATISFACTION WITH CO	0	8	17	8	58	4.27	1.05	11
24 SATISFACTION WITH JOB	0	17	0	17	42	4.11	1.20	9
25 SATISFACTION WITH PAY	17	25	8	17	25	3.00	1.50	11
26 SATIS WITH SUPERVISOR	0	0	0	33	58	4.64	0.46	11
27 SATIS WITH WK GP	0	0	0	42	50	4.55	0.52	11
28 NOW MOTIVS TO WK HARD	0	8	17	17	42	4.10	1.04	10
29 ENJOY JOB ACTIVITIES	0	8	0	33	42	4.[illegible]	1.29	11
30 LOOK FORWARD TO WORK	17	8	0	58	17	3.[illegible]	1.37	11
31 GOODS ENCOURAGE HARD WK	0	17	0	58	8	3.64	0.88	11
32 PAY PEL TO HELP TO CO	25	0	42	25	0	2.73	1.14	11
33 INFL:1ST LEVL ON DEPT	0	17	58	17	8	3.19	0.87	11
34 INFL:TOP MGRS ON DEPT	0	17	17	42	17	3.64	0.98	11
35 INFL:EMPLS ON DEPT	33	25	0	25	0	2.[illegible]	1.25	10
36 INFL:MID MGRS ON DEPT	0	33	33	17	8	3.00	0.95	11
37 INFL:INDIVL ON WK GP	17	17	17	0	33	3.27	1.56	11
38 OBJECTIVS SET JOINTLY	17	8	25	17	17	3.10	1.37	10
39 DECSN LEVELS OPTIMUM	8	0	17	58	0	3.64	0.98	11
40 DECSN-MKRS SEEK IDEAS	17	0	33	42	0	3.00	1.08	11
41 DECSN-MKRS GET INFO	0	17	25	50	0	3.37	0.77	11
42 LOWR-LEVL PROBS KNOWN	8	8	25	50	0	3.27	0.96	11
43 DEPTS PLAN,COORD WELL	0	8	50	25	8	3.36	0.77	11
44 HANDL DEPT PROBS WELL	0	8	25	50	8	3.64	0.77	11
45 HOW DEPT PROBS HANDLD	8	0	8	25	42	4.10	1.22	10
46 SUP HAS MTGS RE:PROBS	0	0	67	0	25	3.55	0.89	11
47 SUP HAS TECH SKILLS	0	8	0	42	42	4.27	0.86	11
48 SUP PULLS FOR CO.SUBS	8	8	8	25	42	3.91	1.51	11
49 NOW:SUP FRIENDLY	8	0	8	8	67	4.36	1.23	11
50 LIKE:SUP FRIENDLY	0	0	0	17	75	4.82	0.39	11
51N SUP PAYS ATTN TO YOU	8	0	25	8	53	4.00	1.20	11
52L SUP PAYS ATTN TO YOU	0	0	0	17	75	4.82	0.39	11
53N SUP WILLNG TO LISTEN	8	0	17	17	53	4.09	1.35	11
54L SUP WILLNG TO LISTEN	0	0	8	8	75	4.73	0.62	11

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from site to site, and did so within the ICLS sites which received this treatment. In certain instances, a "waterfall" pattern was adhered to, in which the process is substantially completed at superordinate levels before moving to subordinate groups. In other instances feedback was more or less simultaneous to all groups and echelons.

Time and space do not permit a lengthy discussion of the various forms which feedback may take. It should be stated, however, that an effective survey feedback operation sees the organization's groups move, by a discussion process, from the tabulated perceptions through a cataloguing of their implications to commitment to solutions to the problems which the discussion has identified and defined.

This technique has long been associated with organizational development and change work conducted by persons from the Institute for Social Research. In the study presently under consideration (ICLS), it was considered at the outset as likely to constitute a more or less standard tool. That it was not as universally employed as these statements might suggest forms the basis for its identification as a distinct treatment.

Interpersonal Process Consultation - This treatment bears a very close resemblance to what Schein has termed "Process Consultation." (Schein, 1969) The change agent most closely identified with this treatment attaches great importance to developing within the client groups themselves a capacity for forming and implementing their own change program. Considerable importance is attached to the

change agent's establishing himself from the outset as a trustworthy, helpful adjunct to the group's own process. A great deal of effort and emphasis is placed upon his catalyzing a process of surfacing data in areas customarily not plumbed in work organizations (attitudes, feelings, individual needs, reasons for conflict, informal processes, etc.). In behavioral specifics, the change agent employs the posing of questions to group members, process-analysis periods, feedback of observations or feelings, agenda-setting, review, and appropriateness-testing procedures, and occasional conceptual inputs on interpersonal topics. Work is occasionally undertaken with members singly, but more often in natural work groupings. An assumption seems generally to be made that human, rather than technical, processes have primacy for organizational effectiveness.

Task Process Consultation - This treatment was oriented very closely about task objectives and the specific interpersonal processes associated with them. The change agent who adhered to this pattern typically begins by analyzing a client unit's work-task situation privately, following extensive interviews, in terms of their objectives, their potential resources, and the organizational forces blocking their progress. He consults privately at frequent intervals with the supervisor, both to establish rapport and to obtain that supervisor's commitment to objectives and desired future courses of action. He sets the stage for client group discussions by introducing select bits of data, or by having another person do so. He encourages group discussion, serves as

Data Handback - Not truly a change treatment, this forms instead a control or comparison condition. In certain sites no real survey feedback work was conducted. Data were tabulated and returned in envelopes to the appropriate supervisors, but no effort was made to encourage group problem-solving discussions concerning those data. Nor did any other treatment occur in these sites.

No Treatment - In a few sites data were tabulated and returned to the appropriate top or staff manager, but were not shared by him with managers and supervisors for whom they were relevant. They were, instead, filed away in a cabinet. Since no other development activities were undertaken in these sites, it seems justifiable to classify them as having had no treatment at all.

As the reader of the earlier report will recall, our classification scheme for treatments is a macro-level categorization, in which all of the work groups of a particular organization are consigned to a class reflecting the overall intervention package which that site received. Like its earlier counterpart, this present report distinguishes between organizations as whole systems and the treatment which the system, as such, received on the one hand, and "capstone" groups and the treatments which they received on the other. Events, schedules, and the personal style preferences of the change agents combined to produce whole intervention "packages" which differed from some sites to others. Where a system is classified in this report as having received Survey Feedback as its treatment, our meaning is that survey feedback, and that alone, was used, both with capstone groups (those groups at the top management rungs of the hierarchical ladder) and all groups below them which were involved in the project. Where Interpersonal Process Consultation, Task Process Consultation, or Laboratory Training are the reported treatments, our meaning

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is that the principal intervention with the capstone groups consisted of that particular treatment. These groups will also have received tabulated data, and will ordinarily have spent a variable amount of time discussing it. It was characteristic of the use of these other treatments, however, that the change agents who chose to follow them ordinarily placed survey feedback work in a distinctly secondary role. In some instances, after a few brief, and sometimes superficial, sessions, groups were encouraged to move on to the "real" change activity. In other instances, the non-feedback activity began before survey data were made available, and the data were used only occasionally (perhaps by the change agent himself) to underscore a point or a development. Feedback, to the extent that it went on at all, was often left in these sites to partially trained, and normally overloaded, internal resource persons, who were themselves often more attracted to the more glamorous activities modeled by the external change agent.

Thus the contrast is between those sites in which Survey Feedback was truly and thoroughly conducted, at all levels and without other treatments, and those sites in which a rather half-hearted effort at feedback was overshadowed by other treatments with capstone groups.

Against a background of these descriptions, it may be helpful to the reader to note the number of groups included in each of the treatments. Table 1 presents the information.

Organizational Climate Change - Five critical indices comprise this category of variables. Drawn from the Survey of Organizations questionnaire, they appear in the present analysis as they did in an earlier report. (Taylor & Bowers, 1970; Bowers, 1969) These measures of the communication patterns, decision-making practices, coordination, control structure, and motivational conditions present in the milieu surrounding any particular focal group are conceptualized as representing the organizational climate within which it must live. The work group mean score on each of these five characteristics at the time of the second survey has been subtracted from that same work group's mean score on the same

Table 1

Number of Work Groups in Each Treatment Classification

Treatment	Number of Work Groups
Survey Feedback Only	112
Interpersonal Process Consultation	298
Task Process Consultation	109
Laboratory Training	167
Data Handback	98
No Treatment	104

measure at the time of the first survey. Since all of the original scores are on a standard 1-to-5 ("Likert") scale, the result of our subtraction procedure is to produce change scores with a potential range from -4.00 to +4.00. For the convenience of not having to deal with negative scores, 5.00 has been added to each change score. The resulting score, therefore, may range from 1.00 (maximum negative change) to 9.00 (maximum positive change). All scores below and including 4.99 represent negative changes from the first to second waves; all those above and including 5.01 represent positive changes. A score of exactly 5.00 would represent no change at all. (In certain of the comparisons to be made later in the report, change scores have been dichotomized; for convenience, these rare instances of 5.00 scores have been included in the upper, or "positive" change category.)

Leadership Change - As in the earlier report, our measures of organizational intra-group functioning represent the "Four-factor" theory of leadership, as measured by the Survey of Organizations. (Bowers & Seashore, 1966; Taylor & Bowers, 1970; Taylor, 1971). 16 multi-item indices are included: four are measures of managerial leadership of an interpersonal (support and interaction facilitation) and task (goal emphasis and work facilitation) nature. Four similar measures tap the peer leadership area. To these basic eight measures of "Actual" leadership, that is, behavior as it actually is, are added eight additional, parallel measures of "Ideal" leadership (behavior as respondents would like it to be).

Change scores for these 16 indices have been computed in the same manner as have those for organizational climate: the second wave score has been subtracted from the first wave score, and a constant of 5.00 has been added to each.

Analysis Procedures

A number of different statistical tests are employed in the results section of the report: analysis of variance, product-moment correlation, cross-lag correlation, chi square, Kendall's coefficient of concordance (W),

and the Kruskal-Wallis test. Heavy reliance has been placed upon a computer program called Multiple Classification Analysis (MCA), which produces estimates of the effect of each predictor alone, of each while controlling for the effects of all others, and of all predictors combined. (Andrews, Morgan, & Sonquist, 1967) Thus statistics such as Eta (the Correlation Ratio) and Beta (a "partial" coefficient, equivalent to an Eta computed for scores adjusted to eliminate the effect of all other predictors) appear at several points in the results presentation.

