

Impact of Management by Objectives on Organizational Productivity

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Goal setting, participation in decision making, and objective feedback have each been shown to increase productivity. As a combination of these three processes, management by objectives (MBO) also should increase productivity. A meta-analysis of studies supported this prediction: 68 out of 70 studies showed productivity gains, and only 2 studies showed losses. The literature on MBO indicates that various problems have been encountered with implementing MBO programs. One factor was predicted to be essential to success: the level of top-management commitment to MBO. Proper implementation starts from the top and requires both support and participation from top management. Results of the meta-analysis showed that when top-management commitment was high, the average gain in productivity was 56%. When commitment was low, the average gain in productivity was only 6%.

Recent survey studies indicate that management by objectives (MBO) is a widely used management system in both private- (O'Donnell & O'Donnell, 1983; Ruth & Brooks, 1982) and public-sector (Greiner, Hatry, Koss, Millar, & Woodward, 1981; Poister & Streib, 1989) settings. Experts have noted, however, that despite widespread use of MBO, the form of MBO programs that have been installed (Carroll, 1986) and the impact that MBO programs have had (Kondrasuk, 1981; Kopelman, 1986) vary considerably. Huge effects have been reported in some studies, and tiny effects have been reported in others. In a few studies, negative effects have been found.

One explanation for the variation in outcomes has been suggested by those who have studied the MBO implementation process (Carroll, 1986; Ivancevich, McMahon, Streidl, & Szilagyi, 1978; Kopelman, 1986; Latham & Yukl, 1975). Programs that are introduced with the high commitment of top management appear to have larger effects than those that begin with low commitment on the part of top management (Argyris,

1973; Hollmann, 1976; Ivancevich, Donnelly, & Gibson, 1976). No review study has systematically tested this hypothesis.

Such a test requires that comparisons be made of the results from studies that evaluated the impact of MBO programs that were introduced with different forms of implementation. In the present study, we used meta-analysis to evaluate the impact that different forms of program implementation have had on organizational productivity. The studies we examined differed in the level of top-management support and involvement. We tested the commitment hypothesis by comparing programs in which there was high commitment with programs in which there was low commitment.

There are two sources of theory about MBO. First, there is theory as to what processes are released by MBO and how each is supposed to work. Second, there is theory about how MBO is supposed to be implemented and why implementation might work poorly. Both are relevant and are considered in this article.

MBO was developed as a synthesis of three component processes: goal setting, participation in decision making, and objective feedback (Barnard, 1938; Drucker, 1954, 1976; Odiorne, 1976, 1986). In the following section, we discuss (a) the theory behind each process and (b) why productivity gain is predicted when any one process is used by itself. Studies in which productivity effects for each process were evaluated support each prediction. Because MBO capitalizes on all three processes, it too should cause large gains in productivity.

MBO's Three Component Processes

Goal setting is the fundamental process in an MBO program. Drucker has argued that organization objectives cannot be presumed "known, obvious, and given" (Greenwood, 1981, p. 226). Rather, setting objectives is a risk-taking process. Objectives must be continuously reviewed and revised (Drucker, 1976, p.

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19). As the centerpiece of day-to-day communications, goal setting increases productivity because it directs the attention and action of all organization members (Barnard, 1938, p. 231; Schleh, 1959, pp. 26–27) and mobilizes overall effort (Locke, 1968; Locke & Latham, 1990).

Participation in decision making promotes understanding throughout the organization (Drucker, 1976, p. 18). Managers who rely on only their own ideas are more like a one-person orchestra than a conductor of musicians (Barnard, 1948, p. 86). But with participatory input from lower levels, useful information that is known to subordinates is made known to top management. Awareness of alternative courses of action is increased and knowledge of the consequences of decisions is enhanced (Tannenbaum & Massarik, 1950, p. 413). Problems are found with the design of the work process and the methods necessary to attain work objectives. Periodic changes to work methods result: Job responsibilities are reallocated, lines of authority are redrawn, and technical systems are restructured (Jamieson, 1973, p. 498). Subordinates are made aware of top management's objectives, and top managers are made aware of problems involved with implementing the objectives they see as important.

Objective feedback is given by managers at the end of each period of evaluation to promote progress toward the objectives that have been set through participatory involvement and two-way discussion. Uncertainty about the standards that will be used to assess progress toward goal attainment is reduced. Positive recognition is forthcoming for objectives that have been met. For objectives that have not been met, a message is conveyed that the goal is still important. This message initiates a search for new work methods that may be more effective (Nadler, 1979).

Empirical Evidence

Research has verified the effectiveness of each component process. The effect of objective feedback on organizational productivity has been examined in many studies. Kopelman (1986) reviewed this body of evidence and found that all studies had positive outcomes. He concluded that objective feedback has always caused significant gains in productivity whenever the process has been evaluated.

Reviews of research on goal setting and participation in decision making also support MBO theory. In five quantitative reviews of studies in which the effects of goal setting on productivity were examined, goal setting consistently was found to increase productivity (Chidester & Grigsby, 1984; Guzzo, Jette, & Katzell, 1985; Latham & Lee, 1986; Mento, Steel, & Karren, 1987; Tubbs, 1986). A meta-analysis of studies in which the participatory process in different organization contexts was examined showed that participative decision-making processes also result in productivity gains (Miller & Monge, 1986).

Not everyone, however, believes that when participation alone is used productivity will improve. Some researchers argue that participation is successful only when used with goal setting (Locke & Latham, 1990; Pitts & Thompson, 1979, p. 25). In a full-fledged MBO system, goal setting and participation are combined in the same management program. Thus, even if participation works only when combined with goal setting, it

still ought to contribute to the positive effect that MBO has on the productivity of the whole organization.

Theory and evidence for each of MBO's component processes are thus consistent. Theory predicts positive effects for each process, and the research evidence supports these predictions. The direct evidence supporting each component process is strong indirect evidence that, as a combination of all three processes, MBO should also result in productivity gains.

Direct evidence also supports this prediction. Many managers have now had first-hand experience with MBO (Mali, 1986; Odiorne, 1981). Surveys have contrasted the experience of organizations that use MBO with the experience of organizations that do not (Ruth & Brooks, 1982). When statements of productivity from managers are analyzed, organizations with MBO are found to have better performance and improved productivity (McGregor, 1960; Moore & Staton, 1981; Poister & McGowan, 1984; Poister & Streib, 1989; Rettig & Amano, 1976; Varney, 1978).

