OD Techniques and Their Results in 23 Organizations: The Michigan ICL Study*

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Data collected by the Michigan Inter-Company Longitudinal Study from more than 14,000 respondents in 23 organizations are analyzed in terms of the organizational development treatments that intervened between pre- and postmeasures. Four "experimental" treatments (Survey Feedback, Interpersonal Process Consultation, Task Process Consultation, *and* Laboratory Training) *and two "control" treatments* (Data Handback *and* No Treatment) *are compared to determine their relative association with improved organizational functioning as measured by the Survey of Organizations questionnaire. The results indicate that* Survey Feedback *was associated with statistically significant improvement on a majority of measures, that* Interpersonal Process Consultation *was associated with improvement on a majority of measures, that* Task Process Consultation *was associated with little or no change, and that* Laboratory Training *and* No Treatment *were associated with declines. In addition, organizational climate emerges as a potentially extremely important conditioner of these results, with* Survey Feedback *appearing as the only treatment associated with substantial improvement in the variables of this domain.*

In 1966, staff members of the University of Michigan's Institute for Social Research launched a five-year program of organizational projects, the *Inter-Company Longitudinal Study* (ICLS). This ambitious under-

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taking addressed itself to a number of substantive questions of organizational behavior and change research within a framework containing the following features:

1. *Continuity of site* (over a period of one or more years);
2. *Use of a common survey instrument* (as a benchmark measure of the functioning of the human organization);
3. *Organizational development as a beneficial tool* (to increase payoff to participating firms and to ensure the presence of constructive movement for research purposes);
4. *Research on organizational change techniques* (to permit the acquisition of systematic knowledge about the comparative effect of a number of possible interventions).

After an initial year of instrument development, staff acquisition, and pilot projects, the main phase of the study began. The hopes and aims sketched in the four precepts listed above were in varying degrees brought to fulfillment. Continuity of site proved to be greater than has been the case in the great majority of previous studies: Most organizations remained committed to and involved in an ICLS project for at least two years. They did not, however, endure for the full five years (although some may well ultimately do so).

A common instrument, the Survey of Organizations questionnaire, was developed and refined. It has been used, in one of its editions, in each site and data collection wave. Most participating organizations underwent at least two measurement waves using that instrument, with some form of change, development, or intervention occurring in the interval between the two; some had as many as five successive measurements. Relevant portions of this instrument generated the substance of the data examined in this article.

All organizations, with the exception of a very few in which no action plan was intended and in which none evolved, undertook some program of organizational development; as we shall see, the specific nature of the activity varied from one site to another.

Organizational change research is an uncharted territory in many aspects, and the research staff has had, of necessity, to feel its way along quite gradually. Many of the findings are only now slowly entering into the professional purview. As the reader can imagine, content analysis of five years of documents and multivariate analysis of a mountain of quantitative data is a lengthy, difficult task. I wish to forewarn the reader

who anticipates a detailed chronicling of intervention strategies that I will present less of that than he (or I) might wish. Instead, my present purpose is an overview of results from this study's large number of cases and their possibilities for comparative analysis.

At the end of five years, work in some form has been underway in 31 organizations (plants or separate marketing regions) in 15 companies. Data from 23 of these organizations in 10 companies are included in the present analysis. Six organizations, in four companies, were excluded because no repeat measurements have as yet been obtained. One company was excluded because it was primarily involved in an ancillary activity unrelated to organizational research and change of the kind considered here.

The 23 organizations comprise 14,812 persons, in white-collar and blue-collar positions, and constitute a wide array of industries—paper, chemicals, petroleum refining, aluminum, automobiles, household products, and insurance, in the areas of continuous process manufacturing, assembly-line manufacturing, components fabrication, marketing, and research and development.

CHANGE TREATMENTS TO BE COMPARED

Six forms of intervention can be identified as having occurred in one or more of the 23 organizations. For the most part they 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 been the source of conflicts between the change agents who used them and to have been regarded 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.[1]

Many persons mistakenly believe that survey feedback consists of a rather superficial handing back of tabulated numbers and percentages, and little else.

On the contrary, when employed with skill and experience, it becomes a sophisticated tool for using the data as a springboard to development. In the sites classified as having received *survey feedback* as a change treatment, this treatment formed the principal substance of the interven-

[1] See Bowers and Franklin (1972) for a discussion of the theoretical rationale for this treatment.

tion. Data were tabulated for each group engaged in the project, as well as for each combination of groups that represented an area of responsibility in the organizational pyramid. Data appeared in the format shown in Figure 1.