A Preliminary Issue

Prior to attempting to explain relationships among our three categories of variables (Treatments, Organizational Climate Changes, and Leadership Behavior Changes), it seems well to dispose first of an obvious question; are there, in fact, relationships to be explained? Table 2 presents correlation ratios (Eta coefficients) indicating the strength of the relationship between climate change and leadership change, and between the latter and change treatment. As the asterisks indicate, every relationship in the table is statistically significant at a level well beyond the one percent level of confidence.

Table 3 presents chi square tests of the relationship between treatment and change in organizational climate. These data make it quite apparent that such relationships do exist; with the possible exception of the relationship to Coordination, in which the chi square value attains a level significant only between the five and two percent levels, all relationships are highly significant.

We may therefore lay to rest the issue of whether or not relationships among our three categories of variables exist. They do exist, and at levels which are likely to occur by chance very rarely.

Potential Causal Models, Evidence, and Inferences

Results presented in the preceding section demonstrate rather conclusively that an association exists among Treatments, Organizational Climate changes, and Leadership changes. Association is one thing, causation is

Table 2

Correlation (Eta) of Organizational Climate Change and Change Treatment with Change in Leadership Measures (N=888 Groups)

Leadership Variable	Organizational Climate					Treatment
	Comm.	Motiv.	Control	Dec.-Making	Coord.	
Mgr. Support (Actual)	.38*	.28*	.27*	.35*	.26*	.27*
Mgr. Support (Ideal)	.22*	.19*	.21*	.27*	.14*	.29*
Mgr. Goal Em. (Actual)	.36*	.26*	.28*	.36*	.30*	.18*
Mgr. Goal Em. (Ideal)	.26*	.20*	.17*	.26*	.22*	.23*
Mgr. Work F. (Actual)	.40*	.31*	.30*	.39*	.25*	.26*
Mgr. Work F. (Ideal)	.19*	.17*	.18*	.26*	.11*	.32*
Mgr. Inter. F. (Actual)	.33*	.25*	.24*	.34*	.24*	.18*
Mgr. Inter. F. (Ideal)	.15*	.18*	.11*	.18*	.14*	.13*
Peer Support (Actual)	.26*	.22*	.26*	.26*	.16*	.24*
Peer Support (Ideal)	.20*	.21*	.19*	.22*	.12*	.19*
Peer Goal Em. (Actual)	.30*	.31*	.28*	.31*	.21*	.20*
Peer Goal Em. (Ideal)	.20*	.23*	.14*	.23*	.20*	.19*
Peer Work F. (Actual)	.30*	.28*	.28*	.30*	.20*	.22*
Peer Work F. (Ideal)	.19*	.16*	.15*	.24*	.13*	.31*
Peer Inter. F. (Actual)	.32*	.28*	.26*	.34*	.21*	.19*
Peer Inter. F. (Ideal)	.13*	.18*	.11*	.18*	.15*	.12

*Significant beyond the .01 level of confidence.

Table 3

Chi Square Test of Relationship of
Treatment of Organizational Climate Change

Organizational Climate Variable	Relationship to Treatment (Chi Square)	df	p
Communication	70.28	5	.001
Motivation	27.38	5	.001
Control	34.62	5	.001
Decision-Making	121.82	5	.001
Coordination	12.95	5	.05> p >.02

quite another; the latter can be demonstrated only by bringing to bear information concerning time sequences and processes of logic to an analysis of the relationships under study.

In the present instance, both logic and time may be entered into our consideration of the problem of location of the treatment variable in the causal sequence. For example, either treatment follows these changes in time and is a result of them, precedes them in time and causes them, coincides with them and, like them, is caused by some other, as yet unidentified factor, or is unrelated to these changes in any way. Similarly, the demonstrated relationship between climate change and leadership change may indicate that the former causes the latter, that the latter causes the former, or that both are the result of some third variable. Cross-lag correlational techniques can perhaps aid us in assigning likely causal priorities to the relationships among climate change variables and leadership change measures.

Figure 2 presents in diagrammatic form a number of possible models of causal relationships among the variables presently being considered. In this figure, as in previous reports in this series, "T" refers to Change Treatment, the pattern of interventions (Survey Feedback, Laboratory Training, etc.) which occurred in a particular site during the time period encompassed by the first and second measurement waves. "C" refers to changes in organizational climate, that set of conditions in any focal group's organizational environment which define limits within which it must work (Decision-making Practices, Communication Flow, etc.). "L" stands for changes in managerial and peer leadership behaviors (Support, Goal Emphasis, etc.) which occur within the focal group itself. Arrows are used to indicate the direction of presumed causation from one variable to another.

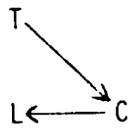
The models are grouped into four categories by general type. Models 1 through 6 are those which assume that one of the three variable sets leads to a second which leads in turn to a third. For this reason they are labelled "Causal-Intervening-End Result" models:

Figure 2

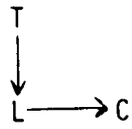
Possible Explanatory Models

Causal-Intervening-End Result Models

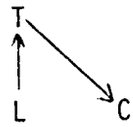
Model 1



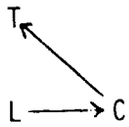
Model 2



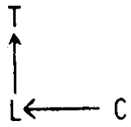
Model 3



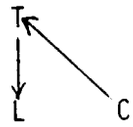
Model 4



Model 5

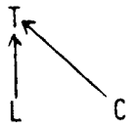


Model 6

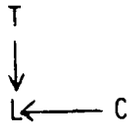


Joint Causation Models

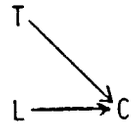
Model 7



Model 8

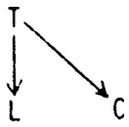


Model 9

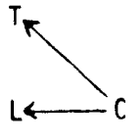


Coincident Result Models

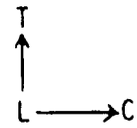
Model 10



Model 11

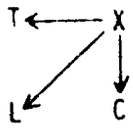


Model 12

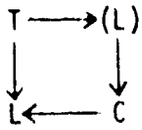


Complex Models

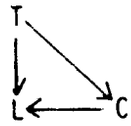
Model 13



Model 14



+23 "closed-loop" models of the form:



Model 1 - The change treatment produces a change in organizational climate which in turn produces a change in leadership behaviors. No direct causal link occurs from treatment to leadership change.

Model 2 - The change treatment produces a change in leadership behaviors within the focal groups, which in turn produces a change in the organizational climate within which that group must work. No direct causal link occurs between treatment and climate change.

Model 3 - Leadership change leads to treatment, which in turn produces a change in organizational climate. No direct causal link exists between leadership change and climate change.

Model 4 - Leadership change leads to climate change which in turn produces the change treatment. No direct link occurs between leadership change and treatment.

Model 5 - Change in organizational climate produces leadership change which in turn results in the change treatment. No direct link occurs between climate change and treatment.

Model 6 - Change in organizational climate leads to change treatment which in turn produces leadership change. No direct link exists between climate change and leadership change.

Models 7-9 are those in which two variables are presumed to be independent causes of the third. For this reason they are termed, "Joint Causation" models:

Model 7 - Leadership change and organizational climate change are presumed to cause, independently and jointly, the change treatment.

Model 8 - Change treatment and change in organizational climate are presumed to be independent and joint causes of leadership change.

Model 9 - Change treatment and leadership change are presumed to be independent and joint causes of change in organizational climate.

Models 10-12 are termed "Coincident Result Models," since they share in common the assumption that one of the variables causes independently the other two:

Model 10 - Change treatment is presumed to cause change in leadership and change in organizational climate.

Model 11 - Organizational climate change is presumed to lead to change treatment and to leadership change.

Model 12 - Leadership change is presumed to lead to both change treatment and change in organizational climate.

Models 13 and 14 are two basic types of more complex models. Model 13 represents the situation in which another variable, external to the three-variable paradigm is viewed as causing all three. Model 14 represents the insertion of one of the three at a superordinate level as explanatory of relationships among the three.

Model 13 - All three of the basic variables (treatment, climate change, and leadership change) are presumed to be caused by some fourth variable X, as yet unknown.

Model 14 - Treatment causes leadership change in the focal group, and in other focal groups above the present one. This latter change leads to organizational climate change for the present focal group, which in turn leads to leadership change.

In addition to these simple models, there are, as the notation in the figure indicates, 22 possible closed-loop models, that is, models which are possible by superimposing not-inconsistent simple models. They are:

Model 1 + Model 3
Model 1 + Model 5
Model 1 + Model 8
Model 2 + Model 4
Model 2 + Model 6
Model 2 + Model 9

Model 3 + Model 5
Model 3 + Model 9
Model 3 + Model 12
Model 4 + Model 6
Model 4 + Model 7
Model 4 + Model 12
Model 5 + Model 7
Model 5 + Model 11
Model 6 + Model 8
Model 6 + Model 11
Model 7 + Model 11
Model 7 + Model 12
Model 8 + Model 10
Model 8 + Model 11
Model 9 + Model 10
Model 9 + Model 12

If we grant certain assumptions, a number of these potential models may be eliminated at the outset. For one thing, Change Treatment was determined on a basis having little if anything to do with either subsequent climate change or subsequent leadership change. It appears to have been determined more by change agent preference, that is, to have been established by the preferred and customary techniques of the change agent assigned to the site, than by any other consideration. There is, of course, the possibility that during the course of the year between waves 01 and 02 of measurement the change agent evaluated informally the amount of change which some form of data return was having, decided that it was insufficient, and therefore added techniques (particularly for capstone groups) which have resulted in our classifying it in the way we have. This possibility has been carefully examined and has not been substantiated.

A rather careful examination of events in each change project has demonstrated to the writer's satisfaction that the general nature of the treatment--the basis for our macro-level distinction--was formed quite early in its history. In 14 our of the 15 organizations, the course which treatment would take had been proposed, accepted, and initially operationalized prior to any extensive return of tabulated data. Nor had there been at that time the kind of in-depth contact by change agents with the large mass of employees which would have been necessary for a success-to-date judgment to have been accurately made and to have influenced the course

of treatment. In short, change treatment can in no way be attributed to subsequent change in either leadership or climate. Nor can it be attributed to some other variable or condition which is at the same time responsible for change in leadership or climate; treatment was determined by change agent selection, and selection was determined by sheer availability at the time of contract. It seems reasonable, therefore, to eliminate as unlikely, if not impossible, Models 3, 4, 5, 6, 7, 11, 12, and 13 -- all models in which treatment is an effect -- from further consideration.