MBO Implementation Process

Problems with implementing MBO programs have been reported by a number of researchers (Carroll, 1986, p. 308; Ford, 1979; French, Kast, & Rosenzweig, 1985, p. 471; Griffin & Moorhead, 1986, p. 438; Hollmann, 1976, p. 29; Ivancevich & Glueck, 1986, p. 303; Levinson, 1970; McConkie, 1979a, p. 472; Miner, 1988, p. 198; Reddin, 1971; Stanton, 1975; Szilagyi & Wallace, 1983, p. 582; Tosi & Carroll, 1968, p. 421; Winstead, 1979). Much of this literature can be interpreted in terms of variation in the level of top-management commitment to the MBO process and resultant differences in the nature of the program developed (Carroll, 1986; Kopelman, 1986; McConkie, 1979a, p. 472; Raia, 1974a; Ruth, 1979; Stein, 1975).

There are two patterns to these reports. In the happy reports there was strong support and active participation from top management. In the unhappy reports top management gave little support to the program and did not participate (Hollmann, 1976; Odiorne, 1976).

We identified two distinct dimensions to top management commitment. First, the emotional support provided by top management can vary from enthusiastic to skeptical disinterest. Second, top management may or may not participate in the MBO process. The ideal MBO design requires both high support and participation. We call this the *high-commitment* case. Program failures seem to have occurred when top management neither participated in nor supported the program. We call this the *low-commitment* case.

With two dimensions of commitment, four combinations are possible: (a) high support with participation (the high-commitment case); (b) low support without participation (the low-commitment case); (c) high support but no participation; and (d) participation but low support. We call the latter two cases the *moderate-commitment* case. However, although both moderate-commitment cases are logically possible, we located no program in which top management participated despite disinterest. Thus, in practice, moderate commitment seems to include only the case in which top management is highly supportive but does not participate in the MBO program.

High Top-Management Commitment

Many researchers believe that MBO must be initiated from the top down—with full participation throughout—for a program to be implemented successfully (Aplin & Schoderbek, 1976; Martin, Johnson, McNitt & Stutzman, 1978; McConkey, 1976b; Nystrom, 1977). Top management needs to have high commitment to the program (Beer, 1980; Carroll, 1986, p. 308; Ford, 1979; Rose, 1977, p. 69; Seward, 1976, p. 274) and to become personally involved in goal setting (Brady, 1973; Bus-sard, 1976; Carroll & Tosi, 1973; Hollmann, 1976, Jun, 1976; Reddin, 1971; Report to the Congress, 1978; Weihrich, 1976).

The opinion that top-management commitment is critical to success is not unique to the MBO literature (Latham & Yukl, 1975, p. 842). Indeed, a massive body of research on different organization development interventions warns that interventions have little chance of success without top-management commitment (Argyris, 1973, p. 59; Beer, 1980, p. 228; Schick, 1973; Schleh, 1959, pp. 26–27). MBO is no exception (Argyris, 1973; Howell, 1967; Lea, 1977, pp. 28–29).

However, one feature of MBO is not always found in other organization development programs: top-management participation. In full-fledged MBO systems, top management is personally involved in goal setting (Calhoun, 1977; Sherwin, 1976) and participative decision making (Ivancevich et al., 1978; Kobayashi, 1971; Wikstrom, 1968). When top management participates, objectives are not issued as one-way edicts; they evolve through the give and take of two-way discussion.

This process is often alien to managers at the start of an MBO program (Muczyk & Reimann, 1989). It is thus critical that someone act as a role model (Strauss, 1972, p. 11). The person uniquely suited for this task is the chief executive officer (Sherwin, 1976), who is in a position to initiate discussions about organization-wide objectives with members of the top-management team. The top-management team then serves as role models for the next level of management (Mackay, 1971; Wikstrom, 1968, p. 57). All senior staff members are eventually involved in these discussions. The top-management team then passes these lessons down to the next rung of management, and so on, until the process has permeated through the entire organization.

Communications thus trickle from the top down, through the entire organization. As lower level workers have an opportunity to comment on operational problems and issues, top management acquires a better understanding of the barriers and obstacles to accomplishing organization-wide goals. Workers at the bottom of the organization's hierarchy have an opportunity to suggest new goals that top managers may not have thought about because they are too removed from the day-to-day production process. Poorly conceived objectives can be abandoned and smartly crafted objectives adopted. Thus, with top-management involvement and participation, goal setting becomes an integral component of the ongoing management process, not a one-shot event.

Low Top-Management Commitment

Consider now an MBO program in which top management does not participate and for which they offer little emotional support. Such programs are usually installed by lower level managers in only one or several units of a larger organizational

system (Duemer, Walker, & Quick, 1978; Elam, 1978; Leathers, 1967; Pascoe, 1970; Tosi & Carroll, 1973). Implementation is the responsibility of an administrative intern, a personnel officer, or a middle manager (Muczyk, 1976, 1978).

If an MBO program is introduced by top managers who have little commitment to MBO and who refuse to become personally involved in the program's tasks and responsibilities, then different subunits within the organization are much more likely to compete with one another. Interdepartmental conflict is likely to increase (Simon, 1957, pp. 210–211), and productivity is likely to suffer. Support for the program is half-hearted, and the program can be expected to deteriorate over time until it is no longer in use.

During the early stages of the program, the motivation of subunit workers may increase (Tannenbaum & Massarik, 1950, p. 418). Over time, however, demands of the management system used by the subunit(s) will take second place to the demands that come from top management. In this case, the MBO management system will be set aside from the integral process of the management system for the organization as a whole, and the time between each goal-setting session can be expected to lengthen until the program is eventually abandoned.

However, as use of the program's component processes withers away, the positive benefits of MBO may not necessarily be lost. Modifications to the work process that resulted from the program would not be undone, and new objectives that were set as a result of goal-setting exercises would not be changed. Thus, productivity gains should still result from even limited implementation of an MBO program.

Moderate Top-Management Commitment

We found some reports of programs in which top managers offered high support for an MBO system but (for a variety of reasons) did not personally participate in goal setting (Argyris, 1973, p. 59). Top management set no personal goals but required others to set goals through participatory discussions with supervisors (Mayer, 1978; McConkie, 1979b; Stein, 1975, p. 528) in hopes that the positive effects from improved communications would trickle up the organizational hierarchy (Lag-sagna, 1971; Levinson, 1970; McGregor, 1960).

Without top-management involvement, participation in decision making is found at lower levels but not at the top. Top management is not available to demonstrate how participatory goal setting is done, and some managers may be unable or unwilling to learn the new management system (Muczyk & Reimann, 1989; Strauss, 1972, p. 11). Others may refuse to participate (Fay & Beach, 1974).