Each supervisor and manager received a tabulation of this sort containing data from the responses of his own immediate subordinates; the measures, descriptions of their basis, and meaning; and suggestions concerning their interpretation and use. A resource person, from ISR or the client system's own staff, usually counseled privately with the supervisor-recipient about the contents of the package and then arranged a time when the supervisor could meet with his subordinates to discuss the findings and their implications. The resource person ordinarily agreed to attend that meeting in order to help the participants with the technical aspects of the tabulations and the process aspects of the discussion.

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

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 helps an organization's groups move from a discussion of the tabulated perceptions, through a cataloguing of their implications, to commitment to solutions to the problems identified and defined by the discussion.

This technique has long been associated with organizational development and change work conducted by the Institute for Social Research and was considered at the outset of this study as likely to constitute a more or less standard tool. That it was not as universally employed as this statement might suggest forms the basis for its identification as a distinct treatment.

FIGURE 1.

Typical Format of Survey Feedback Tabulation

****
* GROUP NUMBER 99999 *
****

	PERCENTAGE DISTRIBUTION						STD.	
ITEM	(1)	(2)	(3)	(4)	(5)	MEAN	DEV.	*N*
7 CO USES NEW WK METHODS	8	0	17	42	25	3.82	1.11	11
8 CO INTEREST IN WELFARE	8	8	17	25	33	3.73	1.29	11
22 DISAGREEMTS WKED THRU	0	8	50	17	8	3.30	0.78	10
38 OBJECTIVS SET JOINTLY	17	8	25	17	17	3.10	1.37	10

Interpersonal Process Consultation

This treatment bears at least some resemblance to what Schein (1969) has termed "Process Consultation." 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 on his catalyzing a process of surfacing data in areas customarily not plumbed in work organizations (attitudes, feelings, individual needs, reasons for conflict, informal processes, and so on). 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 sometimes undertaken with members singly, but more often in natural workgroupings. Human, rather than technical, processes are generally assumed to have primacy for organizational effectiveness.

Task Process Consultation

This treatment is oriented very closely to task objectives and the specific interpersonal processes associated with them. A change agent who adheres to this pattern typically begins by analyzing a client unit's work-task situation privately, after extensive interviews concerning its objectives, potential resources, and the organizational forces blocking its progress. He consults privately with the supervisor at frequent intervals to establish rapport and to gain 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 and serves as a process observer, but also uses role playing, some substantive inputs at timely points, as well as nondirective counseling techniques, to guide the discussion toward commitment to desired courses of action.

Laboratory Training

As practiced within ICLS projects, this intervention technique more nearly approximates the interpersonal relations laboratory than the intrapsychic or personal growth session. A "family group" design was followed almost exclusively, with the entire laboratory lasting from three days to two weeks, depending upon circumstances and organizational schedule requirements. Sessions were ordinarily conducted at a motel or resort away from the usual work place. Experiential exercises (e.g., the NASA Game or "Moon Problem," the Ten-Dollar Exercise, the Tower-Building Problem) were interspersed with unstructured discussion time. During the years of the study, a number of terms were used by those conducting the training

to describe it. Initially it was referred to as "T-Group Training"; in later years it was termed "Team Development Training," or simply "Team Training." The content, however, remained relatively constant in kind, if not in exact substance. The change agents who conducted the training were not novices; on the contrary, they had had many years of experience in conducting it and were judged by those familiar with their work to be competent.

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 relevant managers and supervisors. 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.

Survey Feedback was earlier described as the "principal substance of the intervention" in sites labeled as such in the study. It was also stated that some form of tabulated survey data was returned to someone in all sites. Both statements are true. A system is classified in this article as having received Survey Feedback as its treatment when survey feedback, *and that alone* was used, both with capstone groups (those groups at the top management rungs of the organizational ladder) and with all groups below them which were involved in the project. Where Interpersonal Process Consultation, Task Process Consultation, or Laboratory Training are the reported treatments, the principal intervention *with the capstone groups* consisted of that particular treatment. These groups, along with all other participating groups in their organization, also received tabulated data, and ordinarily spent a varying amount of time discussing it.[2] Change agents who used these treatments characteristically 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 nonfeedback

[2] All items were in each instance returned to group participants. Thus, although selective attention may have occurred, treatments do not differ in the particular data returned.

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. Data 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 often more attracted to the more glamorous activities modeled by the external change agent.

Thus events, schedules, and the personal style preference of the change agents combined to produce a contrast between sites in which Survey Feedback was truly and thoroughly conducted at all levels and without other treatments, and sites in which a rather half-hearted effort at data discussion was overshadowed by other treatments with capstone groups.

Finally, a word must be said about the way in which organizations came to receive different treatments. In a true experiment, assignment to treatment category is random. No pretense can be made that a purely random assignment procedure was employed in this multicompany study. Still, if not random, it appears to have been less than systematic. Change treatment was determined on a basis having little, if anything, to do with the nature of the client system; it was instead determined by change agent preference, i.e., by the preferred and customary techniques of the change agent assigned to the site. In short, treatment was determined by change agent selection, which was in turn determined by sheer availability at the time of contract.

