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THE LEADERSHIP OF GROUPS IN ORGANIZATIONS

J. Richard Hackman and Richard E. Walton

Technical Report #6  
Research Program on Group Effectiveness  
Yale School of Organization and Management  
July, 1985

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Abstract

A theory of leadership that focusses specifically on task-performing groups in organizations is proposed. The theory takes a functional approach to leadership, exploring how leaders fulfill functions that are required for group effectiveness. Implications are drawn for (a) assisting a group that is experiencing performance problems, (b) helping newly-created groups get off to a good start, (c) designing leadership training activities, (d) selecting group leaders, and (e) designing roles for group leaders.

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topic of special interest to both of us. And second, there is a way of thinking about leadership, the "functional" approach, whose potential for pushing forward understanding about group leadership is, in our view, both high and relatively unexploited.<sup>1</sup> By writing this paper, we hope to help readers determine for themselves if the potential of a functional approach is as great as we believe it to be.

We begin by setting forth what we seek in a theory that would address the effective leadership of groups in organizations. Then we describe the functional approach to thinking about leadership, and propose a framework for identifying those leadership functions that appear to be critical to group performance effectiveness. Finally, we illustrate our ideas, and conduct a rough test of their usefulness, by applying them to several practical questions about the leadership of groups.

#### Aspirations

We seek a way of thinking about the leadership of groups that has the following attributes.

1. It would deal specifically with leadership phenomena that occur in bounded groups that do real work (ranging from making decisions to actually producing things) in purposive social systems. We have no particular interest in contributing to discussions about possible differences between "leadership" and "management," nor do we care which academic discipline traditionally has owned the concepts we use in our explorations. Instead, we seek power in understanding what can be done to improve the effectiveness of task-performing groups in organizations, and we will use whatever concepts turn out to be

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<sup>1</sup> Early functionalist thinking about management is found in the work of Barnard (1938) and Davis (1942). Signs of a resurgence of the approach are found in the recent work of Rauch and Behling (1984) on leadership, and that of Peterson (1982) on interpersonal relationships.

helpful in that endeavor. If what we come up with turns out to be useful in gaining leverage on other leadership phenomena (e.g., political leadership, the supervision of individuals, or the management of whole organizations) so much the better--but that will be serendipitous rather than by design.

2. It would focus on the person (or, in some cases, persons) who link a group with the larger social system of which it is a part. This person typically has special responsibility for how well the group performs, and has access to information and resources that are less readily available to other group members. We will refer to him or her as the "leader" of the group (even though occasionally group leadership may be done by a team of leaders). We are not concerned at this point with how the leader came to occupy the role (i.e., by appointment, election, or simple emergence), or with the organizational location of the role (i.e., within the group, on its boundary, or outside). We prefer an approach that is not tied to a particular perch from which leadership is provided, or to the path by which the occupant of that perch got there.

3. It would be normative and usable. It would focus specifically on what is required for a leader to help a group do its work effectively, and it would provide a cognitive model that leaders can use in designing, building and maintaining effective groups in varying organizational circumstances. For example, it should provide ways of dealing with questions such as the following.

--What factors should leaders give special attention to when a group's performance is sub-standard, or when members appear to be unable to work together competently?

--On what basis should people be selected for leadership roles, and how should they be trained to perform them effectively?

--When should organizational representatives appoint (or require that the group select) someone inside the group to serve as team leader? When might an internal team leader be unnecessary or redundant?

--What should be done differently in designing and staffing leadership roles for new vs. relatively mature groups, or for groups that operate in widely different task and organizational circumstances?

4. It would prompt research on leadership that is both of scholarly interest and practical use. While the approach we suggest in this paper probably cannot be tested as an intact whole, it should generate numerous questions that are amenable to systematic research test--tests which, taken together, would provide an assessment of the validity and usefulness of the overall approach. It should be possible, for example, to demonstrate empirically both that (a) the cognitive models leaders use to guide their behavior differ substantially (and in predictable ways) for effective vs. ineffective leaders, and (b) effective leaders are more skilled at executing the behaviors called for by their models than are their less effective peers. And it should be possible to show that groups led by individuals who have been selected and trained in accord with our approach are more effective than groups led by individuals not so selected and trained.

The aspirations listed above are ambitious, and let us say at the outset that we do not adequately fulfill them in this paper. We do hope, however, to provide some new ideas, and some directions for further development of those ideas, that may eventually contribute both to a better understanding of leadership in task-oriented groups and to an improved technology for helping group leaders perform their roles well.

A Functional Approach to Leadership

The key assertion in the functional approach to leadership is this:

"[The leader's] main job is to do, or get done, whatever is not being adequately handled for group needs" (McGrath, 1962, p. 5). If a leader manages, by whatever means, to ensure that all functions critical to both task accomplishment and group maintenance are adequately taken care of, then the leader has done his or her job well.

What are the critical functions that must be fulfilled in a task performing group? Roby (1961) identified nine functions key to group task accomplishment, ranging from scanning the environment to coordinated execution of the group's response.<sup>2</sup> Schutz (1961), focussing on the maintenance of the group as a social system, described critical functions in three areas: (a) the group's relations with other people and groups, (b) members' relations with one another, and (c) members' interdependent work toward some shared goal.<sup>3</sup>

Explicitly building on Roby's ideas about task functions and Schutz's ideas about group and interpersonal functions, McGrath (1962) developed a generalized statement of critical leadership functions, which he arrayed in a 2x2 matrix. One axis deals with the type of activity--specifically, monitoring or taking executive action. The other axis describes the orientation of the activity--whether it is internal or external to the group. The resulting cells describe key leadership functions that must be fulfilled

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<sup>2</sup> The full list is: (1) vigilance, (2) storage, (3) transformation, (4) forecasting, (5) addressing, routing, and distributing, (6) action selection, (7) jurisdiction, (8) execution, and (9) phasing.

<sup>3</sup> Examples include (taking one item from each of the three areas): (a) ensuring sufficient involvement with outside groups to avoid isolation, but not so much that the group loses its privacy, (b) ensuring sufficient control that members can influence one another, but not so much that individual contributions are lost, and (c) finding ways to recognize and integrate the cognitive styles of group members.



if a group is to be effective (McGrath, 1962, p. 17):

- (a) diagnosing group deficiencies [monitoring/internal],
- (b) taking remedial action to correct deficiencies [executive action/internal],
- (c) forecasting impending environmental changes [monitoring/external], and
- (d) preventing deleterious environmental changes or their effects [executive action/external].

Based on this framework, McGrath developed lists of the knowledge and the skills that a leader should have to fulfill these functions. For example, in the "diagnosis" cell, a leader needs knowledge of (a) what are and are not critical group functions, (b) their relative importance, (c) standards of adequacy for each of them, and (d) procedures for assessing their presence and absence. The leader also needs skill in (a) observing critical group functions, and (b) inferring group deficiencies. McGrath does similar derivations for the other three cells, and shows their implications for leadership training.

McGrath's paper (a mimeographed report written at the request of the U.S. Civil Service Commission) is virtually unknown--even to researchers in the leadership area, if frequency of citation is any indication. Yet it anticipates many of the currently promising developments in leadership research, in which the emphasis is not so much on what the leader should do as on what needs to be done for effective performance (cf., House & Mitchell, 1974; Kerr & Jermier, 1978; Oldham, 1976). Because the functional approach leaves room for an indefinite number of specific ways to get a critical function accomplished, it avoids the need to delineate the specific behaviors that a leader should exhibit in given circumstances--a trap into which it is all too easy for leadership theorists to fall.

As formulated by McGrath, the functional approach is generic almost to a fault: it could apply to virtually anybody leading virtually anything. For our purposes, we must ask a more focussed question: "What are the critical functions that need to be fulfilled if a work group in an organization is to perform effectively?" To answer that question requires that we know something about those aspects of the group and the situation that are particularly potent in determining how well organizational teams perform--those matters about which something may "need to be done" by group leaders.

#### Ingredients of Work Group Effectiveness<sup>4</sup>

There are several factors that determine whether or not a team is an appropriate device for performing some piece of work--such as the degree to which the work requires interdependent activity for successful completion, whether the organization tilts toward a "control" or a "commitment" workforce management strategy (see Walton and Hackman in this volume), how feasible it is to create and support a team in the organizational culture, and so on. Rather than delve into such matters here, we will assume that a team is the performing unit of choice, and proceed to explore what is required to foster its effectiveness. We begin by defining what we mean by "group effectiveness," and then work backwards to specify the organizational conditions and leadership functions that contribute to it.