Coordination problems emerge. The ability of one unit to attain a high priority objective may require cooperation from a second unit, but such cooperation may be counter to the second unit's objectives. Such problems emerge when each unit's objectives are set separately (Jones, 1975, p. 311). Thus, the full effects of goal setting and participation may not be realized because of a failure to coordinate innovations across all levels and within all units (Wikstrom, 1968, pp. 38–56).

With emphasis on bottom-up communications, lower level workers may discuss work plans that from time to time are at odds with top management's wishes (Wikstrom, 1968, p. 28).

Time will be wasted by the evaluation of objectives that have no support at the top (Hummel, 1977, p. 90; Preston, 1968).

In moderate commitment programs, there ought to be less coordination and more time wasted on low-level innovations than in high commitment programs. Thus, although the start of a moderate commitment program should produce positive effects, they will be smaller than those of a high commitment program. On the other hand, a moderate commitment program may be used longer and thus should produce much larger effects than a low commitment program.

Summary

Theory about MBO's three component processes suggests that even when MBO is introduced piecemeal it will show positive effects. Further consideration and analysis of the literature on program implementation suggests that productivity gains will be correlated with the extent of top-management support for and participation in the MBO program. That is, the higher the level of top-management commitment to an MBO program, the larger the effect that program will produce. We predicted that organizations with high commitment to MBO would show greater productivity gain than organizations with moderate commitment. Organizations with moderate commitment were predicted to show greater productivity gain than organizations with low commitment.

Method

Studies Located

We used five strategies to locate MBO studies. We located and reviewed studies included in previous review studies (Guzzo et al., 1985; Kondrasuk, 1981; Latham & Yukl, 1975; McConkie, 1979b; Woodman & Wayne, 1985). We scanned MBO bibliographies for additional citations (Guzzo & Bondy, 1983; Katzell, Bienstock, & Faerstein, 1977; Mansell, 1977; Odiorne, 1981; Santora, 1982; Walsh, 1977) and searched the volumes of *Dissertation Abstracts International* from 1970 to 1987. Copies of MBO dissertations were obtained either through interlibrary loan or directly from the authors. We searched computer data banks, including INFORM, Management Contents, Dissertation Abstracts, ERIC, Public Affairs Information Service, Social SciSearch, and the Index to U.S. Government Periodicals. Finally, we asked 32 authors of MBO books, articles, or studies to complete and return an MBO survey. In the survey, we asked authors to provide information on unpublished MBO studies and the names of individuals who were presently conducting or who had recently completed studies of MBO effectiveness. These strategies led to the identification of 34 reports on MBO programs and 41 quantitative evaluations of MBO effects.

The published literature on MBO includes articles on a variety of MBO characteristics, including feedback of results, frequency of performance appraisals, participation in the MBO process, and the administration of ongoing MBO programs (Latham & Yukl, 1975). Such articles detailed the clarification of job responsibilities, discussed reorganization issues, identified interorganizational conflicts that were intensified or resolved, tracked the time and energy needed to implement MBO, considered specific goal-setting procedures, or addressed training issues, all of which are part of the administration of an ongoing MBO program. In other articles, step-by-step implementation guidelines or "steps to success" were provided for organizations to consider when adopting MBO. In other words, MBO programs themselves were studied; their effects on organizational productivity were

ignored. We considered this type of article to be descriptive rather than evaluative and therefore excluded them from our analysis. (A listing of all such articles is available on request.)

We selected for meta-analysis all reports that provided qualitative assessments or quantitative data on productivity outcomes before and after introduction of the MBO program. A computer-simulation study (Poziomek, Rice, & Andersen, 1977) and goal-setting studies (e.g., Dossett, Latham, & Mitchell, 1979; Ivancevich, 1976, 1977) that had been included in a prior MBO review (Kondrasuk, 1981) were excluded.

In some studies, productivity was assessed against a predetermined standard or goal; the percentage of the standard attained was reported. Studies with this type of data rarely contained pretest data or observations. They were typically designed to measure the independent effects of goal setting, not the effects of a full-fledged MBO program. We therefore always excluded studies in which productivity was assessed against predetermined goals.

Some individuals wrote more than one article about the same MBO program (Kondrasuk, 1981). We reviewed all articles written by the same author(s) to identify possible duplications. When the identities of the organizations were concealed but we suspected duplication, we asked the authors or coauthors which studies were duplicates and which were not. When the results of more than one study were reported for the same organization unit, we combined the information across studies.

Dependent Measures

Meta-analysis requires that a common metric be identified so that results can be cumulated quantitatively across studies. Usually this is done by converting the results of all studies to either *d* or *r*. These statistics are used when the unit of analysis is the individual worker. In MBO research, the unit of analysis is the organization as a whole. Thus, in many studies, whole unit measures of productivity were reported for which there is no mean or standard deviation. Even when data on individual productivity were considered, the investigator usually thought in terms of the organization as a whole and thus usually reported only mean productivity before the introduction of MBO and mean productivity after its introduction. Standard deviations were seldom reported, so conversion of the data to *d* statistics was precluded.

Many of the productivity measures were based on ratio scale data, making it possible to calculate a percent productivity estimate by comparing the pretest productivity (PRO_{pre}) to the posttest productivity (PRO_{post}): $100(PRO_{post} - PRO_{pre})/PRO_{pre}$. Signs were adjusted when necessary to ensure that positive change always indicated improvement. Negative percent productivity estimates always mean productivity decline.

The usual meta-analysis corrects the standard deviations of results across studies for sampling error. This was not possible for the main results in our meta-analysis because MBO productivity measures are not the usual sample statistic found in traditional questionnaire surveys. The statistical basis of the productivity data was often not reported. Raia (1966, p. 50), for example, defined productivity as the ratio of "the number of cases (output) of each product to the direct labor hours (input) to produce them, expressed as percentages," but he reported no data on the number of cases or the number of labor hours. Corrections for sampling error require information on the number of units that are sampled. If a sample size can't be assigned, sampling error can't be computed. In many studies, it was unclear what sampling error might mean or even how to compute it.

A more salient concern is measurement error. We do not doubt that productivity measures are imperfect. However, most of the measures are quite different from conventional social science measures, and thus, reliability theory has never been used for such measures. If reliabilities cannot be computed, it is not possible to make corrections for measurement error.