MEASUREMENT AND ANALYSIS PROCEDURES

The dependent variables in the analyses reported below are measures of organizational functioning obtained from repeated administrations (ordinarily one year apart) of the Survey of Organizations questionnaire (Taylor & Bowers, 1972), particularly the 16 critical indices that constitute the core of that instrument. The content of this instrument was originally developed from the many studies which ISR had conducted over the years prior to 1966. Subsequently the content of this questionnaire has been subjected to a number of analyses, employing both smallest-space analysis and hierarchical cluster analysis, which suggest that the total may really comprise the limited number of multi-item indices employed in this present study. Six are measures of the organizational conditions that surround any particular focal group to form the environment within which it must live. These conditions, outside and especially above a particular manager's group, are really nothing more than the perceived accumulated effects of the ways in which other groups function.

Helpful or harmful policies, for example, are the output of higher-echelon groups with good or poor leadership, respectively. We call these accumulated effects *organizational climate*, and attach to that term essentially the same meaning given it by Evan (1968), i.e., a concrete phenomenon reflecting a social-psychological reality, shared by people related to the organization, and having its impact on organizational behavior. We do *not* imply by the term the alternative meaning sometimes given it, that of a general flow of behavior and feeling within a group (cf. Halpin, 1966).

Four other indices measure managerial leadership behavior of an interpersonal (support and interaction facilitation) and task (goal emphasis and work facilitation) nature. Four similar measures tap the peer leadership area, and together these eight measures reflect what has come to be called the "Four-Factor" theory of leadership (Bowers & Seashore, 1966; Taylor & Bowers, 1972). The remaining two measures tap Group Process and Satisfaction, respectively.

High scores on these 16 measures, for any organization or group, are considered to be reasonably reflective of a general state of organizational effectiveness; lower scores, of a less effective state. The content of the measures, like their place in a conceptual scheme, is based upon the Likert "meta-theory" of the human organization as a social system (Likert, 1961, 1967), which itself represents an integration of a large array of empirical findings. The questionnaire has been subjected to extensive analyses, and the healthy and inquisitive skeptic is directed to Taylor and Bowers (1972), where both reliability and validity data are presented in considerable detail. For present purposes, a brief summary of content and reliability is presented in Table 1. Evidence concerning validity is perhaps best summarized by the following statement, taken from the basic reference:

> Fairly clear evidence exists that the *Survey of Organizations* measures relate appropriately to both efficiency and attendance criteria. Relationships to efficiency extend across all four time periods and reach levels as high as .80. Relationships to attendance attain only slightly lower levels, and, where data are available, show every sign of extending across all time periods.[3]
>
> Relationships to other criteria present patterns which are far less definitive. In the case of Product Quality, no clear pattern emerges at all. In

[3] A "time period" is a period of approximately four consecutive months; four such periods, covering an 18-month time span, are used in the validation analyses.

TABLE 1.
Summary of Content and Reliability of 16 Indices of The Survey of Organizations Questionnaire

Area–Measure	Description	No. of Items	Internal Consistency Reliability Coefficient
ORGANIZATIONAL CLIMATE			
Human Resources Primacy	Whether the climate indicates that people, their talents, skills, and motivation are considered to be one of the organization's most important assets.	3	.80
Communication Flow	Whether information flows effectively upward, downward, and laterally in the organization.	3	.78
Motivational Climate	Whether conditions and relationships in the environment are generally encouraging or discouraging to effective work.	3	.80
Decision-Making Practices	How decisions are made in the organization: whether they are made effectively, at the right levels, and based upon all the available information.	4	.79
Technological Readiness	Whether the equipment and resources are up to date, efficient, and well maintained.	2	.58
Lower-Level Influence	Whether lowest-level supervisors and employees feel they have influence on what goes on in their department.	2	.70
MANAGERIAL LEADERSHIP			
Support	Behavior toward subordinates that lets them know they are worthwhile persons doing useful work.	3	.94
Interaction Facilitation	Team building, behavior that encourages subordinates to develop close, cooperative working relationships with one another.	2	.89

TABLE 1 (Cont.)