#### Group Effectiveness Defined

The overall effectiveness of a group, in our view, depends on its standing on the following three dimensions:

1. The degree to which the group's productive output (that is, its

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<sup>4</sup> This section draws heavily on Hackman (in press).

product or service) meets the standards of quantity, quality, and timeliness of the people who receive, review, and/or use that output. If, for example, a group generated a product that was wholly unacceptable to its legitimate client, it would be hard to argue that the group was effective--no matter what the group's own evaluation of its product was, or how the product scored on some objective performance index. While it is uncommon for group researchers to rely on system-defined (rather than objective) performance assessments, the fact is that reliable objective performance measures are rare in work organizations--and even when they do exist, what happens to a team usually depends far more on others' assessments of the output than it does on any objective performance measure.

2. The degree to which the process of carrying out the work enhances the capability of members to work together interdependently in the future. Some groups operate in ways that make it impossible for members to work together again (for example, mutual antagonism becomes so high that members would choose to accept collective failure rather than share knowledge and information with one another). In other groups, members become highly skilled at working together, resulting in a performing unit that becomes increasingly capable over time (for example, a string quartet or athletic team whose members become able to anticipate one another's next moves, initiating appropriate responses to those moves even as occur). Even when a group is temporary (such as a one-shot task force), we would examine what has happened to the performance capability of the team qua team over its life in judging its overall effectiveness.

3. The degree to which the group experience contributes to the growth and personal well-being of team members. Some groups operate in ways that block the development of individual members and frustrate satisfaction of their personal needs; other groups provide their members with many opportunities for learning and need satisfaction. Even when the official purpose of a group has nothing to do with personal development, we would examine the impact of the group experience on individual members in assessing its overall effectiveness.

In sum, we maintain that there is no single, unidimensional criterion of team effectiveness; determining how well a team has performed always involves much more than simply counting outputs. Not only must social and personal criteria be considered, but even assessments of task performance are complex because they depend on system-specified (rather than researcher-specified) standards.

The relative weights one would assign to the three criterion dimensions vary across circumstances. If a temporary team were formed to perform a single task of extraordinary importance, for example, then the second and third dimensions would be of little relevance in judging the team's effectiveness. On the other hand, teams sometimes are formed primarily to help members gain experience, learn some things, and become competent as a performing unit. The task of such a group may be more an excuse for the team than the reason for it, and assessments of the team's effectiveness would depend far more on the second and third dimensions than on the first.

With this understanding of the three dimensions of team effectiveness, let us turn now to the conditions that, if present, increase the chances that

a group will achieve a high standing on them.<sup>5</sup>

#### Conditions Required for Group Effectiveness

As scientists, we have been trained to look for the specific causes of phenomena in which we have interest. When a group performs particularly well (or poorly), for example, our tendency is to rule out as many possible explanations as we can, and pin down the true causal agent. For studies of social system effectiveness our training can mislead us, for three reasons.

First, influences on group effectiveness do not come in separate, easily distinguishable packages. They come, instead, in complex tangles that often are as hard to straighten out as a backlash on a fishing reel. To try to partial out the effects of each possible determinant of team effectiveness can lead to the conclusion that no single factor has a very powerful effect--a conclusion reached by more than one reviewer of the group performance literature. Each possible cause loses its potency when studied in isolation from other conditions also in place for the groups under study. It appears that group effectiveness in organizations usually is overdetermined--that is, it is the product of multiple, non-independent factors whose influence depends in part on the fact that they are redundant.

Second, there are many different ways a group can behave and still perform work well, and even more ways to be nonproductive. Systems theorists call this aspect of organized endeavor "equifinality" (Katz & Kahn, 1978, p. 30). According to this principle, a group can reach the same outcome from various initial conditions and by a variety of means. Equifinality encourages

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<sup>5</sup> We will give relatively more attention to the task dimension than to the social and personal dimensions, because it appears that one of the most powerful ways to help a team on the latter two dimensions is to foster its standing on the first. Indeed, it may be next to impossible for a group to achieve a high standing on the social and personal dimensions if it is failing on its task.

us to view the leadership of work teams as centrally involving the creation of conditions that amply support effective performance--but do so in a way that leaves plenty of room for a group to develop and implement its own unique strategy for carrying out the task. There is no single strategy that will work equally well for different groups, even groups that have identical official tasks.

Third, groups (like any social system) develop and enact their own versions of reality--and then act in accord with the environment they have helped create (see the chapter by Walton and Hackman in this volume for more discussion of this phenomenon). A team's redefinition of reality, which cannot be prevented, can either blunt or enhance the impact of specific actions taken by a researcher or manager to influence the group.

Together, these difficulties suggest that traditional cause-effect thinking about group effectiveness may have to give way to an alternative kind of theorizing, one that is more congruent with the facts of life in social systems. We describe below one such approach, which involves examining the conditions that are present in the performance setting where the group works.

Specifically, we identify and discuss three general ingredients of team effectiveness. Our research (and that of others) suggests that when all three ingredients are present, the likelihood increases that a group will function in ways that promote effectiveness (as defined above); when one or more of them is absent, the likelihood of effectiveness diminishes. As will be seen, however, there are multiple ways each of the ingredients can be provided, and a virtually unlimited number of ways groups can choose to behave when they are present.

Ingredient One: Clear, Engaging Direction

In laboratory research on group effectiveness, it is rare for performance to suffer because members do not know what they are supposed to accomplish. Expert experimenters know that they should be clear about such matters, and invariably instructions to experimental groups are accompanied by rhetoric intended to convince subjects that the work they will do is important, something worth trying to do well.

In work organizations, on the other hand, questions of direction are considerably more problematic. Repeatedly we have observed a group formed and given a task to perform without any briefing about the purpose of the work or how it fits into overall organizational aspirations. Although ambiguity about direction is common in organizations, it is a mistake. We know of no group we would consider effective that did not have a clear sense of direction; and we have studied many groups that spent a great deal of their time wallowing around and being frustrated because they received confusing instructions about their purpose.

It is, of course, possible to have direction that is both crystal clear and alienating (rather than engaging). What will engage a given team depends in part on members' personal interests and aspirations, and on the degree of motivational alignment between the team and the organization (see the chapter by Walton and Hackman in this volume). Engagement also is enhanced when objectives have the following attributes:

- (a) while the overall direction for performance is clear, details are not completely specified--so there is room for the team to "tailor" the objectives to fit with members' own inclinations;
- (b) the aspirations sought will have visible and substantial effects on the psychological or physical well-being of other people;

- (c) seeking the aspirations will stretch team members and provide them with opportunities for personal learning and growth; and
- (d) success or failure in achieving the aspirations will be directly consequential for the team and its members.

Sometimes it is argued that stating objectives clearly risks lowering the motivation of group members because they will react negatively to being told what to do. We have found the opposite: an engaging, authoritative statement of purpose orients and empowers teams (Walton, in press). Having a clear sense of what is expected, and why it is important, appears to be a prerequisite condition for team effectiveness. Direction is not, however, the whole story: how the group's performance situation is structured can either undermine good direction or exploit its positive potential. We review the attributes of well-designed performance situations next.

#### Ingredient Two: An Enabling Performance Situation

Groups that know where they are supposed to be going have three hurdles to surmount in order to get there. They must (a) exert sufficient effort to get the task accomplished at acceptable levels of performance, (b) bring adequate levels of knowledge and skill to bear on their task work, and (c) employ task performance strategies that are appropriate to the work and to the setting in which it is being performed (Hackman, in press).

We refer to these hurdles as the "process criteria of effectiveness." They are not the ultimate test of how well a group has done (see above for our views about that), but they turn out to be of great use both in assessing how a group is doing as it proceeds with its work, and in diagnosing the nature of the problem if things are not going well. One can readily ask, for example, whether a group is having difficulties because of an effort problem, a talent problem, or a strategy problem. And (as will be seen below) the answers that



emerge can be useful in determining what a leader might do to help a group improve its effectiveness.