Table 1
Studies With Ratio Scale Data on Productivity

Study/measures	Type of measure	PRO	PROD	PO	CM	AB	Study/measures	Type of measure	PRO	PROD	PO	CM	AB
Adams (1978)			48.8	48.8			Likert & Fisher (1977; Organization #1)			69.0	69.0		
Assets	po	34.0					Direct labor productivity	po	69.0				
Net earnings	po	37.0					Likert & Fisher (1977; Organization #2)			20.0	20.0		
Total deposits	po	32.0					Scrap savings	po	25.0				
Net loans	po	32.0					Productivity	po	15.0				
Turnover	po	50.0					Mali (1978)			66.7	66.7		
Operating income	po	107.5					Truck breakdown rate	po	66.7				
Ainsworth (1970)			58.3	66.6	50.0		Milgiore (1977; Organization #1)			17.0	17.0		
Dispatch waiting time	po	66.6					Daily productivity index	po	17.0				
Waste reduction	cm	50.0					Milgiore (1977; Organization #2)			49.4	41.0	62.0	
Bryant (1981)			61.5	61.5			Hours per vessel at dock	po	20.0				
Cases pending investigation	po	62.0					Average vessel delay	po	100.0				
Time from filing to issuance	po	61.0					Ore dock efficiency	po	3.0				
Burkhalter & Coffman (1974)			29.0	20.0	38.0		Injury frequency-severity ratio	cm	95.0				
Annual budget increase	cm	38.0					Personal injuries	cm	29.0				
Average crew size	po	20.0					Muczyk (1976)			3.5	3.5		
Butler (1976)			148.6	148.6			productivity change	po	3.5				
Hours taught per semester	po	148.6					Muczyk (1978)			5.0	5.0		
Carroll & Tosi (1976)			109.0	109.0			No. of checking accounts	po	1.2				
Productivity	po	109.0					No. of savings accounts	po	1.2				
Dempsey & Hamm (1981a, 1981b)			14.9	14.9			No. of other time deposits	po	-9.6				
Pilot area accident rate	po	12.0					No. of installment loans	po	1.7				
% drivers exceeding 60 mph	po	17.7					\$ value of checking accounts	po	12.9				
Douds & Collingwood (1978)			3.1	3.1			\$ value of savings accounts	po	12.0				
Recidivism rate	po	-2.1					\$ value of installment loans	po	19.0				
Juvenile court hearings	po	8.2					\$ value of commercial interest	po	1.8				
Duemer, Walker, & Quick (1978)			15.3			15.3	Murray (1978)			21.6	21.6		
Absenteeism	ab	15.3					Intervention cases closed	po	44.7				
French, Kay, & Meyer (1966)			8.9	8.9			Supervision cases closed	po	21.2				
Average estimate of goal achievement	po	17.2					Foster care placement	po	17.2				
Achievement performance goals	po	0.5					Recidivism rate	po	3.5				
Ivancevich (1974; Plant A)			-5.5	-6.1	-2.0	-5.1	O'Hea (1970)			76.0	76.0		
Quantity base	po	0.6					Extra allowance percent	po	78.6				
Quality rate	po	1.2					Unmeasured work percent	po	97.1				
Grievance rate	po	-64.2					Job completions per week	po	52.2				
Absenteeism	ab	-5.1					Pritchard, Jones, Roth, Stumbing, & Ekeberg (1987, June)			55.7	55.7		
Territorial indicator	po	1.6					% bounces	po	54.2				
Direct selling cost	cm	-2.0					% quality assurance inspections passed	po	-2.1				
Sales to visit ratio	po	12.8					No. of units awaiting maintenance	po	49.4				
Marketing potential	po	11.1					No. of units awaiting parts	po	26.5				
Ivancevich (1974; Plant B)			43.6	58.6	-0.8	-2.6	% demand met	po	6.1				
Quantity base	po	28.1					No. of STS tasks completed	po	33.3				
Quality rate	po	26.8					% qualifying tasks, communications	po	17.6				
Grievance rate	po	13.6											
Absenteeism	ab	-2.6											
Territorial indicator	po	51.5											
Direct selling cost	cm	-0.8											
Sales to visit ratio	po	126.8											
Marketing potential	po	105.1											
Klein (1973)			9.2		9.2								
Truck cost per hour	cm	9.2											
Lea (1977)			55.0	45.0	60.0								
Turnover	ab	68.0											
Corporate effectiveness	po	45.0											
Absenteeism	ab	52.0											

Table 1 (continued)

Study/measures	Type of measure	PRO	PROD	PO	CM	AB	Study/measures	Type of measure	PRO	PROD	PO	CM	AB
Pritchard, Jones, Roth, Stumbing, & Ekeberg (1987, June) <i>continued</i>							Pritchard, Jones, Roth, Stumbing, & Ekeberg (1987, June) <i>continued</i>						
% qualifying tasks, navigation	po	37.5					No. of functional checks left	po	83.3				
No. of scheduled Trn. overdue	po	100.0					No. of suspect items left	po	80.0				
No. of mobility eq. overdue	po	100.0					No. of late monthly inspections	po	100.0				
No. of PMEL overdue	po	100.0					No. of returns from data processing	po	100.0				
No. of 349 errors	po	85.2					% TCTOs checked	po	0.0				
No. of missed appointments	po	0.0					No. of RODS from other bases	po	13.8				
In-checking errors/100	po	100.0					No. of off-base shipments left	po	83.3				
Priority 2 rec (min)	po	86.3					No. of delinquent documents	po	80.4				
Priority 4 rec (hrs)	po	72.2					Raia (1965, 1966) Productivity	po	30.0	30.0	30.0		
No. of warehouse refusals in receiving	po	100.0					Seyna (1982) Film spooling			43.7	39.0		53.0
No. of delinquent rejects	po	98.6					productivity	po	37.0				
No. of inspection findings	po	20.3					Labor turnover	ab	53.0				
No. of warehouse refusals for wrong location	po	100.0					Machine downtime	po	41.0				
% cleared off R36	po	11.0					Taylor & Tao (1980)			94.3	94.3		
Priority 2 iss (min)	po	84.4					Case closures per person	po	68.0				
Priority 3 iss (min)	po	86.6					Processing time	po	83.5				
Priority 4 iss (hrs)	po	41.7					Cases that result in remedies	po	194.1				
No. of repeat findings	po	-100.0					Charges resolved	po	30.0				
No. of delinquent turn ins	po	100.0					Cases resolved	po	96.0				
Priority 2 iss (min)	po	57.2					Terpstra, Olson, & Lockeman (1982)			29.4	29.4		
Priority 2 rec (min)	po	66.3					Number of activities	po	15.8				
Priority 3 (min)	po	53.1					Number of service activities	po	61.3				
Priority 4 (hrs)	po	39.4					Management development programs	po	11.1				
Vehicle inspection score	po	0.8					Thompson, Luthans, & Terpening (1981)			113.5	113.5		
No. of reportable accidents	po	0.0					Actions taken by counselor	po	113.5				
No. of nonreportable accidents	po	33.3											
No. of incoming items left	po	65.1					Study means			44.6	46.7	26.1	24.1
No. of dated items left	po	66.7					Standard deviations			36.8	37.5	25.2	27.4
No. of unidentified items left	po	87.5					Number of studies			29	27	6	5
No. of aircraft parts left	po	86.4											

Note. Some estimates were taken from unpublished data that were obtained directly from the researchers. Two productivity outcome measures in Muczyk's (1978) study were excluded because they were outliers. Pretest recidivism estimates for Douds and Collingwood's (1978) study were taken from Williams (1984). PRO = percent productivity estimate; PROD = average percent productivity estimate; PO = average productivity outputs; CM = average cost measures; AB = average attendance behaviors; po = productivity output; cm = cost measure; and ab = attendance behaviors.