Area–Measure	Description	No. of Items	Internal Consistency Reliability Coefficient
Goal Emphasis	Behavior that stimulates a contagious enthusiasm for doing a good job (*not* pressure).	2	.85
Work Facilitation	Behavior that removes roadblocks to doing a good job.	3	.88
PEER LEADERSHIP			
Support	Behavior by subordinates toward one another that enhances their mutual feeling of being worthwhile persons doing useful work.	3	.87
Interaction Facilitation	Behavior by subordinates toward one another that encourages the development of close, cooperative working relationships.	3	.90
Goal Emphasis	Behavior by subordinates toward one another that stimulates a mutually contagious enthusiasm for doing a good job.	2	.70
Work Facilitation	Behavior that is mutually helpful; helping each other remove roadblocks to doing a good job.	3	.89
GROUP PROCESS	How the group functions; does it plan and coordinate its efforts, make decisions and solve problems, know how to do its job, share information; is it motivated to meet its objectives, is it adaptable, is there confidence and trust among its members?	7	.94
SATISFACTION	Whether employees are satisfied with economic and related rewards, adequacy of their immediate supervisor, effectiveness of the organization, compatibility with fellow employees, present and future progress within the organization, and their job as a whole.	7	.87

the Human Cost area, organizational climate seems to have appropriate and significant relationships to all three measures available for analysis: minor injuries, physical health, and grievance rate (Taylor & Bowers, 1972).

Two successive measures are considered simultaneously for the analyses to be reported here: those preceding and following (a year later) the occurrence of a particular change treatment. In certain instances, index measures for the premeasure or the postmeasure are considered separately, and are therefore reported as arithmetic means on a five-point Likert scale (high score = desirable condition, low score = undesirable condition). In other instances, change itself is the focal concern; for these purposes, the first (or pre-) measures have been subtracted from the second (or post-) measures. Thus a "positive" change score indicates enhanced effectiveness; a "negative" score, deterioration.

The balance of the article considers findings which, within the confines of the ICLS setting, help answer the following research questions:

1. *Were the treatments differentially effective in producing change in organizational functioning, as measured by the Survey of Organizations questionnaire?*
2. *What is the relationship between change in organizational climate and the effects of these various treatments?*

RESULTS

We begin with a consideration of change or gain scores for each of the 16 critical indices for each treatment, presented in Table 2. The reader may note that, for each treatment, two sets of scores are given for each variable category. One comparison is labeled "Whole Systems," and refers to grand response mean gain scores for all respondents combined within organizations receiving that treatment for the first and second waves of measurement (ordinarily one year apart). The other comparison is labeled "Capstone Groups" and refers, within the Interpersonal Process Consultation, Task Process Consultation, and Laboratory Training treatments, to persons in groups that actually received that particular treatment. For comparison purposes, persons in groups of a similar nature (ordinarily the top management groups) are presented for the Survey Feedback, Data Handback, and No Treatment clusters.

The findings presented in Table 2 may be summarized as follows:

1. *Laboratory Training* is associated with negative change in organizational climate for both capstone groups and systems as a whole.

TABLE 2.

Changes in Questionnaire Indices, from First to Second Survey Waves, by Variable and Change Treatment

Area–Measure	Treatment											
	Laboratory Training		Interpersonal Process Cons.		Task Process Cons.		Survey Feedback		Data Handback		No Treatment	
	Caps. Gps N = 116	Whole Sys. N = 3417	Caps. Gps N = 12	Whole Sys. N = 3788	Caps. Gps N = 38	Whole Sys. N = 1847	Caps. Gps N = 85	Whole Sys. N = 3893	Caps. Gps N = 55	Whole Sys. N = 932	Caps. Gps N = 51	Whole Sys. N = 935
Organizational Climate												
Hum. Resources Prim.	−.42*	−.18*	+.10	−.02	−.04	−.17*	+.35*	+.15*	+.13	−.05	−.59*	−.61*
Communication Flow	−.19*	−.12*	+.10	+.12*	+.16	−.06	+.22*	+.15*	+.23*	−.12*	−.02	−.06
Motiv'l Conditions	−.13*	−.12*	−.22	+.02	+.03	−.04	+.24*	+.01	+.04	−.16*	−.09	−.09
Dec-Making Prac's	−.15*	−.13*	−.17	+.03	+.21*	−.14*	+.30*	+.17*	+.04	.00	−.32*	−.52*
Tech. Readiness	−.01	+.13*	−.25	−.07	+.02	−.11*	+.39*	+.05	+.02	−.08	NA†	NA†
Lower-Level Infl.	+.03	−.10*	−.23	+.05	+.11	+.03	+.26*	+.01	−.33*	−.18*	−.47*	−.23*
Managerial Leadership												
Support	−.10	−.11*	+.31	+.11*	−.11	−.19*	+.07	+.18*	+.18	+.01	−.16	−.32*
Inter. Facilitation	−.04	+.02	−.05	+.20*	+.07	.00	+.11	+.36*	+.27*	+.15*	+.21*	.00
Goal Emphasis	+.11	−.06	−.13	+.08	+.09	−.06	.00	+.17*	+.21*	+.06	−.11	−.11*
Work Facilitation	+.12	−.08	+.29	+.21*	−.09	−.05	+.17	+.27*	+.33*	+.15*	−.09	−.16*
Peer Leadership												
Support	−.20*	−.11*	−.24	+.02	+.17	−.13*	+.29*	+.06	−.01	+.03	−.19*	−.23*
Inter. Facilitation	+.09	−.04	−.07	+.12*	+.08	−.06	+.30*	+.20*	+.06	+.20*	−.04	−.11*
Goal Emphasis	−.05	.00	+.08	+.12*	+.22	−.02	+.21*	+.14*	+.15	+.12*	+.04	−.12*
Work Facilitation	+.07	+.03	−.17	+.15*	+.04	−.03	+.36*	+.19*	+.09	+.20*	−.02	−.08
Group Process	+.20*	+.27*	−.05	+.01	−.03	−.06	+.28*	+.21*	−.14	−.21*	NA†	NA†
Satisfaction	−.09	−.15*	−.04	+.04	+.32*	−.03	+.17*	+.09	+.07	−.02	−.07	−.23*