In addition, we may eliminate from further consideration any of the 22 closed-loop models which involve elements in which Treatment is a dependent or outcome variable. Seventeen additional models are eliminated in this way.

We are left, therefore, with the models presented in Figure 3 as those for which further serious consideration must be given.

Model 14, under closer scrutiny, can be observed to be merely an elaboration of Model 15; it provides only a more detailed explanation of the route by which change treatment causes change in organizational climate.

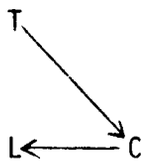
The remaining choice is, as a result, among Models 1, 2, 8, 9, 10, 15, 16, 17, and 18 and it is to these models that we next turn our attention in an attempt to find evidence concerning which is more likely to be the true one. Certain common characteristics can be seen among these remaining models. Models 1, 8, 15, and 17, for example, all share the assumption that climate change causes leadership change, whereas Models 2, 9, 16, and 18 reflect the opposite assumption. Models 1, 9, 10, 15, 16, 17, and 18 share the assumption that treatment causes climate change, whereas Models 2, 8, 10, 15, 16, 17, and 18 assume that treatment leads to leadership change. Model 10 assumes that no connection exists between leadership change and climate change.

Models 1 and 9 must be rejected because the Multiple Classification Analysis findings (which are presented in a subsequent portion of the results section of the report) show a pure treatment-to-leadership change effect to exist. In other words, after controlling for the effects of change in organizational climate, there still remains a relationship

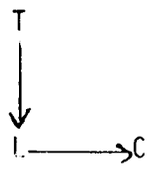
Figure 3

Remaining Explanatory Models

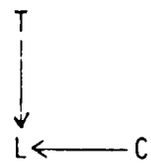
Model 1



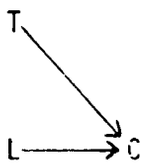
Model 2



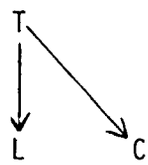
Model 8



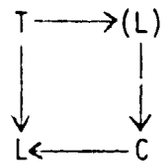
Model 9



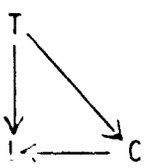
Model 10



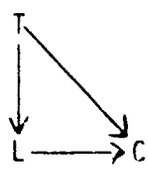
Model 14



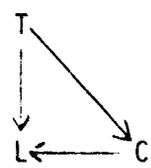
Model 15



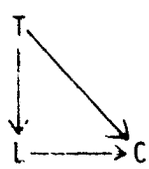
Model 16



Model 17



Model 18



between treatment and leadership change. Our choice, therefore, is among Models 2, 8, 10, 15, 16, 17 and 18.

To answer the question of which model best fits the findings, we turn to cross-lag correlational data drawn from the same master file which enters into the MCA. From Figure 4, we see that no evidence exists of either organizational climate's causing leadership or of the reverse pattern. Instead, the pattern is precisely what one would expect if both were to have been caused by some third variable. Since they all involve a climate-to-leadership loop, Models 2, 8, 15, 16, 17, and 18 can be rejected. Model 10 thus remains as the only plausible model.

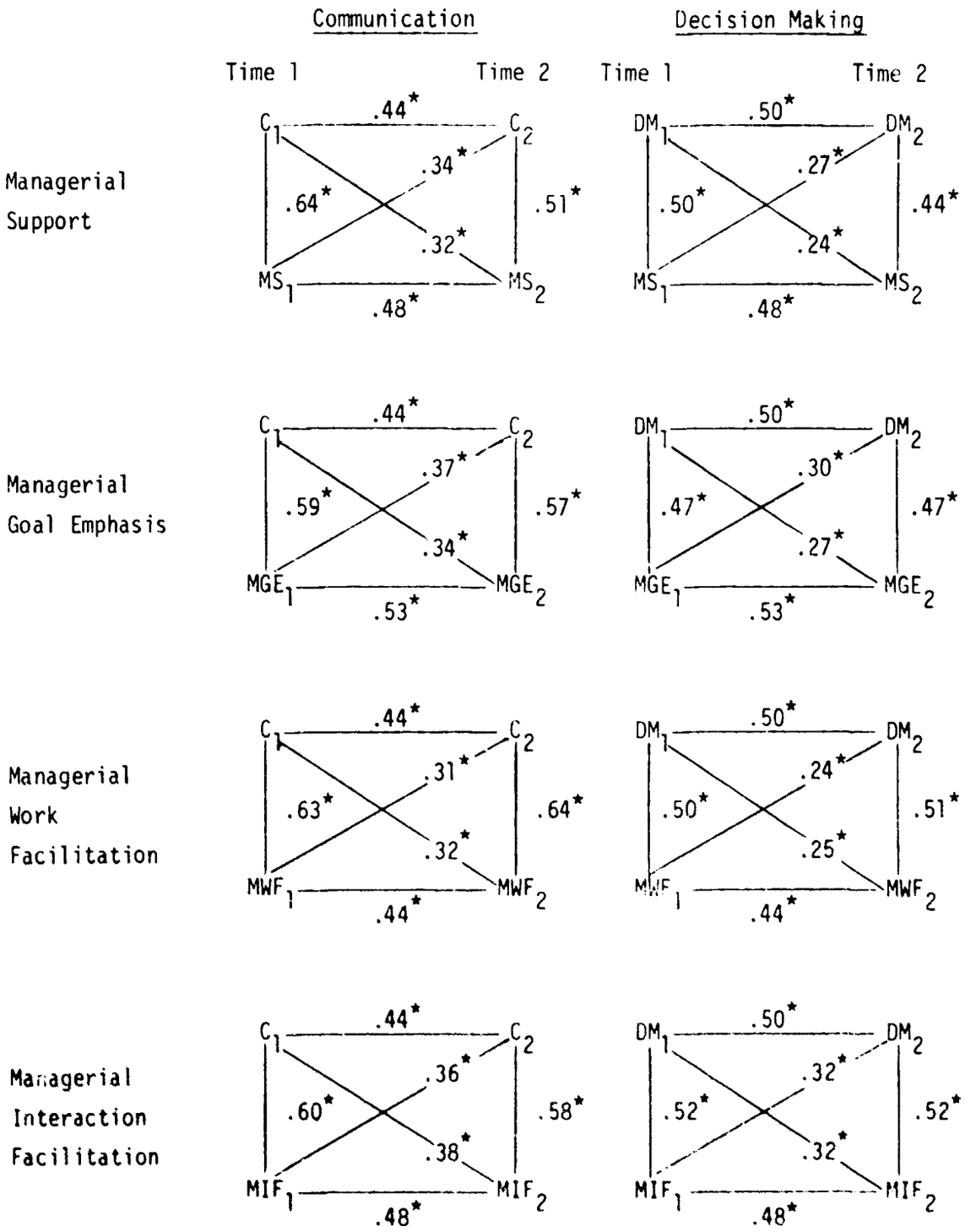
The correlation matrix which provided the preceding cross-lag analysis also contains measures of "superordinate managerial leadership," the mean of managerial leadership indices for the two organizational echelons above each focal group. Just as we cross-lagged climate and leadership variables for focal groups, we can cross-lag superordinate leadership to organizational climate and managerial leadership for those same groups. If, once more, no cross-lag evidence of causation occurs, we may conclude that a third variable affects all three: superordinate leadership, organizational climate, and managerial leadership.

Figures 5 and 6 show that superordinate goal emphasis, work facilitation, and interaction facilitation, in relation to either organizational climate or managerial leadership show no cross-lag effects significant beyond the .01 level of confidence. Although no cross-lag effects at an acceptable level of statistical significance are found for relationship to managerial leadership, superordinate support does, however, display significant cross-lag effects in relation to organizational climate, such that it leads to, rather than stems from, organizational climate for the focal group.

The most reasonable interpretation, therefore, is that treatment affects both leadership and organizational climate in similar ways, and that the relationship observed between the changes themselves is the coincident result of their common cause. To this general conclusion must be added

Cross-lag Correlation of Organizational Climate
and Managerial Leadership for Focal Groups