Although a high standing on the process criteria suggests that a group is performing well, it is not possible to achieve that by merely issuing an exhortation or ultimatum. Instead, we must probe a bit further and identify conditions that do increase the likelihood that a group's work will be characterized by sufficient effort, ample task-relevant knowledge and skill, and task-appropriate performance strategies. As we do that, we will identify three additional points of leverage for promoting team effectiveness.

A group structure that promotes competent work on the task. Some groups have difficulty getting anything done because they were not set up right in the first place. Our research suggests that particularly important structural features include:

1. Task structure. The task should be clear, consistent with the direction of the group, and high on what Hackman and Oldham (1980) call "motivating potential"--i.e., the team task is a meaningful piece of work, for which members share responsibility and accountability, and which provides many opportunities for the team to learn how well it is doing.

2. Group composition. There should be as few members as possible given the work that needs to be done, they should have among them the talents required by the task, and they should be balanced on homogeneity/heterogeneity (that is, members should be neither functional replicas of one another, nor so different that they cannot learn from one another).

3. Core norms that regulate member behavior. While it is perhaps unusual to include group norms as an aspect of structure, research shows that expectations about behavior get established, and enforced, very early in the

life of a group (Gersick, 1983). Moreover, these norms tend to remain in place until and unless something fairly dramatic occurs to force a rethinking about what is and is not appropriate behavior. To foster effective task performance, norms should, at minimum, (a) provide for the efficient regulation of member behavior, thereby making coordinated action possible, and (b) promote active scanning of the task and situation and proactive planning of group performance strategies.<sup>6</sup>

An organizational context that supports and reinforces excellence. While organizational supports may strike some as mundane, our research shows that their presence (or absence) can dramatically foster (or limit) team effectiveness. Specific features of the organizational context that are significant in creating conditions for team effectiveness include:

1. The reward system. It should provide recognition and other positive consequences for excellent team performance. Rewards to individuals should never provide disincentives for task-oriented collaboration.

2. The educational system. It should provide the group with technical assistance regarding any aspect of the task work for which members do not presently have adequate knowledge, skill, or experience.

3. The information system. It should make available to group members the data and projections they need to invent or select a task- and situation-appropriate strategy for proceeding with the work.

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<sup>6</sup> Norms regulate many aspects of group life, not just the management of performance strategies. We emphasize norms about strategy because they are critical to the task-appropriateness of a team's way of proceeding with the work. Norms about other matters (e.g., how members relate to one another or how much effort they expend on the task) tend to develop as a function of other aspects of the performance situation (such as the design of the task or the composition of the group). For additional discussion of the role of norms in task-performing teams, see Hackman (in press).

Available, expert coaching and process assistance. It is not always easy for a team to take advantage of positive performance conditions, particularly if members have relatively little (and relatively negative) experience working collaboratively. Too often a task is tossed to group members with the assumption that "they'll work it out among themselves." And, too often, members may not know how to do that. A leader or consultant can do much to promote team effectiveness by helping team members learn how to work interdependently--although this is probably a hopeless task if the group has an unsupportive organizational context or was poorly structured in the first place.

The role of the help-provider is not, of course, to dictate to group members the "one right way" to go about their collaborative work. It is, instead, to help members learn (a) how to minimize the "process losses" that invariably occur in groups (Steiner, 1972), and (b) how they might work together in ways that generate synergistic process gains. Specific kinds of help that might be provided include:

Regarding effort: (a) helping members minimize coordination and motivation decrements--process losses that can waste effort, and (b) helping members build commitment to the group and its task--a process gain that can build effort.

Regarding knowledge and skill: (a) helping members avoid inappropriate "weighting" of members' ideas and contributions--a process loss, and (b) helping members share expertise and learn from one another--a process gain.

Regarding performance strategies: (a) avoiding flawed implementation of performance plans--a process loss, and (b) developing inventive, creative ways of proceeding with the work--a process gain.

Summary. We began this section by describing three process criteria of effectiveness, hurdles that must be surmounted if a group is to perform well. We then identified several points of leverage for helping a group do well on the process criteria. There is a relationship between these two lists, made specific in Table 1. For each of the process criteria, some aspect of the group structure, some feature of the organizational context, and some type of process assistance is identified as of particular relevance. Thus, as shown in the table:

For effort-related issues, one would consider (a) the motivational structure of the group task, (b) the reward system of the organization, and (c) group dynamics having to do with coordination, motivation, and commitment.

For talent-related issues, one would consider (a) group composition, (b) the educational system of the organization, and (c) group dynamics having to do with how members weight each other's contributions and learn from one another.

For strategy-related issues, one would consider (a) group norms relevant to the management of performance processes, (b) the information system of the organization (i.e., whether the group gets the data it needs to design and implement an appropriate strategy), and (c) group dynamics having to do with the invention and implementation of new ways of proceeding with the work.

### Ingredient Three: Adequate Material Resources

The third generic condition required for effectiveness is having the wherewithall needed to do what needs to be done--such as money, space, staff time, tools, and so on. This condition is not terribly interesting conceptually, but it turns out to be a major roadblock to team effectiveness in many organizations we have studied. Even groups that have a clear and

## POINTS OF LEVERAGE

PROCESS CRITERIA OF EFFECTIVENESS

	GROUP STRUCTURE	ORGANIZATIONAL CONTEXT	COACHING AND CONSULTATION
AMPLE EFFORT	Motivational structure of the group task	Organizational reward system	Remedying coordination problems, and building group commitment
SUFFICIENT KNOWLEDGE AND SKILL	Group composition	Organizational education system	Remedying inappropriate "weighting" of member inputs, and fostering cross-training
TASK-APPROPRIATE PERFORMANCE STRATEGIES	Group norms that regulate member behavior and foster scanning and planning	Organizational information system	Remedying implementation problems and fostering creativity in strategy development

Table 1

Points of Leverage for Creating Conditions that Enhance Group Task Performance

engaging direction, and who are ready to sail over the process hurdles, eventually will fail if they do not have (and cannot get) the resources they need to do their work. Indeed, among the saddest kinds of failures are those experienced by well-designed and well-supported groups with a clear sense of direction--who cannot obtain the resources they need to fulfill their promise.

### Conclusion

In this section, we have explored three generic ingredients that support team effectiveness, and have broken the second one down into three components. The result is a list of five conditions that we believe to be key to the effectiveness of task-performing teams in organizations:

1. Clear, Engaging Direction
2. An Enabling Performance Situation
  - a. A Group Structure That Fosters Competent Task Work
  - b. An Organizational Context That Supports and Reinforces Excellence
  - c. Available, Expert Coaching and Process Assistance
3. Adequate Material Resources

These conditions, and the way they shape group behavior and effectiveness, can be illustrated in the two task forces formed by President John F. Kennedy to assist him in the development of U.S. strategy for the Bay of Pigs invasion and the Cuban Missile Crisis.<sup>7</sup> Briefly, in the Bay of Pigs a task force developed a plan for military action which, when executed, resulted in a military and foreign policy fiasco. The action was based on several distinct assumptions that were invalid--and which could easily have been known to be invalid before the action was executed. In the Missile Crisis, a task force produced recommendations that not only achieved their objectives (a fact

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<sup>7</sup> These two teams were selected for use here both because they are likely to be familiar to most readers, and because they provide a relatively vivid illustration of favorable vs. unfavorable performance conditions.

also influenced by good fortune and autonomous actions taken by representatives of other governments), but which also appear to have anticipated what turned out to be critical variables in the unfolding crisis.

Table 2 provides an assessment of the performance conditions that were in place for the two task forces, based primarily on written accounts by Kennedy (1969) and Schlesinger (1965). The table shows that the Bay of Pigs task force operated under numerous unfavorable performance conditions, while the Cuban Missile Crisis task force enjoyed relatively favorable conditions. Some of these conditions were determined by the nature of the international situation in the two instances, but others were shaped by the President as he formed and managed the two task forces. Note, however, that there also are some conditions that did not differ substantially for the two teams (e.g., highly significant objectives, available but unused educational support, and ample material resources), and that the conditions for both teams were mixed in significant ways (that is, not everything was favorable for the Missile Crisis task force nor was everything unfavorable for the Bay of Pigs task force). The point, again, is that one cannot understand differences in effectiveness in terms of single variables--that, instead, multiple and often-redundant conditions operate in concert to determine how well a team will be able to perform.