* Change large enough to be statistically significant at or beyond .05 level of confidence.

† Measures omitted in edition of questionnaire used in these sites.

Although group process improves at both levels, peer support declines for capstone groups, and both peer and managerial support decline for the systems in which these groups are located, as does overall satisfaction.

2. *Interpersonal Process Consultation* contains so few cases within capstone groups, and the changes are of such a (low) magnitude, that firm conclusions cannot be drawn. For their systems *in toto*, however, 7 of the 16 measures reflect significant, positive changes, largely in the managerial and peer leadership areas. Organizational climate, group process, and satisfaction measures change scarcely at all.
3. *Task Process Consultation* is associated with little significant change among capstone groups; only two measures (Decision-Making Practices, Satisfaction) change, both in a positive direction. For whole systems, however, all significant changes are negative, and a majority of them occur in the area of organizational climate. Considering that the two measures of support (managerial and peer) also show a significant decline, the pattern shows at least some resemblance to that observed in conjunction with Laboratory Training.
4. *Survey Feedback* reflects positive and significant changes for capstone groups in every area except managerial leadership. For whole systems, 11 of the 16 measures show positive, statistically significant change. No measure, for either capstone groups or whole systems, reflects negative change.
5. *Data Handback* is associated in capstone groups with improved communication flow but a decline in the amount of influence attributed to lower organizational levels. Managerial leadership generally improves in these groups; all other measures show essentially no change. For their systems *in toto*, organizational climate is viewed as becoming worse, while peer leadership and some aspects of managerial leadership improve.
6. *No Treatment*, as a "treatment," is associated with general negative change for capstone groups and whole systems.

There are, therefore, clear differences in reported change among treatment categories. It would be premature, however, to discuss substantive implications of these results before considering the possible impact of several methodological or situational factors.

TABLE 3.

Intertreatment Differences in Premeasures

Area–Measure	F	p	Treatments—Capstone Groups ($df = 5,350$) Lab. Training	Interpersonal Process Consult.	Task Process Consult.	Survey Feedback	Data Handback	No Treatment
Organizational Climate								
Hum. Resources Prim.	10.97	.001	4.00	3.46	3.92	3.80	3.46	4.46
Communication Flow	4.94	.001	3.74	3.28	3.74	3.75	3.33	3.93
Motiv'l Conditions	6.83	.001	3.92	3.64	3.98	3.86	3.47	4.20
Dec-Making Prac's	6.94	.001	3.28	3.11	3.49	3.53	2.90	3.60
Tech. Readiness	2.09	N.S.	3.64	4.50	3.86	3.69	3.64	N.A.
Lower-Level Infl.	3.34	.01	2.96	2.54	2.97	2.96	2.86	3.43
Managerial Leadership								
Support	5.02	.001	4.17	4.05	4.26	4.45	3.85	4.42
Inter. Facilitation	8.93	.001	3.99	3.49	4.12	4.11	3.25	3.90
Goal Emphasis	5.73	.001	4.14	4.08	4.41	4.49	3.85	4.40
Work Facilitation	6.53	.001	3.38	3.21	3.68	3.70	3.10	3.79
Peer Leadership								
Support	5.34	.001	4.09	4.06	3.76	3.91	3.87	4.38
Inter. Facilitation	2.55	.05	3.45	3.17	3.31	3.53	3.16	3.71
Goal Emphasis	1.70	N.S.	3.63	3.46	3.38	3.61	3.44	3.78
Work Facilitation	1.69	N.S.	3.00	3.19	3.14	3.21	2.96	3.32
Group Process	5.54	.001	3.52	4.00	3.74	4.00	3.63	N.A.
Satisfaction	4.68	.001	3.99	3.88	3.99	4.22	3.78	4.32