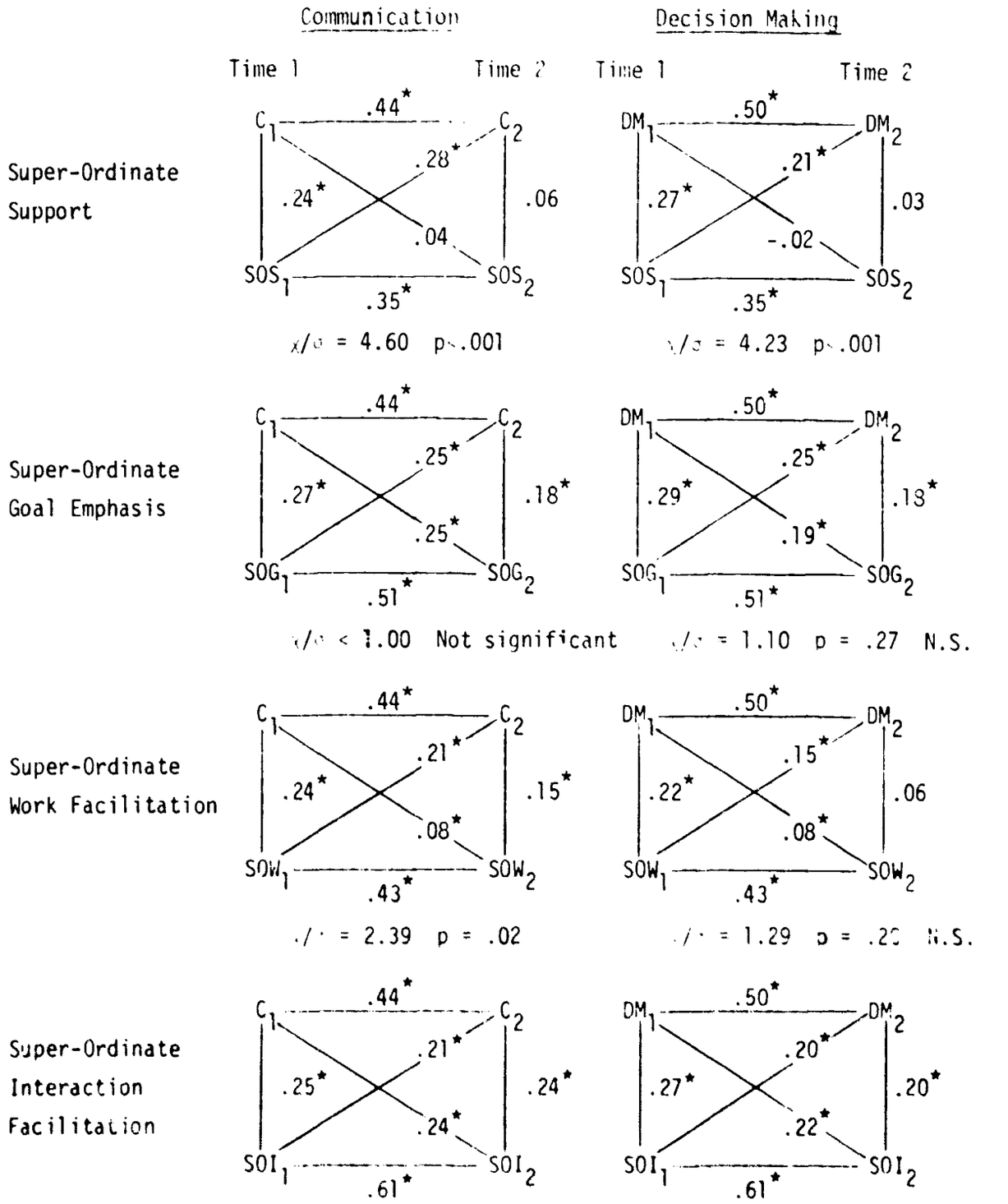
Figure 4



*Significant beyond the .05 level of confidence

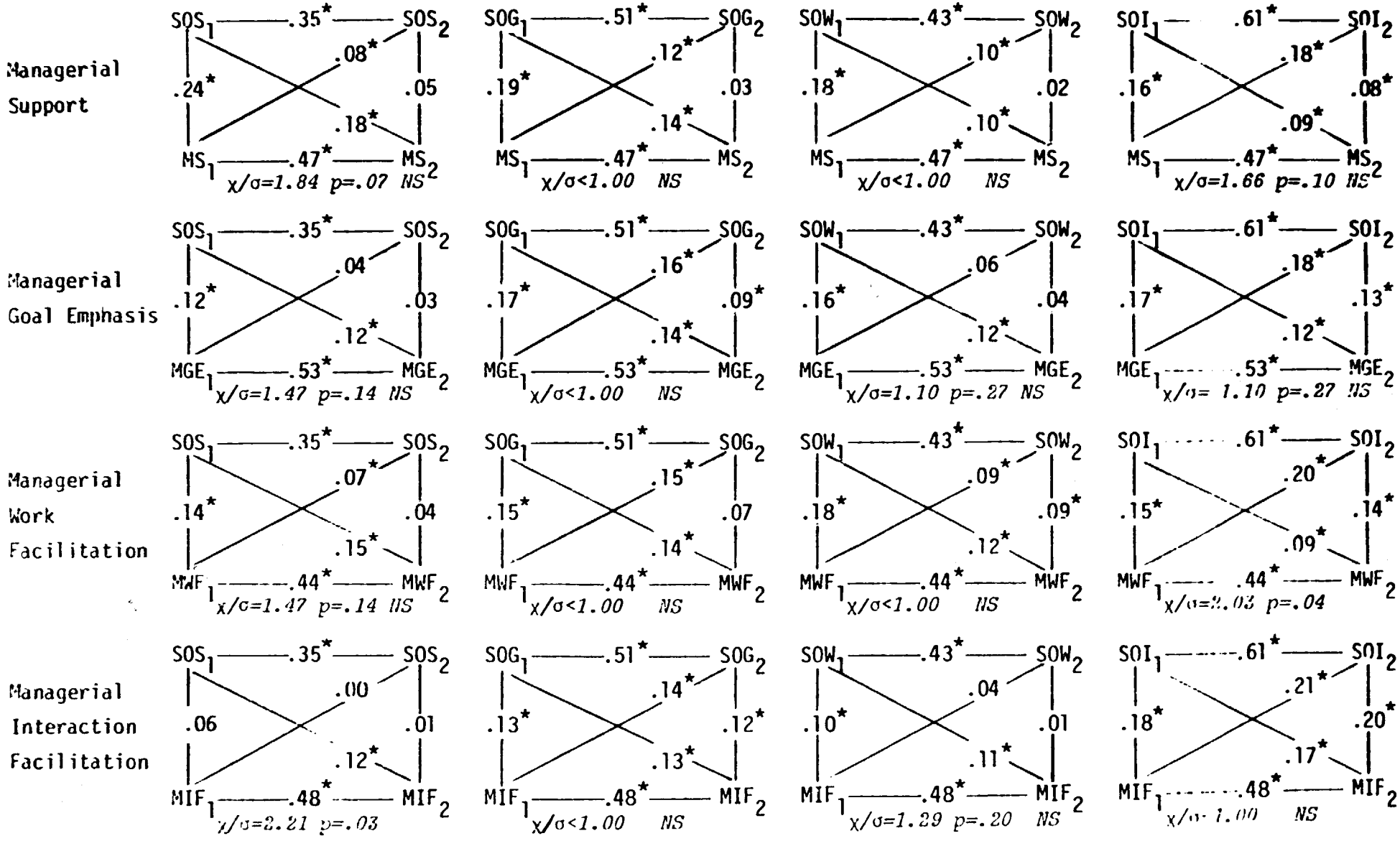
Cross-lag Correlation of Superordinate Leadership
and Focal Group Organizational Climate

Figure 5



*Significant beyond the .05 level of confidence

Cross-lag correlation of Superordinate Leadership
and Focal Group Managerial Leadership

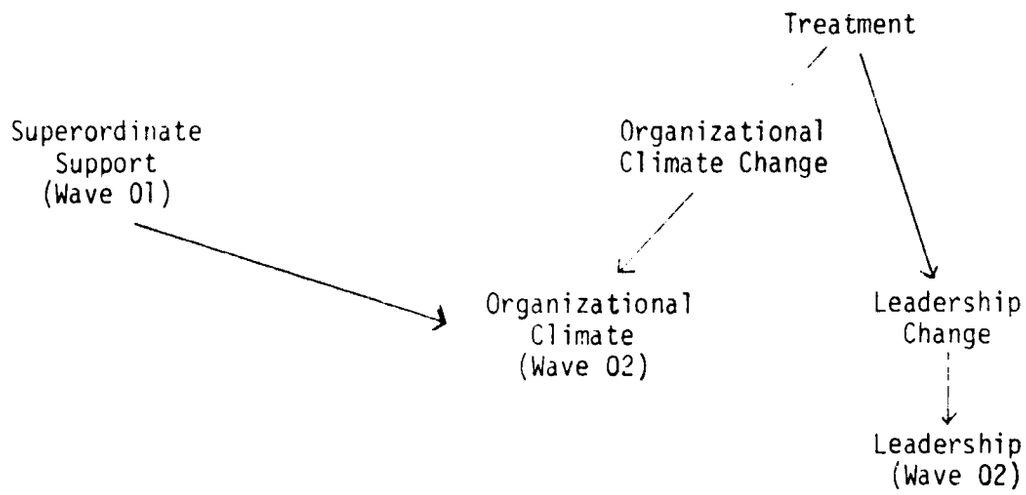


*Significant beyond the .05 level

NS = Not significant

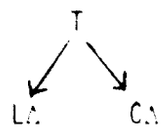
the finding that organizational climate is in part related also to the degree of superordinate support which existed at the start of the project. The resulting picture must therefore appear as it does in Figure 7.

Figure 7



Treatment Effects: Some Probing in Depth

We have seen from the preceding section that the most likely causal model to obtain within the framework of the constructs which we are presently considering is the following:



The obvious conclusion is that change treatments, or intervention strategies, do make a difference. This present study is different from the "classic" study in which one intervention strategy is investigated in relation to outcomes in one or more organizations. Instead, we are presently considering a number of treatments, and we have concluded only that choice of treatment has some effect upon the functional characteristics of the organization. There remains the very cogent question of

which treatments have what effects, as well as their strength and directions. It is to this question that the present section turns its attention.

An initial comparison concerns the "raw" effects of the treatments upon leadership change, that is, the effects of treatments, unadjusted for any potentially unrelated effects of changes in organizational climate. Table 4 presents these effects, along with a test of the significance of the amount of change per se in each variable.

From these data, it is apparent that there are significant differences among treatments in the amount of leadership change which occurs for all measures except the two Ideals (Managerial and Peer) for Interaction Facilitation.

It seems also apparent that, on the whole, the treatments sort themselves into two clusters: (a) Survey Feedback, Data Handback, and Interpersonal Process Consultation, in which raw change is positive, and (b) Laboratory Training, Task Process Consultation, and No Treatment, in which unadjusted change is negative. Within this broad categorization, a bit more may be said by looking at the asterisked mean change scores, which are those large enough to be themselves statistically significant. The pattern presented is indeed an interesting one: Survey Feedback seems primarily to be associated with significant improvement in the Work Facilitation-Interaction Facilitation combination, which reflects in the author's mind the problem-solving aspects of work group life. That this is what proponents of survey feedback have in years past suggested constitutes the dynamic of that process is reassuring in the light of these findings.

Data Handback, on the other hand, appears to lack significant change on Managerial Interaction Facilitation, although it produces positive change in the Work Facilitation area.

Interpersonal Process Consultation presents a rather broad pattern of positive and significant change, particularly on managerial leadership characteristics.