#### Critical Leadership Functions

How do we put a functional approach to leadership together with the conditions for team effectiveness just discussed? The answer, we hope, is obvious: the critical leadership functions for a task-performing team in an organization are those activities that contribute to the establishment and

maintenance of favorable performance conditions. Following McGrath's framework, this involves two types of behavior: (a) monitoring--obtaining and interpreting data about performance conditions and events that might affect them, and (b) taking action to create or maintain favorable performance conditions.

Monitoring. The team effectiveness model prompts a number of diagnostic questions. Does the team have clear and engaging direction? Is the team well-structured? Does it have a supportive organizational context? Are ample coaching and process assistance available to the team? Does it have adequate material resources?

While these questions are posed here in the present tense, the monitoring function includes not only assessments of the present state of affairs (diagnosis), but also projections about how things are changing and what deleterious or fortunate events may be about to occur (forecasting).

Taking action. Based on assessments of the group and the situation, action can be taken to improve the present state of affairs, to exploit existing opportunities, or to head off impending problems. Again, the content of the actions will be to clarify direction, to strengthen the design of the group or its contextual supports, to provide coaching or process assistance to the group, or to ensure it has adequate material resources.

Sometimes the focus of such actions will be within the group (as when the leader works with members to help them understand the significance of their task, or learn better ways of coordinating their activities). Other times external action will be required (as when the leader negotiates a change in the organization's compensation system to provide rewards for excellent team performance, or when he or she helps establish a relationship between the group and a consultant or trainer from elsewhere in the organization).



Summary: Leadership functions. The critical leadership functions described above can be arranged in a matrix, as in Table 3. There are two types of functions (monitoring and action-taking) for each of the five conditions (direction, structure, context, coaching, and resources). For monitoring functions, both diagnosis and forecasting are specified; and for action-taking functions, both internal and external targets are specified.

So far we have defined what we mean by group effectiveness, identified the conditions we believe to be most potent in promoting it, and specified a set of critical leadership functions based on that material. Now, continuing to work backwards, we turn to the behavior of group leaders. What is it, we ask, that a leader actually does to help a group perform as effectively as possible?

#### Appropriate Leadership Behaviors

To reiterate, our view is that the behavioral requirement for the leader is to ensure that critical functions are fulfilled. This does not mean that the leader must handle them personally. As a work team matures, group members often assume responsibility for an increasing number of leadership functions--a constructive development, but one that also poses some problems for the leader who finds that he or she is needed less and less (Walton & Schlesinger, 1979). What is important is that the critical leadership functions are fulfilled--not who fulfills them.

Recall the comparison we made earlier between the Bay of Pigs and Cuban Missile Crisis task forces. The behavior of the President was clearly different in the two instances. In the Bay of Pigs episode, President Kennedy was still new in his job, and he was dealing with an awkward fact his

# FUNCTION TYPE

CONDITIONS FOR TEAM EFFECTIVENESS

	MONITORING	TAKING ACTION
CLEAR, ENGAGING DIRECTION	Diagnosis <hr style="width: 50%; margin: 0 auto;"/> Forecasting	Internal <hr style="width: 50%; margin: 0 auto;"/> External
FACILITATIVE GROUP STRUCTURE	D <hr style="width: 50%; margin: 0 auto;"/> F	H <hr style="width: 50%; margin: 0 auto;"/> E
SUPPORTIVE ORGANI- ZATIONAL CONTEXT	D <hr style="width: 50%; margin: 0 auto;"/> F	H <hr style="width: 50%; margin: 0 auto;"/> E
AVAILABLE, EXPERT COACHING	D <hr style="width: 50%; margin: 0 auto;"/> F	H <hr style="width: 50%; margin: 0 auto;"/> E
ADEQUATE MATERIAL RESOURCES	D <hr style="width: 50%; margin: 0 auto;"/> F	H <hr style="width: 50%; margin: 0 auto;"/> E

Table 3

Summary of Critical Leadership Functions

Table 2

Comparison of Bay of Pigs and Cuban Missile Crisis on Conditions for Team Effectiveness

CONDITIONS FOSTERING EFFECTIVENESS	BAY OF PIGS	CUBAN MISSILE CRISIS
<b>CLEAR, ENGAGING DIRECTION</b>	<p>Unclear objectives, and conflicting objectives among members</p> <p>Engaging objectives (stakes high), but tolerance by President of mediocre task force work</p>	<p>Clear, shared objectives</p> <p>Engaging objectives (stakes extremely high), insistence by President on highest quality task force performance</p>
<b>ENABLING PERFORMANCE SITUATION</b>		
Facilitative Group Structure		
Well-Structured Group Task	<p>High meaningfulness, less clear accountability, little regularized feedback about status of the work</p>	<p>High meaningfulness, clear accountability and assigned responsibility for outcomes, regular on-line feedback about status of the work</p>
Well-Composed Group	<p>Large, constantly changing membership, little familiarity and trust at outset</p> <p>Diverse levels of knowledge and experience; some new to executive branch</p> <p>Balance of perspectives, but imbalance in the relative power of military and intelligence representatives vs. those from other agencies</p>	<p>Smaller membership, stable, familiarity and trust among members at outset</p> <p>All members experienced operators in the Kennedy administration</p> <p>Balance of perspectives, and relatively balanced power of different agencies</p>
Norms That Regulate Behavior, Foster Active Scanning and Planning	<p>Regulation: Advocacy acceptable, with members representing and defending their own agencies; unspoken suspicion of others' agendas, disagreements not aired or dealt with explicitly in group meetings</p> <p>Scanning and Planning: Critical assumptions never challenged; non-systematic and non-critical assessment of the situation; no support for active contingency planning</p>	<p>Regulation: Advocacy unacceptable, with support instead for problem identification and solution; "general management" perspective required, with turf protection unacceptable; mutual respect supported; members held accountable for expressing and dealing with differences in views</p> <p>Scanning and Planning: Constant questioning and testing of assumptions; on-going, skeptical assessment of the situation; positive support for active contingency planning</p>

-continued-

Supportive Organizational Context-----

Reward System

Absence of organizational rewards contingent on team (as opposed to individual) performance (the risks of personal embarrassment being more potent for members than possible team failure)

Strong organizational rewards contingent at the team level, supplemented by perception that team performance had consequences for national and personal survival (individual embarrassment or political therefore less salient)

Educational System

Ample educational and consultative resources available, generally not used

Ample educational and consultative resources available, generally not used

Information System

Ample support staff available for collecting and analyzing data, making projections of strategy implications; staff work not well used, and poor quality staff work tolerated

Ample support staff available for working with information; insistence on quality staff work assessing the situation and devising (and testing) implementation and contingency plans

Available, Expert Coaching-----

Coaching neglected, except for that by the President himself (which confounded the roles of coach and client/authority, President not experienced in coaching role)

Coaching done by President's brother, who played a liaison and internal task force leadership role (confound between coaching authority roles, given blood relation with the President)

ADEQUATE MATERIAL RESOURCES

Unlimited resources on call

Unlimited resources on call

Sources: Kennedy (1969), Schlesinger (1965).

administration had inherited from the previous one--namely, the existence of a force of Cuban exiles who were being trained by the CIA and who had been assured that they would be supported by the U.S. in an invasion of Cuba. His first omission was in not providing direction for the advisory task group he formed; he never clarified whether the objectives were (a) to dispose of the political problem of the increasingly ready, impatient, and visible Cuban exile force; or (b) to accomplish some foreign policy objective vis-a-vis Cuba.

Table 2 summarizes a number of other deficiencies in the conditions under which this task force operated. From the perspective of effective leadership, the President:

- failed to communicate to the task force an expectation that members were collectively accountable for the team's product;
- failed to diagnose and remedy the consequences of the large size of the group and its changing composition from meeting to meeting;
- failed to diagnose and deal with problems caused by the heterogeneity of the team, especially the fact that members representing one faction (the CIA and the military) were in possession of more information (and had a somewhat different foreign policy orientation) than other task force members;
- failed to specify roles, encourage norms, and set standards that would encourage members to candidly express their own views and challenge assumptions made by others; and
- failed to ensure that members of the task force other than himself took an overall national perspective; instead, each faction was allowed to advocate its own agenda throughout the life of the group.