In some studies, ordinal performance rating data were reported, rendering a percent productivity estimate meaningless. In the interest of increasing the number of MBO studies available for quantitative analysis, we converted the results of these studies to *d* statistics (Glass, McGaw, & Smith, 1981, pp. 149-150; Hunter, Schmidt, & Jackson, 1982, p. 98) and analyzed them separately. Two studies with ordinal data provided retrospective assessments of MBO against a preimplementation productivity standard (Shetty & Carlisle, 1974; Timm, Strauss, Sorensen, & Babcock, 1977). Data from these studies were also converted to *d* statistics.

The effect of MBO on an entire organization was considered in some studies. In others, MBO's impact on a single department, division, or

plant was considered. We averaged quantitative data that were reported for multiple departments, divisions, or plants within the same organization. For example, Muczyk (1976) reported productivity data on 24 branches of one parent bank. We averaged Muczyk's results for the branch banks and treated the averaged estimate as a single productivity estimate for the parent bank.

In several studies, data on the same measure were collected at different times before or after implementation (or both). When multiple postimplementation data points were reported in a study, we always took the data associated with the longest time frame. When multiple preimplementation data points were reported (e.g., Thompson, Luthans, & Terpening, 1981), we used the mean.

Multiple indicators of productivity were available in many of the studies. These measures were categorized into three logical groupings: productivity outputs, attendance behaviors, and costs. Such measures as sales, employment, profit, and growth are susceptible to external factors that can cause significant change that is totally independent of MBO program effects. Such measures were therefore excluded from our analysis.

The best estimate of productivity is the average of its corresponding indicators. We averaged multiple measures of productivity with percent productivity estimates. This yielded an averaged estimate for productivity, with equal weighting awarded to each organization. We also averaged measures for productivity outputs, attendance behaviors, and costs. Averages across multiple indicators also have less measurement error (Hunter et al., 1982). We also averaged multiple performance measures for the same organization.

Qualitative assessments of MBO effects on organizational productivity also were analyzed. We determined the direction of the estimate in qualitative studies in which multiple assessments for productivity or performance were made by averaging the count of measures with positive and negative effects. If the averaged count was positive, the study was coded as positive. If the number of measures with negative effects outnumbered those with positive effects, the study effect was coded as negative.

Measurement of Top-Management Commitment

Kondrasuk (1981) observed that reports of MBO studies sometimes contain only sketchy descriptions of the MBO program implemented. In a few reports, Kondrasuk found no descriptions. Scheirer and Rezmovic (1983) encountered a similar obstacle when analyzing the results of 74 studies from nine different research domains. Only 23 of these 74 studies (23%) contained information on the level of program implementation.

Like Kondrasuk (1981) and Scheirer and Rezmovic (1983), we encountered problems coding some of the MBO studies for the level of top-management commitment. Our analysis of the literature on MBO program implementation suggested that top management needed to have high commitment to the program and be personally involved in its implementation for the program to be successful. The text of some study reports contained information about the level of support but not about top management's participation. Other reports contained descriptions of top-management participation but omitted discussion of the level of support.

To obtain full information on the nature of commitment, we gathered new data by surveying the researchers who had conducted the studies. Responses were obtained from 27 of the 39 authors of quantitative reports (69%). Authors of qualitative reports were not surveyed. Authors either returned information to us on a written questionnaire or answered our questions by phone. For each question asked, authors had the option of indicating that they did not know or did not remember. We checked information about top-management commitment in the original study reports against authors' answers to our survey questions and found no inconsistencies.

We were unable to obtain survey data for 12 studies. Four authors did not respond, and the authors of 7 studies could not be located. (One author who did not respond had conducted two studies.) We used the study reports to code as many of these studies as possible.

The measure of top-management commitment that was used in the analysis was drawn from answers to two questions (reported in the Appendix). First, authors characterized top management as having high commitment, moderate commitment, or low commitment to MBO. Second, authors indicated whether or not top management personally participated in setting goals. Commitment of top management to MBO was considered to be high if and only if support was high and members of the top-management team formulated their own personal

objectives. In several studies, top management was said to have high or moderate support for MBO, but there was no participation in goal setting. These organizations were considered to have moderate top-management commitment. Additional discussion with the author of a study (McCotter, 1983) in which moderate support and top-management participation in goal setting was reported indicated to us that the organization should be classified as moderately committed to MBO.

If support was low and top management did not participate in goal setting, we considered top-management commitment to be low. As noted previously, in no study did top management show low support for MBO and participate in goal setting. Data on top-management participation in goal setting was missing in two studies in which low support was reported. Information from the study reports justified our coding of low commitment in these cases.

Results

Individual Study Results

Descriptions of and estimates for all study measures are presented in Tables 1, 2 and 3. Percent productivity estimates for 29 organizations are reported in Table 1. Separate effect sizes are reported for productivity, productivity outputs, attendance behaviors, and costs. The mean for each component for each study is also presented. The average productivity estimates were formed by averaging across the components, and those values are also presented for each study.

The effect sizes for 12 studies in which ordinal scale measures of productivity (i.e., performance ratings) were used are presented in Table 2. Two of the 12 studies contained both percent change and performance rating data, and hence they appear in both Tables 1 and 2. In Table 3, results are shown for 34 studies in which only qualitative assessments of productivity gain were made. Percent productivity estimates were reported in 3 of these 34 studies; those 3 studies appear in both Tables 1 and 3. The study estimates in Tables 1, 2, and 3 total 75, but because of the duplications, estimates on only 70 different organizations were available.

Overall Analysis of Productivity Change

Ratio scale data were gathered in 29 studies (see Table 1); in 28 of those studies, positive productivity estimates were reported, and in one study, a negative productivity estimate was reported. Ordinal performance rating data were reported in 12 studies (see Table 2); results were positive in all 12. As shown in Table 3, qualitative assessments of productivity outcomes were made for 34 different organizations; 33 were positive and 1 was negative. When duplicate estimates of the same organizations were included, 68 of 70 assessments were positive. That is, productivity gains were reported in 97% of the studies we surveyed. These findings support our hypothesis that MBO will cause positive changes in productivity.