Table 4

Significance of the Difference Between Unadjusted Mean Change Scores, by Leadership Measure by Treatment

Leadership Measure	Survey Feedback (N=112)	Laboratory Training (N=167)	Task Proc. Consult. (N=109)	Interpers. Proc. Cons. (N=298)	Data Handback (N=98)	No Treatment (N=104)	df	F	p
Mgr. Supp. (Act.)	5.13	4.85*	4.75*	5.12*	5.03	4.75*	5/882	14.40	<.001
Mgr. Supp. (Ide.)	5.13*	4.90*	4.92*	5.07*	5.03	4.83*	5/882	17.50	<.001
Mgr. Goal Em. (Act.)	5.14	4.98	4.91	5.13*	5.06	4.92	5/882	4.86	<.001
Mgr. Goal Em. (Ide.)	5.22*	4.99	4.98	5.10*	5.09	5.02	5/882	9.58	<.001
Mgr. Work F. (Act.)	5.24*	4.99	4.91	5.22*	5.16*	4.87*	5/882	12.31	<.001
Mgr. Work F. (Ide.)	5.29*	4.98	5.02	5.18*	5.21*	4.92*	5/882	19.83	.001
Mgr. Inter. F. (Act.)	5.43*	5.07	5.03	5.23*	5.14	5.05	5/882	4.33	.001
Mgr. Inter. F. (Ide.)	5.13*	5.00	5.00	5.02	5.00	5.09	5/882	1.61	NS
Peer Supp. (Act.)	5.00	4.83*	4.82*	5.06	5.07	4.78*	5/882	9.50	<.001
Peer Supp. (Ide.)	4.96	4.85*	4.91	4.99	4.97	4.82*	5/882	5.44	<.001
Peer Goal Em. (Act.)	5.10	4.96	4.94	5.15*	5.16*	4.90	5/882	6.37	<.001
Peer Goal Em. (Ide.)	5.16*	4.94	4.93	5.04	5.04	4.99	5/882	6.50	<.001
Peer Work F. (Act.)	5.25*	5.05	4.90	5.24*	5.22*	4.95	5/882	9.31	<.001
Peer Work F. (Ide.)	5.34*	4.94	4.94	5.13*	5.19*	4.93	5/882	19.36	<.001
Peer Inter. F. (Act.)	5.17*	4.99	4.91	5.16*	5.20*	4.88	5/882	6.83	<.001
Peer Inter. F. (Ide.)	5.07	4.91	4.93	4.99	4.98	4.93	5/882	2.79	.05>p>.01
Mean	5.17	4.95	4.93	5.11	5.10	4.91			

*change itself is large enough to be statistically significant at .01 level of confidence

Finally, Laboratory Training and Task Process Consultation are associated with significant declines in managerial and peer support. No Treatment at all presents the same pattern, and in addition shows significant declines on managerial work facilitation.

Turning once more to a more global scrutiny of these data, it is apparent that the eight Actual leadership characteristics seem to change in approximately the same order of positiveness from one treatment to another. Thus, overall, the work facilitation and interaction facilitation variables seem to change most positively (or least negatively), the goal emphasis variables at an intermediate level, and the support variables least positively (or most negatively). A Kendall's Coefficient of Concordance (W) computed for an 8 x 6 table of ranks, corrected for ties, is .70 (Chi square with 7 df = 29.12 $p < .001$).

These data are thus quite consistent with the more global findings presented in the earlier report, although they provide a more detailed portrait of the effects themselves. Taken together, they tend to convey the impression that both Laboratory Training, and Task Process Consultation, like No Treatment, produced either questionable gain or outright deterioration in the organization's functional capability.

Still, the cross-lag relationships analyzed in an earlier section are far from perfect, and the possibility remains that some portion of the change in organizational climate, particularly where that change is negative in character, "masks" the true effect of these treatments upon intra-group behavior. This explanation, in fact, has great plausibility, since laboratory training, particularly, was conducted in organizations in which, coincidentally or not, that constellation of policies, practices, procedures, and objectives which we term "organizational climate" tended to change for the worse during the period of the project.

Accordingly, we have drawn from the Multiple Classification Analysis the mean scores by treatment, adjusted to remove the effects of the five organizational climate variables. The effects which we see in Table 5 are, accordingly, the "pure" effects of treatments upon within-group functional (leadership) characteristics.

Table 5

Significance of the Difference between Mean Change Scores
Adjusted to Remove Effects of Organizational Climate Change,
by Leadership Measure by Treatment

Leadership Measure	Survey Feedback (N=112)	Laboratory Training (N=167)	Task Proc. Consult. (N=109)	Interpers. Proc. Cons. (N=298)	Data Handback (N=98)	No Treatment (N=104)	df	F	p
Mgr. Supp. (Act.)	5.05	4.96	4.78*	5.04	5.07	4.82*	5/877	7.04	<.001
Mgr. Supp. (Ide.)	5.10*	4.94*	4.92	5.05	5.04	4.86*	5/877	10.76	<.001
Mgr. Goal Em. (Act.)	5.06	5.09	4.94	5.05	5.09	4.99	5/877	1.94	NS
Mgr. Goal Em. (Ide.)	5.19*	5.03	4.99	5.07*	5.10	5.04	5/877	5.82	<.001
Mgr. Work F. (Act.)	5.15	5.11*	4.95	5.13*	5.21*	4.95	5/877	5.48	<.001
Mgr. Work F. (Ide.)	5.26*	5.01	5.02	5.16*	5.22*	4.94	5/877	14.20	<.001
Mgr. Inter. F. (Act.)	5.33*	5.20*	5.07	5.13*	5.18*	5.14*	5/877	2.43	.05>p>.01
Mgr. Inter. F. (Ide.)	5.11*	5.03	5.00	5.00	5.01	5.11*	5/877	2.75	.05>p>.01
Peer Supp. (Act.)	4.94	4.89*	4.83*	5.01	5.08	4.83*	5/877	6.50	<.001
Peer Supp. (Ide.)	4.93*	4.88*	4.92	4.96	4.98	4.85*	5/877	3.36	.01>p>.001
Peer Goal Em. (Act.)	5.04	5.05	4.96	5.08*	5.20*	4.97	5/877	3.85	.01>p>.001
Peer Goal Em. (Ide.)	5.13*	4.98	4.94	5.01	5.05	5.01	5/877	4.09	.01>p>.001
Peer Work F. (Act.)	5.18*	5.15*	4.92	5.16*	5.26*	5.02	5/877	5.80	<.001
Peer Work F. (Ide.)	5.31*	4.98	4.95	5.11*	5.20*	4.95	5/877	14.68	<.001
Peer Inter. F. (Act.)	5.08	5.11	4.94	5.06	5.24*	4.97	5/877	3.85	.01>p>.001
Peer Inter. F. (Ide.)	5.05	4.94	4.93	4.97	4.99	4.95	5/877	1.41	NS
Mean	5.12	5.02	4.94	5.06	5.12	4.96			

*change itself is large enough to be statistically significant at .01 level of confidence

From these data, we see that, although the magnitude of the intra-treatment differences has been reduced somewhat by controlling upon organizational climate change, the overall pattern observed in the unadjusted statistics remains substantially the same. In the particular instance of Laboratory Training, the pattern of reduced supportiveness remains. A difference does appear within this treatment, however: both managerial work facilitation and managerial interaction facilitation now show moderate (and statistically significant) gains. One must conclude, therefore, that the negative changes in organizational climate, whether coincidental companion or result of the treatment, served to cover or disguise what otherwise would have been improved problem-solving behaviors not unlike those observed within Survey Feedback.

Effects in the Capstone Groups

A somewhat more telling comparison occurs when we turn to data from the capstone groups (those groups in the top management rungs of the various organizations which, in the case of Laboratory Training, Interpersonal Process Consultation, and Task Process Consultation actually received those specific interventions, and, in the case of Survey Feedback, Data Handback, and No Treatment represent comparable hierarchical levels). The number of groups analyzed is naturally quite small, and the more elaborate analyses conducted by the MCA computer program are therefore impossible. Still, many of the same comparisons can be made, as Table 6 indicates.

To permit some form of analysis, treatment cells have been combined, such that comparisons are made between those capstone groups whose intervention package was essentially data-based (Survey Feedback + Data Handback), those who received Laboratory Training, and all others (Interpersonal Process Consultation, Task Process Consultation, and No Treatment). The findings indicate that the data-based treatments are associated with a positive change in communication (organizational climate), and positive changes in the problem-solving combination of managerial work facilitation and managerial interaction facilitation. In addition, a positive change in peer goal emphasis occurs.

Table 6

Significance of the Difference Between Unadjusted Mean Change Scores, by Measure by Treatment Cluster, for Capstone Groups Only

Measure	Treatment Cluster			df	Kruskal Wallis (H)	p
	Survey Feedback + Handback (N=14 gps.)	Laboratory Training (N=20 gps.)	Other (N=15 gps.)			
Communication (Climate)	5.17*	4.86	4.97	2	4.18	NS
Motivation (Climate)	5.03	4.88	5.00	2	2.63	NS
Control (Climate)	4.91	4.76*	4.86	2	1.37	NS
Decision-Making (Climate)	5.12	4.79*	4.83	2	2.82	NS
Coordination (Climate)	5.18	4.94	5.01	2	1.49	NS
Mgr. Supp. (Act.)	4.74	4.64	4.93	2	.52	NS
Mgr. Goal Em. (Act.)	5.16	5.15*	4.94	2	5.66	NS
Mgr. Work F. (Act.)	5.36*	5.13*	4.92	2	7.45	.025
Mgr. Inter. F. (Act.)	5.23*	4.99	4.99	2	2.68	NS
Peer Supp. (Act.)	5.02	4.80*	4.86*	2	3.73	NS
Peer Goal Em. (Act.)	5.20*	4.95	5.13*	2	2.85	NS
Peer Work F. (Act.)	5.19	5.13	4.89	2	2.53	NS
Peer Inter. F. (Act.)	5.18	5.05	4.95	2	2.67	NS

*Change itself is large enough to be statistically significant at the .05 level

Laboratory Training is associated with negative changes in control (the sum total of influence present in the organization, notably including influence attributed to lower echelons), in decision-making practices, and in peer support. Positive changes, on the other hand, occur on both of the task dimensions of managerial behavior (goal emphasis and work facilitation).

The remaining treatments are associated with a negative change in peer support, and a positive change in peer goal emphasis. Since treatments whose system-wide associations were quite different have been combined, little that is conclusive can be gained from speculation about the meaning of these changes.

For the data-based and Laboratory Training capstone groups, certain observations seem warranted, however. First, the results are in the main remarkably like those for whole systems. Data-based treatments seem to have been associated with an improved ability in the capstone groups' communication climate and with an enhanced ability within its groups to solve problems. In addition, within these top echelon groups, an improvement occurred in that mutually-motivating behavior which we term "peer goal emphasis."

Laboratory Training similarly replicates in part the pattern of findings generated regarding whole systems. The fund of organizational influence declined, and the participative character of decision-making practices deteriorated. As in their whole organizations, these capstone groups showed a decline in supportive behavior of peer toward peer. Interestingly enough, the task-oriented behavior of capstone group managers increased. The parallel to the findings in the celebrated International Harvester study are striking. (Fleishman, 1953) As in that study, it would appear that the principal effect of interpersonal relations-oriented training was to increase task-directed behavior by managers.

Comparative Effects of Climate Change and Treatments

Analyses presented quite early in this results portion of the report showed that relationships do, in fact, exist among our three categories of variables. In part these relationships have been probed in depth. What must be equally apparent is that not all of the variance in climate and leadership change is encompassed as shared variance with the treatments variable. There is, after all, some portion of variance which climate change and leadership change share with one another, but not with treatment. The overall effect is exemplified by the data in Table 7, drawn from the MCA analysis, in which multiple correlations predicting leadership change from the combination of organizational climate changes, including and excluding treatment as a sixth predictor, are compared.