In the Bay of Pigs case, the group product ultimately was judged poor by both the President and historians; moreover, the immediate effect of the group experience and the outcome was divisive for the group and demoralizing for individuals. Fortunately, however, President Kennedy and key members of his administration learned from the experience.

That learning paid off, in the second (Cuban Missile Crisis) task force. In this case, the President took care to ensure that the purpose of the task force was clear and understood by all. In addition, he provided a structure for the team that was better--in the composition of the group, certainly, but perhaps most importantly in his communicated expectations about how the task force should operate, expectations that became translated into group norms that served the group well. The President also provided better organizational support for the team (specifically regarding the reward and information systems), but did little of which we are aware regarding the educational system or the provision of material resources (perhaps because those supports were more than ample already). Finally, the President kept himself out of the day-to-day deliberations of the task force, turning to his brother to fulfill the on-going coaching function--activities that he had learned (perhaps in part from the Bay of Pigs experience) are not well-performed by a President of the United States.

In sum, while the President ensured that the critical functions were taken care of, he did not attempt to handle all of them personally (that would almost certainly have been counterproductive), he apparently gave relatively little attention to functions that were already in relatively good shape (that would have been a waste of energy), and he focussed on the design of the group and its organizational context--refraining from personal interventions into the group's internal processes. To the extent the reports available to us about the President's leadership of the Missile Crisis are accurate, he deserved excellent marks as the external leader of this task force--certainly higher marks than he would have been given for his leadership of the Bay of Pigs task force.

Since few of us have the opportunity to help with crisis management teams in the White House, let us consider now a more typical leadership situation. A group is performing a piece of work in a business organization, its leader has some concern that all may not be well with the group and its performance, and he or she wants to figure out whether there is in fact a problem--and if so what might be done to remedy it. We will illustrate the kinds of behaviors that would be called for by our model in that situation. Then we will close this section by examining some special opportunities for constructive behaviors by leaders that emerge at special times in the life cycles of task-performing groups.

#### Leading A Group That Is Having Problems

Our overall approach suggests that remedial action would be initiated by a leader when he or she observes that a team is falling short on one or more of the three indicators of team effectiveness. It might be that the clients of the team's work are becoming increasingly less satisfied with its products. Or that the capability of team members to work interdependently is slipping. Or that individual members are finding their experiences in the team frustrating or alienating.

In such circumstances, the leader would begin by collecting diagnostic data, and then take action to remedy problems revealed in the diagnosis. For clarity of presentation, we will discuss the leader's behavior in terms of an ordered set of questions, recognizing that in practice they may not be dealt with in this order. Indeed, some of them will be quickly dismissed as of little consequence for a given group, and attention will turn immediately to other issues that have greater significance for that team's effectiveness.

1. Does the group have clear direction? Are there signs that members have oriented their work activities toward inappropriate ends, that there is disagreement among them about what they are actually supposed to be doing and why, or that members do not understand the significance of their work?

If direction is a problem, then the leader must do further diagnostic work to determine why it is a problem. It may be that direction has always been unclear, that the people who created the group were unsure just what it actually was supposed to accomplish. Or it may be that organizational representatives were clear about the direction of the group, but the word never got to the group (or was never understood by them). Or it may be that direction was communicated but not accepted by group members--i.e., they redefined the task to fit better with their own interests and aspirations without much concern for organizational needs.

Obviously, the behaviors of a leader to solve a "direction problem" would depend significantly upon the answers to these diagnostic questions. In one case, the appropriate behavior might be to exercise influence outwards or upwards to get senior managers to be clearer about what they seek from the group. In another, it might be to spend time with group members, communicating and teaching the direction and its implications. In yet another, it might require the leader to exercise his or her own authority to insistently articulate organizational expectations of the group.

2. Are performance conditions satisfactory? To deal with this question, the leader would first examine how the group is doing on the three process criteria of effectiveness.

Effort. Is sufficient effort being applied to the task? If this is a problem, then diagnostic questions continue. Is the group task unmotivating?



Does the organization fail to provide positive consequences for team excellence (or, worse, are members competing for scarce rewards given out for individual performance)? Are members interacting in ways that result in coordination or motivation decrements, or in the alienation and withdrawal of individuals?

Knowledge and Skill. Is sufficient talent being brought to bear on the work? If not, is the main difficulty with members' knowledge (i.e., they do not know what they need to know to do the task) or with their skills (i.e., they know what needs to be done, but they are not able to pull it off)? If there is a problem with knowledge or skill, what are its roots? Is it a composition issue (too many people, the wrong people, or the wrong mix of people)? Is it an organizational support problem (e.g., the unavailability of task-related training or consultation needed by the group)? Is it a group dynamics problem (members weighting each others' contributions in accord with some task-irrelevant criterion such as demographic attributes rather than task expertise, or failing to recognize and use non-obvious talents of individual members)?

Performance Strategies. Are the performance strategies being used by the group appropriate to the task and the situation? Or are members going about the work in a way that does not quite fit with what is required for effectiveness (e.g., attempting to write a committee report by sitting around a table writing sentence after sentence by consensus)? Again, if this is a problem the questions continue. Do norms discourage rather than encourage active scanning of the performance situation and planning of alternative ways for proceeding with the work? Does the group not have access to information that members need to develop performance strategies that fit with the

realities of the task and situation? Are members interacting in ways that introduce "slippage" in the implementation of their performance strategies?

Obviously, the actions of a leader should depend on the answers to these diagnostic questions. Although one cannot state ahead of time what specific behaviors will be particularly useful in aiding team effectiveness, there is a preferred order to actions that might be taken. It is highly doubtful, for example, that attempts to work on group dynamics problems will be successful if the structure of the group, or its relation with the organizational context, are fundamentally flawed. And it is doubtful that an improvement in context supports will be of much help if the structure of the group itself is disabling. So, in general, one would attempt first to get the structure of the group in shape; that would be followed by attention to organizational supports; and attention to group dynamics issues would come last.

3. Does the group have adequate resources? As noted earlier, even a well-designed and well-supported group in which members are interacting competently will fail if the resources needed to accomplish the work are unavailable. Generally, inadequate resources are easy to discern and difficult to remedy: a search committee that discovers late in the game that it has no candidates to consider, for example, may be genuinely stuck. The same is true for a production team that cannot get the raw materials it needs because there is a worldwide scarcity of those materials. So the forecasting part of the diagnostic work is of special importance here--so that action can be taken before a resource crisis occurs to head it off or to redirect the work of the group when it hits. And, once again, the actions taken by a leader to remedy the problem may focus much more on exercising influence external to the group than on attempts to directly alter members' behaviors vis-a-vis one another.

### Leader Behaviors at Special Times

Certain leadership functions may be more appropriately fulfilled at certain times in a group's life and, indeed, may be impossible to fulfill at other times. Consider, for example, the period before a group is initially formed or convened. At this time, the leader has a unique opportunity to review in his or her own mind the direction for the team's work (and to clarify that direction with senior managers if need be), and to make sure that a team is an appropriate device for accomplishing that work. If this review affirms the choice of a team as the performing unit, then the leader would proceed to determine how much self-managing authority the team will have, to design the team task and determine the composition of the group, to arrange for needed organizational supports and resources, and to plan the first group meeting. These are key leadership functions, and they often can be accomplished more thoughtfully and efficiently before the group is convened than would be possible later, after the group has formed and is underway.

Timing also conditions the kinds of leader behaviors that are likely to "take" at various points in the life of a group. This is illustrated below for two very different types of groups: temporary task forces, and permanent production teams.

Task forces. In a study of the life cycles of temporary task forces in organizations, Gersick (1983, 1984) found that such groups do not proceed, serially and inexorably, from developmental stage to developmental stage as some textbook accounts would have us believe. Instead, each group studied (all of which had to prepare a product by some deadline) spent the first half of its life on whatever track was established in the first meeting of the team. That track was different for different groups, depending on the

conditions in place when members first gathered; but in each case, what got established initially guided group behavior until almost exactly half way through the time the team had to complete its work (in some cases that was a few days, in others over two months). At the midpoint, each group re-engaged with the person in authority who had assigned the task, and experienced a major transition in how members construed the work and went about performing it. In effect, each team redesigned itself at the mid-point. Then followed a period of relatively intense production work, culminating in a flurry of wrap-up activities just before the deadline for completing the group product.