For the 29 studies in which ratio scale data were reported, the mean gain in productivity was 44.6%. The standard deviation was 36.8%, however, suggesting the possibility of a moderator variable. Results for each productivity component followed a similar pattern. As shown in Table 1, the standard deviations for each component measure were large when compared with

Table 2
Studies With Ordinal Scale Data on Performance Ratings

Study/measures	d	PR	N	Study/measures	d	PR	N
Babcock (1970)		0.51	101	Shetty & Carlisle (1974)		0.45	109
Quality of job performance	0.57			Performance (productivity)	0.45		
Productivity on the job	0.60			Sloan & Schrieber (1971)		0.16	7
Effort expended in job	0.35			Overall behavior	0.16		
Dyer, Monson, & Cope (1975) ^a		0.19	325	Timm, Strauss, Sorensen, & Babcock (1977)		0.52	36
Psychosocial patient care	0.24			Feeling of self-fulfillment	0.68		
Physical patient care	0.15			Feeling of accomplishment	0.35		
General patient care	0.19			Vanzandt (1976)		0.26	250
Patient communications	0.48			Hampden guidance service	-0.11		
Professionalism	0.19			Newburgh guidance service	0.53		
Nursing care safety	0.14			Weatherbee guidance service	0.72		
Nursing care environment	0.06			Winterport guidance service	-0.10		
Special therapy	0.03			Muczyk (1978) ^b		0.04	12
Nursing notes	0.15			No. of checking accounts	0.02		
Nursing care plan	0.31			No. of savings accounts	0.03		
Futrell, Swan, & Lamb (1977)		0.93	67	No. of other time deposits	-0.17		
Performance and improvement	1.80			No. of installment loans	0.01		
Product knowledge	0.90			\$ value of checking accounts	0.12		
Human relations	0.68			\$ value of savings accounts	0.21		
Sales ability	0.93			\$ value of installment loans	0.09		
Current performance	1.04			\$ value of commercial interest	0.01		
Work hard	1.08			Seyna (1982) ^b		1.28	168
Planning ability	1.29			Project completions	1.09		
Territory coverage	0.46			Work effectiveness	1.19		
Activity reporting	0.06			Motivation to work	1.56		
Attitude	1.04						
Hollingsworth & Mobley (1978)		0.28	261	Weighted mean performance rating		0.42	
Job effort	0.22			Standard deviation		0.25	
Job performance	0.34			Total N		2,737	
McCotter (1983)		0.47	82				
Manhattan productivity	0.73						
Outer borough productivity	0.21						
Morrow & Holton (1986)		0.38	1,319				
Turnover of high performers	0.53						
Turnover of low performers	0.44						
Encouragement of innovative work	0.39						
Group work output high	0.15						

Note. PR = averaged performance rating.

^a Estimates are based on experimental versus control group comparisons for the 6-month evaluation. ^b Percent productivity estimates also were used in this study and thus it is listed in Table 1 as well.

the mean estimates. In the 27 studies in which data on productivity outcomes were reported, the mean increase in productivity was 46.7% ($SD = 37.5\%$). The mean estimate derived from the 6 studies in which cost data were reported was 26.1% ($SD = 25.2\%$). In the 5 studies in which attendance behavior estimates were reported, the mean increase was 24.1% ($SD = 27.4\%$).

For the 12 studies in which ordinal performance rating data were reported, the mean d was .42 ($N = 2,737$; $SD = .25$). As with the percent productivity estimate, the large standard deviation suggests the possibility of a moderator variable.

In summary, positive results were found in 97% of the studies included in the meta-analysis. The mean gain of 44.6% is quite large, though the standard deviation is also quite large. The positive change in performance ratings of 42% of one standard deviation is large, but again the standard deviation is also large. It is clear that the average effect of MBO on productivity is positive and quite substantial but that there are also large differences in effects across studies. Thus, it is important to consider how much productivity may vary depending on the level of top-management commitment.

Top-Management Commitment as a Moderator Variable

Results of the meta-analysis for each level of top-management commitment are presented in Table 4. Included is a summary of the mean percentage gain for studies in which results were reported in ratio scale form and a summary of the mean d values for those studies in which data on performance ratings were reported.

Of the 29 studies in which ratio scale data were reported, 23 could be broken down by level of top-management commitment. In the organizations with high commitment, the average productivity gain was 56.5% ($SD = 29.9\%$). In the organizations with moderate commitment, the average gain was 32.9% ($SD = 14.1\%$), and in the organizations with low commitment, the average gain was 6.1% ($SD = 8.2\%$).

A similar pattern was found when productivity outcomes, costs, and attendance behaviors were separately broken down by top-management commitment. Differences in mean estimates between low- and high-commitment organizations were large, and standard deviations were small. (These breakdowns are not reported in the tables, but they are available on request.)