Adding treatment as a sixth predictor does improve the multiple correlation coefficient at a level that is statistically significant. However, the large number of cases makes any improvement statistically significant. Thus the comparison is really between no improvement and improvement of any size at all. The data indicate that no improvement occurs for:

Managerial Goal Emphasis (Actual)
Managerial Interaction Facilitation (Actual)
Managerial Interaction Facilitation (Ideal)
Peer Support (Ideal)
Peer Interaction Facilitation (Ideal)

A substantial degree of overlap is therefore indicated between organizational climate predictors on the one hand and treatments on the other. A better indication of the comparative degree of relationship which each of these predictors has to leadership change is perhaps given by the beta coefficients (correlation ratios computed from scores adjusted in each case to remove the effects of all other predictors). These are presented in Table 8.

Table 7

Multiple Correlation Coefficients (Squared)
of Organizational Climate Change with Leadership Change,
Including and Excluding Treatment as a Sixth Predictor

Leadership Variable	R^2 Excluding Treatments	R^2 Including Treatments	df	F	p
Mgr. Supp. (Act.)	.22	.24	1/881	23.26	<.001
Mgr. Supp. (Ide.)	.11	.14	1/881	30.93	<.001
Mgr. Goal Em. (Act.)	.22	.22	---	---	---
Mgr. Goal Em. (Ide.)	.12	.13	1/881	20.41	<.001
Mgr. Work F. (Act.)	.25	.26	1/881	12.05	<.001
Mgr. Work F. (Ide.)	.10	.14	1/881	41.24	<.001
Mgr. Inter. F. (Act.)	.18	.18	---	---	---
Mgr. Inter. F. (Ide.)	.06	.06	---	---	---
Peer Supp. (Act.)	.12	.14	1/881	20.62	<.001
Peer Supp. (Ide.)	.09	.09	---	---	---
Peer Goal Em. (Act.)	.18	.19	1/881	10.99	<.001
Peer Goal Em. (Ide.)	.09	.10	1/881	9.80	<.01
Peer Work F. (Act.)	.17	.19	1/881	21.98	<.001
Peer Work F. (Ide.)	.08	.13	1/881	51.02	<.001
Peer Inter. F. (Act.)	.18	.19	1/881	10.99	<.001
Peer Inter. F. (Ide.)	.05	.05	---	---	---

Table 8

Beta Coefficients of Organizational Climate Change and Change Treatment with Change in Leadership Measures

(N = 888 Groups)

Leadership Variable	Comm.	Motiv.	Control	Dec.-Making	Coord.	Treatment
Mgr. Support (Actual)	.21*	.12*	.10*	.11*	.07	.17*
Mgr. Support (Ideal)	.06	.08	.08	.10*	.02	.23*
Mgr. Goal Em. (Actual)	.19*	.08	.12*	.15*	.12	.09
Mgr. Goal Em. (Ideal)	.12*	.07	.02	.08	.11*	.17*
Mgr. Work F. (Actual)	.23*	.14*	.11*	.16*	.03	.15*
Mgr. Work F. (Ideal)	.05	.08	.05	.10*	.00	.26*
Mgr. Inter. F. (Actual)	.19*	.10*	.08	.16*	.06	.10
Mgr. Inter. F. (Ideal)	.06	.12*	.02	.10*	.04	.12
Peer Support (Actual)	.12*	.10*	.13*	.08	.01	.18*
Peer Support (Ideal)	.08	.11*	.07	.08	.00	.13*
Peer Goal Em. (Actual)	.15*	.19*	.13*	.11*	.02	.13*
Peer Goal Em. (Ideal)	.06	.15*	.01	.08	.10*	.14*
Peer Work F. (Actual)	.15*	.16*	.14*	.10*	.03	.16*
Peer Work F. (Ideal)	.0[illegible]	.07	.04	.08	.03	.27*
Peer Inter. F. (Actual)	.17*	.14*	.11*	.17*	.02	.13*
Peer Inter. F. (Ideal)	.02	.12*	.01	.07	.07	.09

*Significant beyond the .01 level of confidence.

These data indicate that Treatment is the "best predictor" in eight of the 16 instances, six of them ideal leadership measures. Treatment appears, however, to be largely unrelated (when organizational climate change is controlled) to managerial goal emphasis (actual), managerial interaction facilitation (actual), and to both ideal interaction facilitation measures. A more general impression obtained from the data is that, when non-overlap variance alone is considered, organizational climate change relates more strongly to actual leadership behavior change than does treatment, whereas treatment relates more strongly to ideal leadership change than does change in climate. Thus there would appear to be a somewhat greater tendency, in terms of pure effects, for treatments to relate to changes in persons' expectations or preferences regarding leadership, and for climate changes to relate to changes in behavior itself.

We turn now to a comparison of mean leadership change scores for positive and negative organizational climate change classes, adjusted in each instance to remove the effect of all other organizational climate change variables than the one in question. These are provided separately by change treatment and there are, therefore, 5 (climate variables) x 16 (leadership variables) x 6 (treatments), or 480 cell means.

To simplify the task, we shall examine only two portions of the total array: (a) those demonstrating little or no difference (.00, +.01, -.01) between climate change classes in adjusted leadership change means; and (b) those demonstrating the greatest differences (.26 and above) between adjusted class mean scores. Thus we shall be looking at those instances in which climate change makes (a) little or no difference, and (b) a great deal of difference.

Looking first at the little or no difference category (.00's and $\pm$.01's), it is apparent that there are 44 such differences. (See Table 9) Of these 44, 34 reflect Ideal leadership change measures, whereas 10 reflect Actual leadership change measures. This difference is statistically significant beyond the .01 level of confidence, according to a sign test.

Table 9

Leadership Variables, Treatments, Climate Change Measures
Inter-class Comparisons Involving Little or No Difference

Difference	Leadership Variable	Treatment	Climate Measure	Positive Climate	Negative Climate
.01	Peer Work F. (Ide.)	Survey Feedback	D-M	5.34	5.33
-.01	Peer Inter. F. (Act.)	Survey Feedback	D-M	5.17	5.18
.00	Peer Goal Em. (Act.)	Task Proc. Consult.	D-M	4.94	4.94
.00	Mgr. Inter. F. (Ide.)	Interpers. Proc. Cons.	D-M	5.02	5.02
.01	Peer Supp. (Ide.)	Interpers. Proc. Cons.	D-M	5.00	4.99
-.01	Peer Work F. (Ide.)	Interpers. Proc. Cons.	D-M	5.13	5.14
-.01	Mgr. Supp. (Act.)	Data Handback	D-M	5.02	5.03
.01	Mgr. Work F. (Act.)	Data Handback	D-M	5.17	5.16
.01	Mgr. Work F. (Ide.)	Data Handback	D-M	5.22	5.21
.00	Mgr. Supp. (Ide.)	No Treatment	D-M	4.83	4.83
.00	Peer Work F. (Ide.)	No Treatment	D-M	4.93	4.93
.01	Mgr. Goal Em. (Ide.)	Survey Feedback	Coord.	5.23	5.22
-.01	Mgr. Supp. (Ide.)	Laboratory Training	Coord.	4.90	4.91
-.01	Mgr. Work F. (Ide.)	Laboratory Training	Coord.	4.97	4.98
.00	Peer Goal Em. (Ide.)	Laboratory Training	Coord.	4.94	4.94
-.01	Peer Work F. (Ide.)	Laboratory Training	Coord.	4.94	4.95

Table 9 (continued)

Difference	Leadership Variable	Treatment	Climate Measure	Positive Climate	Negative Climate
.01	Mgr. Work F. (Ide.)	Interpers. Proc. Cons.	Coord.	5.19	5.18
-.01	Mgr. Work F. (Act.)	Data Handback	Coord.	5.16	5.17
-.01	Peer Supp. (Ide.)	No Treatment	Coord.	4.82	4.83
-.01	Peer Goal Em. (Ide.)	No Treatment	Coord.	4.99	5.00
.00	Peer Inter. F. (Ide.)	No Treatment	Coord.	4.93	4.93
.00	Mgr. Work F. (Ide.)	Survey Feedback	Comm.	5.29	5.29
-.01	Peer Supp. (Act.)	Survey Feedback	Comm.	4.99	5.00
-.01	Peer Goal Em. (Ide.)	Survey Feedback	Comm.	5.15	5.16
-.01	Peer Work F. (Ide.)	Survey Feedback	Comm.	5.34	5.35
.01	Mgr. Supp. (Ide.)	Task Proc. Consult.	Comm.	4.92	4.91
-.01	Mgr. Work F. (Ide.)	Task Proc. Consult.	Comm.	5.01	5.02
-.01	Mgr. Inter. F. (Ide.)	Task Proc. Consult.	Comm.	4.99	5.00
.01	Peer Goal Em. (Ide.)	Interpers. Proc. Cons.	Comm.	5.04	5.03
.01	Peer Work F. (Ide.)	Interpers. Proc. Cons.	Comm.	5.14	5.13
-.01	Mgr. Supp. (Ide.)	No Treatment	Comm.	4.83	4.84
-.01	Mgr. Goal Em. (Act.)	No Treatment	Comm.	4.92	4.93

Table 9 (continued)

Difference	Leadership Variable	Treatment	Climate Measure	Positive Climate	Negative Climate
.01	Peer Supp. (Ide.)	Survey Feedback	Control	4.96	4.95
-.01	Peer Inter. F. (Ide.)	Survey Feedback	Control	5.07	5.08
.00	Peer Inter. F. (Ide.)	Task Proc. Cons.	Control	4.93	4.93
-.01	Mgr. Supp. (Ide.)	Interpers. Proc. Cons.	Control	5.07	5.08
.00	Mgr. Work F. (Ide.)	Interpers. Proc. Cons.	Control	5.18	5.18
-.01	Mgr. Inter. F. (Act.)	Interpers. Proc. Cons.	Control	5.23	5.24
.01	Peer Work F. (Ide.)	Interpers. Proc. Cons.	Control	5.14	5.13
-.01	Mgr. Goal Em. (Ide.)	Data Handback	Control	5.09	5.10
-.01	Mgr. Supp. (Act.)	No Treatment	Control	4.74	4.75
.01	Mgr. Supp. (Ide.)	No Treatment	Control	4.84	4.83
-.01	Mgr. Goal Em. (Act.)	No Treatment	Control	5.02	5.03
-.01	Mgr. Inter. F. (Ide.)	No Treatment	Control	5.08	5.09

In magnitude and in treatment, these "non-differences" distribute themselves along the lines presented in Table 10.