In summarizing her findings, Gersick identifies five phases in the life of a group: (1) the first meeting, (2) Phase I, when the group is learning and exploring but may appear to be producing relatively little, (3) the midpoint transition, when the group has a major upheaval and redesigns itself, (4) Phase II, the major production period, and (5) completion.

First Meeting. This meeting, when the theoretical design for the group becomes real, is an occasion when a knowledgeable leader can help fulfill a number of critical functions--and lay the groundwork for fulfilling others. He or she can, for example, help the team with at least three start-up challenges members face: (a) starting to come to terms with the task the team will perform, (b) developing an appropriate boundary for the group, and (c) beginning to develop the norms that will guide behavior in the group during the first part of its life (Hackman, in press). In addition, the leader can educate team members about the organizational supports that will be available to help them in their collective work, and in the process can begin to collect diagnostic data about the kinds of problems and opportunities the group is likely to encounter as it gets underway.

Phase I. The time from the first meeting to the mid-point of a group's life cycle is relatively barren of opportunities for constructive intervention by external leaders. The group, in effect, has its head down and is doing the kind of internal exploring and trial-and-error learning that is most appropriately done on its own. It is not very receptive to interventions by outsiders during this period.

Midpoint Transition. Because the group's readiness for assistance is particularly high during the transition, this period provides a unique leadership opportunity. It is, for example, a good time for diagnostic and forecasting work, to assess with the group what has happened thus far, where the group stands at the moment, and what problems or opportunities are likely to appear in the second half of the life cycle. These data may prompt a number of actions by the leader--such as helping the group reflect on (and consider doing something about) the process difficulties (and unexploited opportunities for synergy) it has encountered. In addition, the transition provides an opportunity to reaffirm (and potentially to renegotiate) the group's direction, to fine tune the group's task (and perhaps even the composition of the group), to assess the appropriateness of the group norms that have guided behavior thus far, and to consider what organizational supports and resources may be needed for the next phase of the group's work.

Phase II. While the group is heavily involved in production work, the leader might appropriately focus his or her attention on two activities: (a) monitoring the processes and progress of the group, and providing coaching and process assistance as required, and (b) running interference on behalf of the group with the larger organization, making sure that members have the supports and resources they need for smooth, competent task execution. The leader, in this phase, is much more a helper than a provider of direction or instruction.

Completion. Although group members may be tired and have limited receptivity to reflection during the team's pre-deadline spurt of activity, the time immediately thereafter provides a good opportunity for a leader to encourage members to review the life and work of the group and to learn from those reflections. Recall that our definition of team effectiveness included not only acceptable group output, but also gains in the competence of the team as a performing unit and the personal growth of individual members. The completion phase is a good time to consider how these personal and collective lessons can be consolidated and extended.

For clarity, the above account has been written as if the group were a temporary, time-bounded team performing a single task. Many work teams in organizations are on-going entities, whose first meeting may have happened many months (or years) ago, whose composition has gradually changed over the team's life, and whose work is continuous rather than one-shot. How do timing questions apply to on-going groups?

Permanent task teams. Walton's studies of on-going production teams (Walton, 1980; Walton & Schlesinger, 1979) show that the timing of leader interventions also is critical for these groups. But because the life cycle of permanent teams differs substantially from that of temporary task forces, the requirements for leader behavior also differ.

The teams studied by Walton were production groups in new plants, where they constituted the fundamental building blocks of the plant task organization. They were, in addition, intended to serve as a major vehicle for transmitting organizational values (such as high standards of excellence, integration of business requirements and human needs, autonomy, participation, and egalitarianism). The organizational plan was for these groups to become as self-managing as possible.

At the time the groups were formed, members were new employees, only superficially acquainted with one another, with relatively little technical expertise. They had little or no prior experience working in self-managing teams, and had only vague ideas about what the stated values of the organization might imply for their daily work activities.

The most effective leaders in this setting initially positioned themselves half in and half out of their groups. They were sufficiently involved that they could readily provide technical education on a daily basis; they were present to articulate organizational values at propitious times; and they could help members derive the implications of those values for group norms and performance strategies. But because the leaders also were partially outside the group, members could not count on their continuing guidance--and therefore they had to develop norms and processes for group self-management.

Over the first eighteen months, the effective leaders became increasingly removed from the daily activities of their groups. Many of the functions they had attended to earlier were either not required or were being supplied by one or more members (i.e., emergent leaders) within the teams. The supervisors remained organizationally responsible for the productivity of the groups, their development, and the well-being of members; however, an increasing number of the ingredients for group effectiveness were monitored and adjusted by regular team members.

In this particular genre of teams, certain other leadership requirements tended to emerge and become acute at predictable times in the group life cycle. For example, after several months of intensive learning by individuals (and a growing sense of potency on the part of the teams), many groups developed expectations for increased compensation beyond that contemplated in

the formal reward system created when the plant was begun. Supervisors who were effective leaders became actively involved with both the teams and organizational managers in dealing with this issue--understanding both perspectives and helping negotiate modifications of the reward system as appropriate.

In sum, both the roles of the leaders and the issues that required their attention changed over time in these production teams--in predictable ways, but quite different from what developed in the temporary task forces. In both cases, however, appropriate leader behavior depended on the waxing and waning of functions that needed to be fulfilled. The different imperatives for leaders arose because different kinds of teams require different supports at different times. These findings suggest that our understanding of team leadership could be furthered by further research on what might at first seem to be a quite different topic--namely, mapping regularities in the life cycles of various types of task-performing teams, and identifying the generic problems that appear at predictable times in teams' lives.

#### Summary

Clearly, there is no single set of leader behaviors that are always desirable and appropriate, nor will any single "style" of leadership be generally effective. Sometimes, for example, intense, involved coaching will be appropriate and helpful (as with Walton's production teams early in their lives); other times, external leaders should remain mostly in the background, leaving group members themselves to wrestle with the issues they face (as with Gersick's task forces in the period following the first meeting).

So what do we have here? Have we just sketched the beginnings of one of the most complex contingency tables ever constructed in behavioral science?



We think not. Although the specific leader behaviors that are needed do indeed vary as a function of circumstances, what we have tried to do here is provide a relatively straightforward and theory-driven set of tests that a leader can use to guide his or her own behavior, and to assess the likely impact of that behavior.

A summary of our approach, from the perspective of the leader, is provided in Figure 1. The figure reviews the performance-enhancing conditions we have been discussing; its main purpose, however, is to highlight the monitoring function of team leaders. It shows that a leader's first priority is to keep track of changes in a team's standing on the effectiveness dimensions. "How is the group doing?" the effective leader asks. "Are there signs of problems in the task work, in members' ability to work together interdependently, or in the quality of individuals' group experiences?" When problems, unexploited opportunities, or negative trends are noted, he or she would examine the process indicators in the center of the figure to learn more about what may be going on.

Then, guided by the answers to the diagnostic questions, a leader's attention would turn to the group and organizational conditions at the left of the figure. "Which performance conditions most need strengthening?" the leader continues. "How are we doing in direction, in structure, in context supports, in hands-on help, in resources?" If it turns out that things are not as great as they could be, the question then becomes one of inventing (the word is chosen deliberately) ways of behaving that may remedy a deficiency or exploit an unrealized opportunity. The five critical conditions we have identified and discussed, then, serve as criteria for evaluating alternative behaviors the leader has invented and is considering. That is a far more

feasible activity than attempting to regulate one's behavior in accord with some contingency model that specifies exactly which behaviors should be exhibited in which particular circumstances.

Leaders always behave in accord with some model (even if implicit) that specifies what kinds of actions will yield what kinds of results. We have attempted to provide here a theory-based model that can be learned by a leader and used in his or her day-to-day work--a supplement to, or possibly a replacement for, whatever personal model a leader happens to have developed over time based on his or her own experience. Our hypothesis (and it is open to empirical test) is that leaders who are successful in helping task-performing groups become effective already have in their minds, and use in their work, models of action that emphasize monitoring and action-taking vis-a-vis roughly the same five conditions (i.e., direction, group structure, organizational context, hands-on coaching, and material resources) that we are discussing in this chapter.

#### Applications and Implications

In applying the functional approach to decisions about selecting leaders, training them, and designing their roles, we follow the same logic that we have used thus far: first identifying what is required for effectiveness, and then testing those inventions against the requirements of the situation. The only real difference is that this time the focus is on the person and role of the leader, not the group itself; the logic remains the same.