			Treatments—Whole Systems (df = 5, inf.)					
Organizational Climate								
Hum. Resources Prim.	236.78	.001	3.00	3.28	3.65	3.17	2.93	4.01
Communication Flow	110.09	.001	2.94	2.98	3.27	2.94	2.96	3.57
Motiv'l Conditions	99.25	.001	3.23	3.31	3.56	3.25	3.10	3.77
Dec-Making Prac's	164.16	.001	2.73	2.84	3.13	2.68	2.47	3.38
Tech. Readiness	342.60	.001	2.80	3.47	3.70	3.37	3.53	N.A.
Lower-Level Infl.	61.81	.001	2.56	2.48	2.68	2.50	2.37	3.01
Managerial Leadership								
Support	83.15	.001	3.78	3.84	4.04	3.82	3.77	4.44
Inter. Facilitation	33.44	.001	3.20	3.20	3.37	3.11	2.98	3.48
Goal Emphasis	50.52	.001	3.72	3.75	3.86	3.66	3.57	4.16
Work Facilitation	75.13	.001	3.15	3.19	3.32	3.17	2.99	3.74
Peer Leadership								
Support	51.97	.001	3.84	3.83	3.89	3.73	3.80	4.20
Inter. Facilitation	44.98	.001	3.16	3.18	3.19	2.96	2.91	3.40
Goal Emphasis	41.19	.001	3.30	3.36	3.36	3.21	3.15	3.60
Work Facilitation	34.65	.001	3.10	3.20	3.12	2.98	2.85	3.22
Group Process	95.33	.001	3.28	3.56	3.59	3.63	3.56	N.A.
Satisfaction	61.65	.001	3.60	3.73	3.74	3.68	3.51	4.07

Regression Toward the Mean

One such factor is the familiar argument concerning "regression toward the mean." Although clients were assigned on a staff-availability basis, it is conceivable that client systems were assigned to change agents (and therefore to treatments) in a way which coincided with their initial positions on the characteristics measured. If so, and if regression toward the mean accounts for the observed results, we would expect those initially below the mean to exhibit positive change (toward the mean) and those initially above the mean to exhibit negative change (also toward the mean). We would also expect them to reflect significant differences at the outset; that is, to have been different from one another in the premeasure in ways congruent with a regression explanation. Table 3 presents an analysis of variance test of the differences among treatment categories at the time of the premeasure, and Table 4 shows a simple categorization of significant changes in terms of their consistency or inconsistency with a regression hypothesis.

There are clearly significant differences at the outset. Inspection of the treatment means shows that these differences do not, however, coin-

TABLE 4.
Consistency of Significant Changes with a Regression Hypothesis, by Change Treatment

Treatment	No. Consistent with Regression Hypothesis	No. Inconsistent with Regression Hypothesis
Laboratory Training		
Capstone	1	5
Whole Systems	1	9
Interpersonal Process Consult.		
Capstone	0	0
Whole Systems	0	7
Task Process Consult.		
Capstone	0	2
Whole Systems	3	2
Survey Feedback		
Capstone	0	12
Whole Systems	0	11
Data Handback		
Capstone	4	1
Whole Systems	5	4
No Treatment		
Capstone	1	4
Whole Systems	10	0

cide with what would be expected if some form of regression toward the mean were to account for the contrasting results obtained with the various treatments. Task Process Consultation sites, which began the effort around mid-range of the comparative distribution, show scarcely any change, and that which does occur is mixed as to its possible regression effects. Interpersonal Process Consultation and Data Handback treatment sites did, in fact, begin the change process from a somewhat lower scale point. Although capstone groups in Data Handback reflect a pattern in Table 4 that might suggest consistency with a regression hypothesis, the pattern for whole systems in this treatment is mixed, and that for whole systems in Interpersonal Process Consultation is clearly contrary to the hypothesis.

The contrary pattern presented by both Laboratory Training and Survey Feedback is even stronger. Laboratory Training, which began below the mean of the array and which would therefore be expected to show improvement, in fact declined. Survey Feedback, which started above the array mean and would be expected on a "regression toward the mean" hypothesis to decline, showed improvement.

Only in the case of whole systems experiencing No Treatment is there some substantial evidence for the regression hypothesis. In terms of the most striking differences in changes associated with various treatments it therefore seems reasonable to reject the hypothesis that they represent regression-toward-the-mean, methodological artifacts.

Organizational Climate as a Mediating Factor

Still another possible explanation of the findings centers around the role played by organizational climate in conjunction with attempts at intervention. A quite plausible argument can be made (and indeed was made at the time, particularly by individuals connected with the Laboratory Training sites) that basically autocratic and punitive practices and policies contribute to an organizational climate that masks the true effects of the change treatment. Thus, the argument goes, if organizational climate could be controlled, the effects of the treatment on group member leadership behavior would show themselves to be positive.