It is apparent from the data that over half of these non-differences" fall at an absolute change score level which varies but little from the 5.00 "no change" point, and that they distribute themselves in no strikingly uneven way across all treatments. 15 of the non-differences fall at a level well up into the positive change area and thus represent instances in which climate change did not detract from what was essentially a positive change in a leadership characteristic. Five of the non-differences, on the other hand, fall well down into the negative change area and thus represent instances in which climate change in no way modified an essentially deteriorating situation. These positive and negative range "non-differences" present an interesting study in contrast: all of the positives occur within the Survey Feedback, Data Handback, and Interpersonal Process Consultation treatments, whereas all five of the negative occur within the No Treatment category.

Distributed by climate change measure, we see that these non-differences distribute themselves quite equally across all measures except Motivation, for which no non-differences (as we have defined them) occur.

The net implication from looking at non-differences, therefore, is that they occur less often with regard to Motivation than with any other climate change measure, involve Ideal more often than Actual measures, and that they tend to accompany (a) unobstructed increase for Survey Feedback, Interpersonal Process Consultation, and Data Handback, (b) unameliorated decline for No Treatment, and (c) little or no change for Laboratory Training and Task Process Consultation.

Turning to the largest climate change, inter-class differences, Table 11 shows that there are 42 which exceed one-quarter scale point in magnitude (i.e., .26 or better). All are positive; that is, the leadership change score is more positive with positive climate change than with negative climate change.

Table 10

Frequency of Non-Differences in Leadership Change
Between Climate Change Classes, By Magnitude and Treatment

Magnitude	Survey Feedback	Laboratory Training	Task Proc. Consult.	Interpers. Proc. Cons.	Data Handback	No Treatment	Total
+ .10 and above	6	0	0	6	3	0	15
± .09	3	4	5	4	2	6	24
- .10 and below	0	0	0	0	0	5	5

Table 11

Leadership Variables, Treatments, Climate Change Measures
Inter-class Comparisons Involving Large Difference

Difference	Leadership Variable	Treatment	Climate Δ Measure	Positive Climate Δ	Negative Climate Δ
.37	Mgr. Work F. (Act.)	Laboratory Training	Comm.	5.24	4.87
.28	Mgr. Inter. F. (Act.)	Laboratory Training	Comm.	5.26	4.98
.32	Peer Work F. (Act.)	Laboratory Training	Comm.	5.27	4.95
.29	Peer Inter. F. (Act.)	Laboratory Training	Comm.	5.19	4.90
.33	Mgr. Supp. (Act.)	Task Proc. Consult.	Comm.	4.95	4.62
.33	Mgr. Goal Em. (Act.)	Task Proc. Consult.	Comm.	5.10	4.77
.38	Mgr. Work F. (Act.)	Task Proc. Consult.	Comm.	5.14	4.76
.30	Peer Goal Em. (Act.)	Task Proc. Consult.	Comm.	5.12	4.82
.34	Mgr. Supp. (Act.)	Interpers. Proc. Cons.	Comm.	5.24	4.90
.33	Mgr. Inter. F. (Act.)	Interpers. Proc. Cons.	Comm.	5.34	5.01
.33	Mgr. Supp. (Act.)	Data Handback	Comm.	5.22	4.89
.27	Mgr. Work F. (Act.)	Data Handback	Comm.	5.33	5.06
.29	Peer Supp. (Act.)	Data Handback	Comm.	5.24	4.95
.27	Peer Work F. (Ide.)	Data Handback	Comm.	5.36	5.09
.27	Peer Inter. F. (Act.)	Data Handback	Comm.	5.36	5.09

Table 11 (continued)

Difference	Leadership Variable	Treatment	Climate Measure	Positive Climate	Negative Climate
.27	Peer Supp. (Act.)	Survey Feedback	Motiv.	5.15	4.88
.31	Mgr. Supp. (Act.)	Data Handback	Motiv.	5.24	4.93
.27	Mgr. Inter. F. (Ide.)	No Treatment	Motiv.	5.26	4.99
.25	Peer Goal Em. (Act.)	No Treatment	Motiv.	5.08	4.80
.33	Peer Work F. (Act.)	No Treatment	Motiv.	5.16	4.83
.30	Peer Inter. F. (Act.)	No Treatment	Motiv.	5.07	4.77
.38	Peer Goal Em. (Act.)	Survey Feedback	Control	5.28	4.90
.28	Mgr. Goal Em. (Act.)	Laboratory Training	Control	5.17	4.89
.30	Peer Work F. (Act.)	Laboratory Training	Control	5.26	4.96
.38	Mgr. Work F. (Act.)	Survey Feedback	D-M	5.34	4.96
.45	Mgr. Inter. F. (Act.)	Laboratory Training	D-M	5.41	4.96
.34	Peer Goal Em. (Act.)	Laboratory Training	D-M	5.22	4.88
.36	Peer Work F. (Act.)	Laboratory Training	D-M	5.33	4.97
.28	Peer Work F. (Ide.)	Laboratory Training	D-M	5.16	4.88
.49	Peer Inter. F. (Act.)	Laboratory Training	D-M	5.37	4.88
.37	Mgr. Inter. F. (Act.)	Data Handback	D-M	5.33	4.96
.32	Peer Inter. F. (Act.)	Data Handback	D-M	5.36	5.04

Table 11 (continued)

Difference	Leadership Variable	Treatment	Climate Δ Measure	Positive Climate Δ	Negative Climate Δ
.30	Mgr. Inter. F. (Act.)	Survey Feedback	Coord.	5.57	5.27
.27	Peer Inter. F. (Act.)	Survey Feedback	Coord.	5.30	5.03
.26	Peer Inter. F. (Act.)	Task Proc. Consult.	Comm.	5.07	4.81
.25	Mgr. Work F. (Act.)	Interpers. Proc. Cons.	Comm.	5.31	5.05
.26	Mgr. Inter. F. (Act.)	Data Handback	Comm.	5.30	5.04
.26	Peer Work F. (Act.)	Data Handback	Comm.	5.38	5.12
.26	Peer Work F. (Act.)	Survey Feedback	Motiv.	5.40	5.14
.26	Peer Goal Em. (Act.)	Data Handback	Motiv.	5.34	5.08
.26	Mgr. Inter. F. (Act.)	No Treatment	Motiv.	5.21	4.95
.26	Mgr. Inter. F. (Act.)	Task Proc. Consult.	Control	5.17	4.91

In the case of this comparison, only three concern Ideal leadership measures, whereas 39 involve Actual measures, a difference which is significant by a sign test well beyond the .01 level of confidence.

Among climate change measures and treatments, these differences distribute themselves in the manner shown in Table 12.

The largest number clearly involve climate changes in Communication. Next in order of importance are Motivation and Decision-making.

From these data we see that large differences seem to occur most frequently for Laboratory Training and Data Handback. Beyond this, it seems apparent that communication climate change differences show no instances of a large leadership change differential within Survey Feedback, whereas within Data Handback they do. This seems certainly to suggest that results from Data Handback depend much more upon what happens by way of change in the communication climate than is true for results from Survey Feedback. The implication emerges that Survey Feedback must therefore affect climate itself in ways which Data Handback does not.

Results emerging from No Treatment at all appear, on the other hand, to be much more contingent upon what changes occur in the Motivational climate, while Task Process Consultation is similarly dependent upon changes in Communication climate, and Laboratory Training is contingent upon changes in both the Communication and Decision-making aspects of climate. Interpersonal Process Consultation shows the overall lowest frequency, all of them related to the Communication variable.

The net implication of these findings concerning large climate change inter-class differences in leadership change are, therefore, that (a) such differences occur almost exclusively with regard to Actual leadership measures, (b) they occur least frequently for Interpersonal Process Consultation and most frequently for Laboratory Training and Data Handback, and (c) they concern changes in Communication climate more often than anything else.

Drawing both sets of differences together, it seems reasonable to conclude the following:

Table 12

Distribution of Largest Climate Change
Inter-Class Differences in Leadership Change,
By Treatment and Climate Measure

Treatment	Climate Change Measure					Total
	Comm.	Mot.	D-M	Control	Coord.	
Survey Feedback	0	2	1	1	2	6
Laboratory Training	4	0	5	2	0	11
Task Process Consultation	5	0	0	1	0	6
Interpers. Process Consult.	3	0	0	0	0	3
Data Handback	7	2	2	0	0	11
No Treatment	0	5	0	0	0	5
Total	19	9	8	4	2	

(a) Organizational climate change has less effect upon ideal than it does upon actual leadership change. This conclusion is reinforced by more general data available in Table 13 in which multiple correlations of climate change with leadership change are shown to be statistically significant in the case of actual, but not ideal, measures.

(b) Communication aspects of organizational climate change are more frequent associates of differential actual leadership change, especially within the Task Process Consultation and Data Handback treatments.

(c) Certain treatments have comparatively greater association of actual leadership change with aspects of climate change other than Communication, for example, Laboratory Training with Decision-making and No Treatment with Motivation.

One final finding seems worthy of note. When we compare the "pure" effects of climate change upon leadership change (the beta coefficients) with and without controlling upon treatment as a sixth predictor, little difference occurs. Table 14 presents these data.

The implication of these data would appear to be that there is a substantial area of overlap among climate measures shared by them with the treatment variable.

Integrating and Interpreting the Findings

We began the preceding section with the intent of elaborating the basic causal model identified in an earlier section of the report, that change in both organizational climate and leadership processes was in some substantial measure a result of the treatment package which obtained in that site. By controlling on first one and then the other of these elements, we have in fact been able to provide a degree of elaboration.