Table 3
Studies With Qualitative Assessments of Management by Objectives

Study/type of organization/measure	Direction of estimate	Average estimate	Study/type of organization/measure	Direction of estimate	Average estimate
Ainsworth (1970) ^a			McConkey (1976a)		
Tobacco company		Positive	Management institute		Positive
Cigarette rejects	Positive		Product quality	Positive	
Product quality	Positive		Program reputation	Positive	
Machine output	Positive		Ottawa hospital		Positive
Butler (1976) ^a			Project completions	Positive	
State environmental resources		Positive	City of Sapporo, Japan		Positive
Processing effectiveness	Positive		Tax collection efficiency	Positive	
Calhoun (1977)			McConkey (1976b)		
Security equipment manufacturing		Positive	Western Company of North America		Positive
Volume performance levels	Positive		Costs of staff services	Positive	
Elam (1978)			Manager performance	Positive	
University public relations department		Positive	Results orientation	Positive	
Work completions	Positive		O'Hea (1970) ^a		
Fenton (1977)			Colt Heating		Positive
Accurex Corporation		Positive	Financial savings	Positive	
Performance	Positive		Pascoe (1970)		
Decision making	Positive		Navy supply and transport		Positive
Ford (1979)			Management performance	Positive	
Semiconductor manufacturer		Negative	Pitts & Thompson (1979)		
New product development	Negative		State agency		Positive
Ganser (1975)			Placements	Positive	
Logging association		Positive	Preston (1968)		
Image	Positive		Equipment manufacturing		Positive
Quality of programs	Positive		Cash savings	Positive	
Total membership	Positive		Performance of managers	Positive	
Job completions	Positive		Raia (1974b)		
Jones (1975)			California school district		Positive
University library		Positive	Use of time	Positive	
Professional identity	Positive		Reddin (1971)		
Employee accomplishment	Positive		Electric utility		Positive
Latona (1978)			Labor costs	Positive	
Juvenile justice center		Positive	Sheparovych (1973)		
Job involvement	Positive		Essex College Learning Resources Center		Positive
Work goal attainment	Positive		Managerial efficiency	Positive	
Sense of achievement	Positive		Staff performance	Positive	
Mali (1986)			Production	Positive	
United Technologies		Positive	Stoelwinder & Clayton (1978)		
Performance	Positive		Sir Charles Hospital		Positive
Managing results	Positive		Cost per admission	Positive	
People's Bank		Positive	Length of patient stay	Positive	
Performance	Positive		Admission scheduling	Positive	
New York Transit Authority		Positive	Waiting times	Positive	
Performance	Positive		Viner (1970)		
Problem solving	Positive		Viner's Limited		Positive
Phoenix		Positive	Performance of managers	Positive	
Service	Positive		Wickens (1968)		
Per capita performance	Positive		British factory		Positive
Mali (1978)			Cost reductions	Positive	
Garbage collection		Positive	Managerial motivation	Positive	
Productivity audit	Positive		Efficiency	Positive	
Memorial Hospital		Positive	Wikstrom (1968)		
Productivity audit	Positive		General Mills		Positive
Overseas chemical industry		Positive	Meeting deadlines	Positive	
Productivity	Positive		Management performance	Positive	
Sports equipment		Positive	Wikstrom (1968)		
Productivity audit	Positive		3M Company		Positive
Mali (1972)			Quality of work	Positive	
International fruit company		Positive	Costs	Positive	
Schedule slippage	Positive		Adherence to delivery schedules	Positive	
			Individual creativity	Positive	
			Department performance	Positive	

Note. Positive assessments were made in 33 studies, and a negative assessment was reported in 1 study.

^a Also appears in Table 1.

Table 4

The Impact of Management by Objectives as a Function of Level of Top-Management Commitment for Studies With Quantitative Data

Level of commitment	No. of organizations	<i>M</i>	<i>SD</i>
Percentage gain			
High	13	56.5%	29.9%
Moderate	4	32.9%	14.1%
Low	6	6.1%	8.2%
Total	23	39.2%	31.9%
Performance rating gain (<i>d</i>)			
High	6	.63	.39
Moderate	3	.37	.05
Low	3	.18	.03
Total	12	.42	.25

On the basis of MBO implementation theory, we predicted that MBO effects would be lower when top-management commitment was lower. As predicted, the correlation between top-management commitment (where high = 3, moderate = 2, and low = 1) and productivity was large, $r(23) = .67$, and significant at the .001 level. The difference between the 56.5% productivity gain in the high-commitment organizations and the 6.1% gain in the low-commitment organizations is stark and highly significant, $t(17) = 3.84$, $p < .05$. High-commitment organizations were predicted to show larger productivity gains than moderate-commitment organizations. As expected, the mean productivity gain for high-commitment organizations was larger (56.5% vs. 32.9%), but the difference was insignificant, $t(15) = 1.48$, $p > .05$. Moderate-commitment organizations were predicted to show greater productivity gains than low-commitment organizations. As predicted, the average productivity gain of moderate-commitment organizations was larger (32.9% vs. 6.1%), and the difference was significant, $t(8) = 3.39$, $p < .05$.

The large differences in the impact of MBO across levels of top-management commitment for studies with ratio data show that commitment moderates the effect of MBO. In addition, the standard deviation for each subgroup of studies was smaller than the standard deviation for the total set of studies. The weighted mean standard deviation within subsets dropped from 31.9% to 21.5% for the combined analysis.

All of the studies in which performance rating data were provided could be broken down by top-management commitment. For the high-commitment organizations, $d = .63$ ($N = 742$, $SD = .39$). For the moderate-commitment organizations, $d = .37$ ($N = 1,651$, $SD = .05$), and for the low-commitment organizations, $d = .18$ ($N = 344$, $SD = .03$).

The correlation between top-management commitment and performance ratings was large and highly significant, $r(12) = .67$, $p < .05$. The difference in performance rating gains between the high- and low-commitment organizations is stark and was almost significant, $t(7) = 1.76$, $p > .05$. As expected, the mean performance gain for the high-commitment organizations was larger than the gain for moderate-commitment organizations, although this difference was insignificant, $t(7) = 1.02$, $p > .05$. As predicted, productivity gain in the moderate-com-

mitment organizations was larger than the low-commitment organizations, a difference that was highly significant, $t(4) = 4.61$, $p < .05$.

The large differences in the impact of MBO across levels of top-management commitment for studies with ordinal data also show that commitment moderates the effect of MBO. In addition, the standard deviation for studies with moderate and low top-management commitment was smaller than the standard deviation for the total set of studies. The weighted average standard deviation within subsets dropped from .25 to .21 for the combined analysis. The standard deviations within the sets varied with the mean gain. Standard deviations for the moderate- and low-commitment studies were very small, but the standard deviation for the high-commitment studies was large, suggesting the presence of another moderator variable.

Studies with performance ratings showed the same pattern found with percentage gain: Larger productivity gains were achieved in high-commitment organizations than in moderate-commitment organizations, and higher gains were found in moderate-commitment organizations than in low-commitment organizations. Standard deviations for the low- and moderate-commitment organizations also were considerably smaller than the standard deviation for the combined group.

Discussion

Effects of Extraneous Factors

Sixty-four of the 70 studies used in the meta-analysis had no control groups. We therefore worried that our results might have been magnified or diminished by the effects of unknown extraneous factors, and we conducted two additional analyses to examine this issue. First, using meta-analysis, we developed a method to estimate the effects of unknown extraneous factors. In an earlier article (Hunter & Rodgers, 1989), we explained how this analysis is done and estimated that there was a small positive effect (2%) due to unknown extraneous factors. We also outlined the step-by-step procedures needed to correct MBO study results for extraneous effects. This correction did not alter the conclusions drawn here, though it did reduce the magnitude of all estimates by 2%.

Second, we examined the effects due to a wide variety of extraneous factors listed by various researchers as potential moderators of MBO effects (Rodgers & Hunter, 1989). Factors considered included the effects on study findings of publication, regression to the mean, type of study author, and the nature of author involvement in implementing the MBO program. We translated each factor into testable hypotheses and identified variables to test each hypothesis. Studies were coded for the presence or absence of each factor. Because the factors were present in some of the MBO studies but absent in others, we were in a position to test whether results were magnified or diminished by the presence or absence of each specific factor. Results of this analysis also did not change the substantive findings reported here.