What could not be controlled in the course of the projects can be controlled at least reasonably well by an analytic strategy employing Multiple Classification Analysis, which produces estimates of the effect of each of several predictors alone, after controlling for the effects of all others (Andrews, Morgan, & Sonquist, 1967). Table 5 shows change scores

TABLE 5.

Mean Workgroup Change Scores, Adjusted To Remove Effects of Organizational Climate Change, by Leadership Measure, by Treatment

	Treatment											
	N = 167 Lab. Training		N = 298 Interpersonal Process Consult.		N = 109 Task Process Consult.		N = 112 Survey Feedback		N = 98 Data Handback		N = 104 No Treatment	
Area–Measure	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.
Managerial Leadership												
Support	−.15*	−.04	+.12*	+.04	−.25*	−.22	+.13	+.05	+.03	+.07	−.25*	−.18*
Inter. Facilitation	+.07	+.20*	+.23*	+.13*	+.03	+.07	+.43*	+.33*	+.14	+.18*	+.05	+.14*
Goal Emphasis	−.02	+.09	+.13*	+.05	−.09	−.06	+.14	+.06	+.06	+.09	−.08	−.01
Work Facilitation	−.01	+.11*	+.22*	+.13*	−.09	−.05	+.24*	+.15	+.16*	+.21*	−.13*	−.05
Peer Leadership												
Support	−.17*	−.11*	+.06	+.01	−.18*	−.17*	.00	−.06	+.07	+.08	−.22*	−.17*
Inter. Facilitation	−.01	+.11	+.16*	+.06	−.09	−.06	+.17*	+.08	+.20*	+.24*	−.12	−.03
Goal Emphasis	−.04	+.05	+.15*	+.08*	−.06	−.04	+.10	+.04	+.16*	+.20*	−.10	−.03
Work Facilitation	+.05	+.15*	+.24*	+.16*	−.10	−.08	+.25*	+.18*	+.22*	+.26*	−.05	+.02

* Statistically significant at .01 level of confidence.

for the eight leadership indices, adjusted to remove the effects of organizational climate change.[4]

The results indicate considerable merit to the argument that the impact of a treatment is in part contingent upon the organizational climate in which it occurs, particularly in the case of Laboratory Training. The significant decline in managerial support present in the unadjusted scores disappears when adjustment is made for organizational climate, and the changes for managerial interaction facilitation and work facilitation, as well as for peer work facilitation, become positive. Only peer support remains significant and negative, although a decline in magnitude is apparent there as well.

Data Handback also benefits somewhat from controlling for level of organizational climate, with previously significant, positive changes increasing slightly in magnitude, and one additional measure attaining significance.

The remaining treatments (Interpersonal and Task Process Consultation, Survey Feedback, and No Treatment) show slight reduction in effects as a result of controlling for the effects of organizational climate.

SPURIOUS EFFECTS IN SURVEY FEEDBACK

An additional issue potentially affecting interpretation must be at least acknowledged before discussion of the overall implications of the findings. As an intervention technique, Survey Feedback usually employs the same instrument as a development tool that it uses to measure changes in the dependent variables. Therefore, the argument may be made, the results are likely to be confounded.

On reflection, this question breaks down into two separate issues: (a) the possibility that the feedback process subtly teaches organizational members how to respond to the questionnaire, and (b) the greater likelihood that issues tapped by the instrument will receive more attention during the work or change activities which intervene between pre- and postmeasures than will other issues.

The "subtle education" issue seems plausible on the surface, but with close examination proves less reasonable in the present setting. First, at least as employed within ICLS, questionnaires were administered by

[4] The technical report from which this analysis was drawn used workgroup means, not individual scores, as the analysis units. Thus the gain scores reported in Table 5 differ slightly from those reported in Table 2. The pattern, however, is substantially the same.

members of the ISR project staff, who literally took them to the sites and returned them to Ann Arbor. Large stocks of questionnaires left for scrutiny, memorization, or "boning up" were not available to member-participants. Second, the questionnaire contains over 100 items, and only a shorthand identification of the question stems appears on the computer print-out employed in feedback. Third, the tabulation sheets for any group or organization show considerable variation in response among members, as well as variation among the responses of any single respondent. Fourth, organizations of the type included in this study undergo a great deal of member rotation and turnover. Fifth, a substantial amount of evidence (not reported here) obtained from more detailed analyses within organizations reflects the construct validity of the measured changes. Changes in questionnaire indices relate differentially to one another in ways congruent with chronicled events in the project's history, with reports of change agents and top managers (obtained by content-analyzed interviews), and with performance measures from the operating records of the firm.