First, both change in organizational climate and treatment have relationships to leadership change above and beyond that portion of variation which they have jointly with the dependent measures. Controlling for change

Table 13

Mean R^2 and R^2 Confidence Limits of
Organizational Climate Change with Leadership Change,
by Actual Characteristics

Characteristic	R^2	R^2 Confidence Limits
Actual		
Managerial Support	.17*	.08 - .30
Managerial Goal Emphasis	.20*	.10 - .33
Managerial Work Facilitation	.21*	.11 - .34
Managerial Interaction Facilitation	.16*	.07 - .28
Actual		
Peer Support	.10*	.03 - .20
Peer Goal Emphasis	.16*	.08 - .29
Peer Work Facilitation	.15*	.07 - .27
Peer Interaction Facilitation	.18*	.09 - .30
Ideal		
Managerial Support	.07	.01 - .16
Managerial Goal Emphasis	.08	.02 - .18
Managerial Work Facilitation	.03	.01 - .10
Managerial Interaction Facilitation	.05	.01 - .14
Ideal		
Peer Support	.06	.01 - .16
Peer Goal Emphasis	.08	.02 - .19
Peer Work Facilitation	.05	.01 - .13
Peer Interaction Facilitation	.05	.00 - .14

* $p < .01$

Table 14

Beta Coefficients for Climate Change Predictors
with Leadership Change Measures, with and without Controlling
for Effects of Treatment as a Sixth Predictor

Leadership Measure	Organizational Climate Change Measure									
	Communication		Motivation		Control		Decision-making		Coordination	
	w/o Tmt.	w/Tmt.	w/o Tmt.	w/Tmt.	w/o Tmt.	w/Tmt.	w/o Tmt.	w/Tmt.	w/o Tmt.	w/Tmt.
Mgr. Supp. (Act.)	.22	.21	.10	.12	.10	.10	.16	.11	.06	.07
Mgr. Goal Em. (Act.)	.19	.19	.08	.08	.12	.12	.16	.15	.12	.12
Mgr. Work F. (Act.)	.24	.23	.13	.14	.11	.11	.20	.16	.02	.03
Mgr. Inter. F. (Act.)	.18	.19	.10	.10	.08	.08	.19	.16	.05	.06
Peer Supp. (Act.)	.14	.12	.10	.10	.13	.13	.12	.08	.01	.01
Peer Goal Em. (Act.)	.15	.15	.18	.19	.12	.13	.13	.11	.02	.02
Peer Work F. (Act.)	.16	.15	.14	.16	.12	.14	.13	.10	.02	.03
Peer Inter. F. (Act.)	.17	.17	.12	.14	.09	.11	.19	.17	.01	.02

in climate removes only about one-third of the effect which treatment otherwise displays; more of the latter's effect, in other words, is unrelated to climate change than related to it. It must be added, however, that much of this remaining, "pure" effect of treatment is upon leadership preferences (that is, Ideal leadership); relationships of pure treatment effect to actual leadership behavior change are much lower.

By way of contrast, the pure effects of climate change variables upon leadership change are not appreciably affected by adding treatment as a sixth predictor and controlling upon it. However, controlling upon all other climate change variables removes somewhat more than half of the effect of any single climate change variable upon leadership change present under uncontrolled conditions. This finding, that removing the effect of treatment does not remove anything not already removed by controlling for other climate change variables, is at first blush a bit confusing. It should be noted that it does not imply that treatment is without impact; it simply indicates that there is a substantial pool of common variation which all climate change variables share with treatment, such that subsequently removing the latter has no additional impact. The pure effects which climate change variables have, if accumulated, would certainly be greater in magnitude than the pure effect of treatment; furthermore, the data show that these pure climate effects are related to actual, but not to ideal, leadership change.

A concise summary of these results would be that there is a sizeable portion of change in leadership practices and preferences which is paralleled by the affect of treatment upon organizational climate. Beyond this, treatment has separate or "pure" impact upon leadership, much of it upon preferences rather than actual behavior. Organizational climate change and leadership change share considerable additional variance with one another, variance which is not attributable to treatment.

It is also apparent that treatments differ in their productive potency. Interpersonal process consultation and those treatments which are data-based, particularly survey feedback, seem to have some advantage over either laboratory training or a more task-oriented form of process consultation.

The findings suggest that their most important contribution is to enhance problem-solving capability, both by way of improved leadership processes related to work and interaction facilitation and by means of improved organizational communication and decision-making functions in the climate which surrounds the group.

Laboratory training, used with capstone groups, has mixed effects, in net negative. Within those capstone groups themselves it seems to have resulted in less supportiveness among members, and a more task-flavored stance by the managers. For the whole system, this treatment package produced a general deterioration in climate and in supportiveness, which seems to have countered whatever it might have accomplished by way of improved problem-solving.

The finding that superordinate support at the outset of an activity is independently important has added meaning when we consider the fact that laboratory training appears to lead to a reduction in supportiveness. It may well be that at least a portion of this treatment's difficulties stem from a combination of these facts. Stated in perhaps overgeneralized fashion, laboratory training may well fail out as a treatment with these capstone groups because it produces a decline in the very thing which successful efforts at lower levels require as a prerequisite. Even more, there is the possibility, observed in the results, that it leads to the opposite of its intended outcome: managers, having attained an in-depth experience are now more keenly aware of their importance as managers and therefore become <u>less</u>, not more, sensitive to the needs of their subordinates and <u>more</u>, not less, task-masters in their customary behavior.

Task Process Consultation seems to have been associated with deterioration in some areas and no change in others.

Data Handback, while generally positive in impact, seems to have had little capability for handling the climate change problem and suffers somewhat as a result.

No Treatment is, as we might expect, the worst of the lot.

An interesting outcome is the finding that leadership processes within groups and organizational climate outside of and enveloping groups are coordinate, not cause and effect, conditions. Both appear to be affected by treatment, and both appear to be affected by some events or conditions of considerable potency other than treatment.

Related to this, there is at least some evidence to support the notion that change in climate relates to change in superordinate goal emphasis, work facilitation, and interaction facilitation. Stated in simpler terms, what is judged by lower echelons to be a change in organizational climate may be largely the appearance in their work world of changed conditions stemming from different team, task, and motivational leadership practices within higher echelon groups.

One finding stands as a possible warning signal for development efforts. The finding that superordinate support at Time 1 (prior to the intervention) "causes" climate for subordinate groups at Time 2 at least raises the possibility that the intervention strategies under consideration depend in some measure for success upon the prior presence of that quality. This issue deserves a research attention not possible within the present report.

The present findings would also appear to shed light upon yet another issue of organizational change. Katz and Kahn have, in the present writer's view, correctly noted that organizations are social systems and that change efforts, to be effective, must result in change in system variables. They have also stated the opinion that many of the currently well known change techniques, such as those forming the treatments in the present study, are inadequate to that systemic purpose because their application focus is the group or individual, not the system. (Katz & Kahn, 1966)

However, the data from the present study would tend to contradict this assessment: there are at least some grounds for concluding that organizational climate (which we assume represents a set of systemic properties) changes as a result of the treatment's effects upon higher-echelon groups. If so, proper sequencing of activities to attain systemic impact becomes a critical consideration in the planning of any change project.

On another issue, the writer came to this present study with his share of values and biases. He shares with many of his colleagues, but not with all, the belief that development efforts which collect and use, if only as benchmarks, rigorous quantitative data about the functional properties of the organizations they propose to change are better, safer, and more efficient than those which do not. That the findings go some measure toward supporting this belief is a source of some reassurance to him, but may be cause for their being suspect in the minds of those of different initial persuasion. The writer can only assure the reader that he has been constantly aware of his personal biases and has attempted scrupulously to analyze and present the data fairly. He is satisfied in his own mind that the results turned out as they did because they are truly that way, not because he would have preferred them to be so.

All of this is prelude to what seems to be necessary in this concluding portion of the report, an exploration of the implications of these findings for development practice more generally. First, it seems worthwhile to note that none of the intervention strategies studied in the present report follow what the writer terms a "medical" model or what Schein has termed a "Doctor-Patient" model. (Bowers, 1970; Schein, 1969) In none of them were various treatments selectively applied to different groups within a system upon the basis of expert differential diagnosis and prescription.

Instead, each setting consisted of a more or less universal application of an intervention package. Capstone groups received non-feedback or feedback activities, not because their need was in any way differentially diagnosed as calling for it, but because the change agent's method of operation included, if not required it.

It may well be, therefore, that an entirely different pattern of outcomes would have occurred had treatment activities been differentially matched to group ills by an expert diagnosis. Laboratory training, for example, may be quite successful in some kinds of problem situations. Survey Feedback may be a disastrous selection in certain definable instances. The thrust of the present findings, however, is that Survey

Feedback and Interpersonal Process Consultation succeed reasonably well as general application techniques, whereas Laboratory Training and what we have termed "Task Process Consultation" do not.

A final issue must certainly be that of comparative cost, coverage or inclusiveness, and required skill. Both Laboratory Training and Process Consultation are highly skilled activities whose practitioners arrive at an acceptable level of competence only by a great deal of training, apprenticeship, and exposure. Competent practitioners are in scarce supply and are necessarily rather expensive.

Table 15 presents the writer's own estimate of the direct costs involved in each of three treatments for a 2000-man, 200-group organization. It is apparent from these figures that survey feedback is considerably less expensive, for comparable organizational coverage, than are the other treatments. The response, of course, is that all groups in an organization are seldom given the non-feedback treatments. These activities are, instead, reserved for some proportion of groups well up in the hierarchy. Still, involvement of the whole organization seems more likely to lead to lasting change, and, when it is undertaken, something akin to a cost-benefit ratio should be considered.

Summary

An earlier, more global report pointed to the general importance of treatment (intervention strategy) and organizational climate and correlates of change in supervisor's and subordinates' leadership behaviors. This present study investigates this issue in some detail, addressing itself to two major questions:

(1) Do treatments produce organizational change? If they do, what are their comparative magnitudes and directions?

(2) Is change in organizational climate itself an effect of treatment, an independent, additional cause of behavior change in work groups, a conditioner of change success, or a coincidental variable?

Table 15

Comparative Requirements
and Costs of Intervention Techniques: An Illustration
(For 2000-man organization, 200 Groups)

Technique	Assumptions	Change Agent Man Days Required	Change Agent Salary Cost (@ $20,000 Per year)	Other Costs Incurred	Total	Cost per Member
Survey Feedback	3 4-hour meetings per group	300	$ 23,000	Data Tabs = $4,000 @ $2 per person	$ 27,000	$ 14
Laboratory Training	1 5-day Lab per group, 1 Change Agent per group	1,000	$ 76,800	Living Expenses = $600,000 @ $300 per person	$676,800	$338
Process Consultation*	1/4 time for 6 months per group	6,400	$492,200	None	$492,200	$246

*Both Interpersonal Process Consultation and Task Process Consultation are figured on same basis.

Data drawn from 868 work groups in 15 organizations are analyzed by a variety of statistical methods in an attempt to answer these questions. The results indicate that Survey Feedback and Interpersonal Process Consultation had generally positive impact upon behavior, particularly in the area of problem-solving, and that Laboratory Training and Task Process Consultation had either no or negative impact. Organizational climate is found to be a coordinate condition to work group behavior, rather than either cause or effect. Supportive behavior by upper management levels at the outset of a change project emerges as an additional, independent source of change success.

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