We have not explained all of the variation within commitment levels. Considerable variation in productivity effects remains, particularly for organizations with high top-management commitment. This suggests that, in addition to top-man-

agement commitment other variables influence MBO program effectiveness, a possibility that merits consideration in future studies.

Effects of the Component Processes

The theoretical underpinnings of MBO combine the features of three distinct processes. We considered only studies of MBO programs in which all three techniques were used in combination. Theory suggests that each of MBO's three component processes have positive effects. More theory development and research is needed to evaluate the expected effects of various process combinations. More studies are needed that evaluate the effects of each separate process when used by itself and the effects of two of the three processes when used in combination.

Summary of Hypotheses and Results

MBO was originally designed as a synthesis of three interventions that had been found to increase productivity: participative management, goal setting, and objective feedback. In theory, each component process increases productivity. For each process, there is a large body of research evidence supporting such a prediction. Because each component process has been found to increase productivity, their combined effect as seen in an MBO program was also expected to result in productivity gain.

Results of the meta-analysis supported the prediction that MBO would produce a gain in productivity. First, productivity gains were found in 68 of the 70 evaluation studies surveyed. Second, the mean percent gain across 29 studies with ratio scale measures of productivity was 44.6%. Third, the mean increase across 12 studies with performance ratings was 42% of one standard deviation. Thus, all three analyses showed an average gain in productivity after the introduction of MBO.

The literature on the implementation of MBO programs suggests that MBO is only fully effective if introduced with the full support and participation of top management. We predicted that MBO would have a greater effect when top-management commitment was high than when it was moderate and that MBO effects would be greater when top-management commitment was moderate than when it was low.

These predictions were also supported. Out of 39 studies with quantitative data, only 1 had a negative finding; it was a low-commitment program. The gain in productivity dropped from 56.5% to 32.9% to 6.1% as top-management commitment dropped from high to moderate to low. Increases in performance ratings (*d*) dropped from .63 to .37 to .18 as commitment dropped from high to moderate to low.

Conclusion

Studies of MBO implementation suggest that some programs have been abandoned and others have shown modest effects. The key determinant of programs success appears to be top management's level of commitment to an MBO program. Full effectiveness requires not only the support of top management but also their participation. If top management gives strong support but does not participate—a condition we called moderate commitment—MBO programs can be expected to produce smaller increases in productivity. If top management

offers neither strong support nor participation, MBO programs can be expected to have only a small effect on productivity.

Using a meta-analysis of the research evidence on MBO, we confirmed all predictions about the level of top-management commitment: Productivity gain was greater in high-commitment programs than in moderate-commitment programs and higher in moderate-commitment programs than in low-commitment programs.

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(Appendix follows on next page)

Appendix

Study Moderators

Study	Organization type	Top management ^a		
		Commitment	Support	Participation
Adams (1978)	West Virginia Bank	High	High	Yes
Ainsworth (1970) ^b	Tobacco company	High	High	Yes
Bryant (1981) ^b	National Labor Relations Board	High	High	Yes
Burkhalter & Coffman (1974)	City sanitation department	Moderate	High	No
Butler (1976) ^b	Department of Environmental Resources	Don't know	High	Don't know
Carroll & Tosi (1976)	Power tool manufacturing	High	High	Yes
Dempsey & Hamm (1981a, 1981b) ^b	Colorado State Patrol	High	High	Yes
Douds & Collingwood (1978)	Police department	Low	Low	No
Duemer, Walker, & Quick (1978)	Insurance company	High	High	Yes
French, Kay, & Meyer (1966) ^b	General Electric plant	Low ^c	Low	Don't know
Ivancevich (1974; Plant A) ^b	Manufacturing plant	Low ^c	Low	Don't know
Ivancevich (1974; Plant B) ^b	Manufacturing plant	Don't know	High	Don't know
Klein (1973) ^b	Cable corporation	Don't know	Don't know	Don't know
Lea (1977)	Paul Revere Life Insurance Co.	High	High	Yes
Likert & Fisher (1977; Organization 1)	Consumer product division	High	High	Yes
Likert & Fisher (1977; Organization 2)	Automotive plant	High	High	Yes
Mali (1978)	Garbage collection	Don't know	Moderate	Don't know
Milgiore (1977; Organization 1)	Press department	Moderate	High	No
Milgiore (1977; Organization 2)	Ore dock shipping	High	High	Yes
Muczyk (1976)	Railroad car repair	Low	Low	No
Muczyk (1978)	Bank	Low	Low	No
Murray (1978)	Division of Family Services, Utah	Low	Low	No
O'Hea (1970) ^b	Heating and ventilation	High	High	Yes
Pritchard, Jones, Roth, Stumbing, & Ekeberg (1987, June)	Air Force maintenance	Moderate	Moderate	No
Raia (1965, 1966) ^b	Purex Corporation	Moderate	Moderate	No
Seyna (1982)	Kodak Australasia	High	High	Yes
Taylor & Tao (1980) ^b	Equal Employment Opportunity Commission district offices	Don't know	High	Don't know
Terpstra, Olson, & Lockeman (1982)	University of Idaho Business School	Don't know	Don't know	No
Thompson, Luthans, & Terpening (1981)	State vocational agency	High	High	Yes
Babcock (1970)	Aerospace company	High	High	Yes
Dyer, Monson, & Cope (1975)	Veteran's Administration hospitals	Low	Low	No
Futrell, Swan, & Lamb (1977)	Hospital supply	High	High	Yes
Hollingsworth & Mobley (1978)	South Carolina hospitals	High	High	Yes
McCotter (1983)	Cleaning and maintenance	Moderate ^d	Moderate	Yes
Morrow & Holton (1986)	Naval Ocean Systems Center	Moderate	High	No
Shetty & Carlisle (1974)	Public university	High	High	Yes
Sloan & Schrieber (1971) ^b	Urban hospital	Low	Low	No
Timm, Strauss, Sorensen, & Babcock (1977)	YMCA	High	High	Yes
Vanzandt (1976)	Maine school district	Moderate	Moderate	No

^a Commitment was coded as *high* if support was high and top management participated in goal setting. Commitment was coded as *moderate* if support was moderate or high and top management did not participate in goal setting. Commitment was coded as *low* if support was low and top management did not participate in goal setting.

^b Authors either did not respond to our author survey or could not be located. Coding of top-management support and participation was taken directly from the study.

^c Coding of top-management commitment was suggested by information found in the study text.

^d Coding of top-management commitment was suggested by the study's author.

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