All in all, then, in order for the observed effects in the present study to represent a "subtle education" in how to respond, either an educative capability that would make organizational development itself obsolete or a conspiracy of organizational members so large and complex as to be mind-boggling would have had to occur. Consider: the invisible hand guiding such a process would have had to build into the memory banks of hundreds—often thousands—of persons (many of them relatively uneducated) exactly that correct combination of responses which would square with all or most of the appropriate comparisons internal to the data themselves, with data from operating records, and with events during the interim which had been flagged by project staff members. It would have had to accomplish this without inducing an undifferentiated, across-the-board rise in response positiveness, while taking into account a large percentage of members who were new to the setting. Finally, it would have had to arrange all of this some six to eight months after the overwhelming majority of persons within the organization had seen the instrument or any data tabulated from it!

The second problem, that greater attention is likely to be paid during the intervention to issues reflected in the survey rather than to issues not reflected in the survey, is not to be denied, but rather acknowledged. In its most basic form, this is not a "problem" (in the sense of something which distorts or obfuscates). Instead, it is the heart of the change process

for any system attempting to adapt to changes in its environment by a process of information inputs concerning the effect of mid-course corrections. This so-called problem appears in any change treatment and any evaluation or self-monitoring system geared to corrective input short of ultimate survival or destruction.

Having said this, we must also acknowledge that a measuring instrument fails to the extent that it is parochial in content. It may well be, for example, that the questionnaire used in this study omits content areas of great significance for organizational effectiveness—areas which are targeted by non-Survey Feedback treatments. If that is the case, however, it becomes an error of omission, not of commission. Errors of commission only appear if the instrument or the meta-theory on which they are based are themselves invalid. To the extent that the questionnaire taps what it purports to tap, and to the extent that those characteristics *do* relate to valid outcomes, its use as an assessment device is appropriate.

THOUGHTS ABOUT THE IMPLICATIONS OF THESE FINDINGS

Although these findings emphasize the differences present among the several treatments, all the application methods used in the present study appear to be quite climate-impacted. If the organizational climate is not changing positively, none of the treatments show any likelihood of substantially enhancing supportive behavior, whether by managers or by peers, or of enhancing goal emphasis by managers. Similarly, the problem-solving behavioral combination of interaction facilitation and work facilitation, as well as mutual goal emphasis by peers, seems climate-prone, in the sense that it is enhanced by positive shifts in climate, and harmed by negative shifts.

In the sites and projects included in the present study, Laboratory Training clearly suffers from an organizational climate that is *becoming* harsher and more barren.[5] This may, in fact, explain the discrepancy between findings in the present study and findings reported elsewhere: it may be that laboratory-like, experiential learning is successful in organizations whose climate is, or is becoming, positive (e.g., a Harwood or a TRW; cf. Marrow, Bowers, & Seashore, 1967; or Davis, 1967), but unsuccessful in organizations whose superstructure is, or is becoming, more autocratic and punitive.

[5] It is worth noting that it is the *change* in climate, not its original state, which seems impactful. Laboratory Training and Survey Feedback, for example, are almost identical in climate at the outset, but change differentially.

Survey Feedback, on the other hand, is the only treatment in the present study associated with large, across-the-board, positive changes in organizational climate. Controlling for these changes tends to *reduce* the raw, significant, and positive change observed in Survey Feedback sites for managerial and peer leadership variables. By way of contrast, Data Handback shows an increase, not a decrease, in positive change in managerial and peer variables when change in organizational climate is controlled statistically. In both treatments, the data format, content of the tabulation, and nature of the recipients are the same. Why, then, do we find a difference? The reason may be that the Survey Feedback process, in combination with the data, produces an attention to those issues related to organizational climate that must change if the system itself is to change. In fact, considering the intrinsic nature of the other treatments, it seems at least plausible that Survey Feedback is the only treatment of those considered which is likely to attend to these system-level issues in anything like a comprehensive form. Although the issue whether treatment itself effects climate change remains truly unanswered within these present data, a technical report (Bowers, 1971) investigates this particular problem and produces evidence to suggest that it does. In any event, more research on this question is needed; if treatments do not affect organizational climate positively or if other ways of accomplishing that end are not available, the present findings suggest that one would be best off following the rather barren practice of simply tabulating the data and handing them back!

Little more can be added at this point by way of interpreting the present findings. At the very least, they indicate that the different intervention strategies employed in ICLS had somewhat different outcomes. Beyond this, however, they add a degree of credence to the argument advanced by some that organizational change is a complex, systems-level problem in organizational adaptation, not merely an additive end-product of participation in particular development activities.

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A judicious man looks at statistics not to get knowledge, but to save himself from having ignorance foisted on him.

—THOMAS CARLYLE