#### Training Team Leaders

Clearly, our approach to group leadership will not be comfortable to those who have a highly rationalistic view of leadership, to those who see

leadership exclusively as an intuitive artistic activity, or to those who think that effective leadership has mainly to do with the style one uses in dealing with subordinates. We believe that leaders both have to know some things, and know how to do some things. How, then, should one think about helping leaders obtain the knowledge and the skill they need to perform effectively?

Once again, we find McGrath's paper on critical leadership functions helpful. He suggests that one can develop a matrix, with the critical functions as rows and the knowledge and skills required to fulfill those functions as columns. For our leadership functions, it looks like this:

CRITICAL LEADERSHIP FUNCTIONS

REQUIRED  
KNOWLEDGE

REQUIRED  
SKILLS

Monitoring and Taking  
Action Regarding:

1. Setting Directions
2. Designing the Group
3. Tuning the Context
4. Coaching and Assisting
5. Providing Resources


In designing a leadership training program, one would determine which among the functions are critical for the work to be done, and proceed to fill in the cells with the actual knowledge and skills that would be required of the leader. To a considerable extent, that activity must be idiosyncratic to the organization in which the leaders will function, because the knowledge and skills that are critical will vary from setting to setting. In some organizations, for example, political skills will be needed to obtain

organizational supports and resources; in others, those supports may be abundantly available or obtainable simply by asking--in which case political skills would be irrelevant to their acquisition. As another example, consider the help provided to a group through on-line coaching and process assistance. In some organizations, there will be great need for such help and no one available to provide it but the leader; in others, members may be experienced and expert in team work (and therefore less in need of such help) and, moreover, there may be a staff of organization development professionals on call to help out if asked. Obviously, the need for leader training in process skills will vary as a function of those circumstances.

There are, nonetheless, some generic knowledge and skills that we believe to be generally valuable in the leadership of teams, capabilities that almost any leader of a work team should have. We identify these below, separately for the two critical leadership functions: monitoring and action-taking.

Monitoring. To effectively diagnose the state of a group and forecast future problems and opportunities that may arise, a leader most of all needs knowledge about what the key conditions for team effectiveness are. In addition, he or she needs knowledge of the relationships that link those conditions to the process criteria and to ultimate team effectiveness. We have attempted to provide some guidance about such matters in this paper, and suspect that it would be reasonably straightforward to develop a training course for team leaders based on this material.

In addition to general knowledge about the conditions for effectiveness, team leaders need some specific skills if they are to generate valid and reasonably complete diagnoses (or forecasts) about the state of a group and its performance situation. These include:

- Data gathering skill: the ability to collect data about social systems that are reliable (trustworthy) and valid (the data mean what they appear to mean).
- Diagnostic and forecasting skill: the ability to apprehend complexity and make sense of it, drawing on both data and existing knowledge in shaping one's conclusions.
- Hypothesis testing skill: the ability to use data to conduct assessments of the relative validity of alternative hypotheses about the state of a social system (or, for forecasting, about its likely future state).
- Learning skill: the ability to learn about leadership and management, and to apply what is learned in understanding social systems and planning actions to change them.

Action-taking. In taking action to help a team perform well, a leader needs knowledge about both (a) the key levers that are available (or can be made so) to improve the performance system, and (b) timing considerations that condition when various interventions are likely to "take" (vs. when they may fall on barren ground and have little effect). Again, we have tried in this chapter to provide some guidance about these matters.

Among the skills required for competent action-taking may be the following:

- Envisioning skill: the ability to envision desired end-states and to articulate and communicate them to others.
- Inventive skill: the ability to think of numerous non-obvious ways of getting something done.
- Negotiation skill: the ability to work persistently and constructively with peers and superiors to secure resources or assistance that are needed to support one's subordinates.
- Decision-making skill: the ability to choose among various courses of action under uncertainty, using all perspectives and data that can be efficiently obtained to inform the decision.
- Teaching skill: the ability to help others learn both experientially and didactically.
- Interpersonal skill: the ability to communicate, listen, confront, persuade, and generally to work constructively with other people, particularly in situations where people's anxieties may be high.

--Implementation skill: the ability to get things done--at its simplest level, knowing how to make lists, attend to mundane details, check and re-check for omitted items or people, and follow plans through to completion. At a more sophisticated level, the ability to constructively and assertively manage power, political relationships, and symbols to get things accomplished in social systems.

We believe it is feasible to design and conduct training that will help team leaders develop the knowledge and skill they need to fulfill the critical leadership functions. Yet there are some individuals for whom such training would be a waste of time--individuals who, perhaps, should not be invited to serve as team leaders. With that possibility in mind, we turn now to the selection of people for team leadership roles.

#### Selecting Team Leaders

Are there general qualities (or "traits") that can be used to differentiate between people who are likely to develop into first-rate team leaders and those who will never be effective in such a role? Although we are mindful of the pessimistic conclusions that have emerged from decades of research on leadership effectiveness traits, we believe that relatively stable individual differences in leadership potential do exist, and that these differences can be assessed.

Specific qualities needed for leading particular teams will, of course, vary from circumstance to circumstance--such as the need for certain technical skills to effectively lead a scientific team. We will pass over idiosyncracies such as these, pausing only to suggest that in many cases managers may weight technical or "subject matter" knowledge too heavily in selecting team leaders, that group-oriented monitoring and action-taking skills (such as those we listed in the previous section) may prove to be more critical to a leader's effectiveness, even for groups doing technical work.

INDICATORS OF PERFORMANCE OUTCOMES

- CLIENTS ARE PLEASED WITH THE TEAM'S PRODUCT
- THE TEAM'S CAPABILITY AS A PERFORMING UNIT INCREASES
- INDIVIDUAL MEMBERS LEARN AND OBTAIN PERSONAL SATISFACTIONS IN THE TEAM

INDICATORS OF PERFORMANCE PROCESSES

PERFORMANCE IS ALIGNED AND ENHANCED

PROCESS CRITERIA ARE BEING ACHIEVED:

- Ample effort is applied to the task
- Sufficient knowledge and skill used
- Performance strategies are task-appropriate

TASK EXECUTION IS SMOOTH, UNCONSTRAINED

KEY PERFORMANCE CONDITIONS

CLEAR, ENGAGING DIRECTION

AN ENABLING PERFORMANCE SITUATION:

- Facilitative group structure (task, composition, norms)
- Supportive organizational context (rewards, education, information)
- Available, expert coaching

ADEQUATE MATERIAL RESOURCES

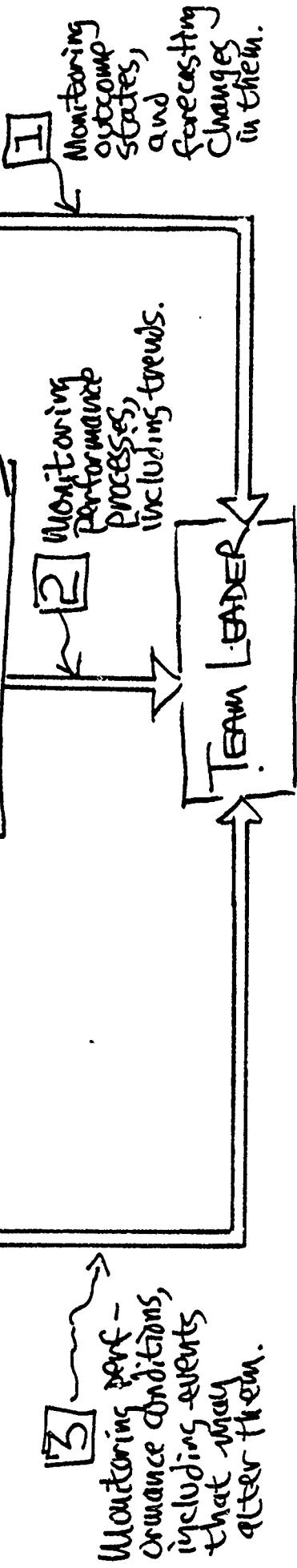


Figure 1. The Team Leader's Monitoring Function: Summary

We list below three qualities that might be assessed when people are being considered for team leader roles--qualities that are probably not trainable in the short term. People who have these qualities, we suspect, will be both better able to obtain the knowledge and skill they will need as team leaders, and better able to use what they know in working with teams. These three qualities have little in common with those that have been studied in trait-oriented leadership research, and we offer them here in a speculative spirit:

- Courage: a willingness to buck the tide (and social norms) when necessary to create conditions required for effectiveness. To help a team address and modify dysfunctional group dynamics, a leader may need to challenge group norms and disrupt established routines--and may risk incurring the anger of group members in so doing. To improve a team's contextual supports or to increase the resources available to it, a leader may need to rock the organizational boat--and may risk a loss of esteem with his or her peers and superiors in so doing. Moreover, the leader may need to do both at the same time, running the risk of incurring nearly everyone's displeasure. Such behaviors require courage.
- Emotional maturity: the ability to move toward anxiety-arousing states of affairs in the interest of learning about them and doing something about them (rather than moving away to get the anxiety reduced as quickly as possible).
- Personal values: an internalized commitment to both economic effectiveness (or, for public sector and non-profit entities, efficient and responsive service) and individual well-being (especially individuals' personal development). Without some well-understood sense of what is valued, leaders will find it difficult to choose among competing options for action. Values are, in this sense, the criterion used to assess the relative merit of alternative behaviors. While almost any clear value can serve this function, we believe that the specific values identified above are required for the effective leadership of teams. According to the theory set forth in this chapter, groups are judged effective based on both their task performance and their impact on individual well-being. Leaders who genuinely value both of these outcomes should be better able to detect and anticipate shortcomings on either dimension, and be more likely to invent actions that promote the two values simultaneously.<sup>8</sup>

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<sup>8</sup> Groups also are judged on a third dimension (i.e., how well they develop their capabilities as performing units) but this dimension often is primarily instrumental and only weakly linked to fundamental values. We



The above list may seem a bit strange to organizational scientists who typically do not deal with things such as courage, emotions, and values. But stranger still, perhaps, is the fact that excellent leaders we have studied in organizations tend to have many, if not all, of exactly these qualities. Can we devise a paper-and-pencil test to determine who has them? Probably not. Can we turn to past behavior to see if the qualities are present in a leader-candidate? Sometimes--but not if the person has been in a work situation that has provided few opportunities to exhibit these qualities. Do we need to continue to think, as creatively as we can, about new ways to assess candidates for leadership positions on difficult-to-measure but potentially-significant attributes such as those listed above? Certainly.

#### Designing the Leader Role

Should each task-performing team in an organization have a clearly identified internal leader? Or should internal leadership be informal, a matter to be worked out at the group's discretion, with an external leader available to assist the group? Or should there be both a designated internal leader (whether appointed or elected by group members) and an external leader (perhaps a manager with responsibility for several teams) who work together to guide and support the team? How much official power should people who hold such roles be given? Should they have full authority to deal with virtually anything that comes up in the team, or should their authority be limited so they have an incentive to work interdependently with others in the organization in providing direction and support to work teams?

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recognize, nonetheless, that for some individuals and organizations (e.g., worker cooperatives) competent interdependent work is also an end-state value, something worth pursuing for its own sake. In such organizations, leaders who endorse that value should perform more effectively than those who do not, for the same reasons as outlined above.

We hope it is clear by now that in a functional approach to leadership such questions are derivative--there are no generally right or wrong answers to them, nor is there any contingency table that can specify which option to select in what circumstances. The real questions, following the line of thinking we have been developing here, are these:

--What are the resources the leader needs to fulfill the critical functions well?

--How should the leader role be designed to provide its occupant with access to those resources--thereby increasing the chances that he or she will be able to perform effectively?

The design strategy that derives from a functional approach is, once again, an "invent and test" methodology. That is, those responsible for leader role design in a given circumstance would first generate a number of alternative ways to structure leader roles for the group being considered. Then, with several alternatives on the table, each possibility would be assessed to determine which one shows the greatest promise for getting the critical leadership functions fulfilled for that particular group.

Considerations in making this judgment might include the following:

--From what perch would a leader be best able to provide direction to the group? Will he or she be setting direction, or merely translating and communicating it? How much authority needs to be built into the role to legitimize and support the direction-setting function?

--How can the group be provided with the maximum amount of autonomy to manage its own affairs, given organization-specified directions and constraints? Would having a strong leader within the group assist in maintaining an appropriate balance between collective direction and team autonomy?

--How much external influence will the leader require? How can his or her role be designed to make it relatively easy to exercise that influence?

--To what extent will the leader need to coordinate his or her behavior and decisions with other leaders who have responsibility for other groups? How can the role be designed to foster such coordination?

--What are the key data and resources the leader will need to perform well? How can the role be designed to make it easy for the leader to obtain them?

Once questions such as these are reviewed, it is likely that one or another of the alternative designs under consideration will emerge as dominant (or, perhaps, a new and better alternative will come up in the testing process). The remaining design issue (which, in our view, should be addressed last) is the feasibility question--determining if the design of choice is actually possible, given organizational circumstances such as individuals' workloads, organizational politics, and the like.<sup>9</sup>

So: is there a generally correct design for team leader roles? The functional approach to leadership suggests not. Instead, as with the other aspects of leadership we have discussed in this paper, the "right answer" is to have a device that will help generate an answer that is right for particular organizational circumstances.

#### Conclusion

The major proposition in the model of leadership we have developed in this chapter is this: Effective leadership is that which contributes to the provision of engaging direction, an enabling structure, a supportive context, coaching as needed, and adequate material resources. We suggest three elaborations of this general proposition:

--The conditions created should be robust enough that they can survive normal organizational turbulence and remain in place for a reasonable period of time (they should not, for example, be easily reversible as soon as the leader has put them in place).

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<sup>9</sup> We have found that a good way to address the feasibility question is to ask "How can this design be implemented?" (rather than "Can this design be implemented?"). The former question invites a creative, problem-solving stance toward achieving what people have agreed is the preferred design alternative; the latter question invites objections and skepticism.

--Redundant conditions are to be sought rather than avoided (as, for example, when the direction communicated to a team, the design of its task, the reward system of the organization, and the coaching provided by a leader all contribute positively to high, task-focussed effort). Redundancy lessens the vulnerability of the performance system to unexpected and unfortunate changes in any one condition (for example, senior managers unilaterally altering the reward system, or a new technology having unanticipated negative effects on team task design).

--The process by which the conditions are established should not undermine either the capability of team members to work together or the personal well-being of individual members.

A subordinate proposition is that behaviors intended to strengthen each of the conditions will be helpful only if (a) the condition is not already at a satisfactory level, (b) the present level of the condition, even if satisfactory, is below its potential, or (c) there is risk that the state will soon fall from its present satisfactory level because of impending changes in the organization or the environment. To use a mechanical metaphor, our model of leadership suggests that continuous monitoring of the state of the system and regular preventative maintenance often can preclude the need for expensive and difficult repair work later.

Finally, a number of derivative propositions also can be developed from the general model--for example, regarding what will be needed (and therefore the kinds of functions that should occupy a leader's attention) under specifiably different group and organizational circumstances, and the attributes of leaders who are likely to be relatively more and less effective in various kinds of settings.

We could close the chapter by formalizing these propositions and derivations, and generating specific researchable hypotheses based on them. On reflection, it seems premature to do that. This chapter has been an explicitly exploratory venture by two scholars who heretofore have been

farming adjacent fields, growing similar crops but cultivating them differently. We prefer to keep learning from one another for a while, and we hope to learn from readers of this chapter as well, before attempting to develop a more formal statement of our ideas.

Let us end the chapter, then, by attempting to summarize our thoughts from a slightly different perspective than we have used throughout the chapter, in hopes that this alternative frame may provide readers with an additional perspective on our ideas, or some new notions of their own. Specifically, we will state, as succinctly as we can, how our model looks when examined from the perspective of individuals who occupy positions of team leadership.

Individuals who provide leadership to task-performing teams in organizations behave in accord with some cognitive model that specifies what kinds of actions are likely to yield what kinds of results. Their assumptions about the links between actions and results have developed from their past experience and their formal training. These personal models often are implicit, they often are wrong, and they typically focus selectively on a limited set of variables. For example, one leader may be preoccupied with manipulating formal rewards, another with personally facilitating constructive group dynamics, and still another with obtaining material resources. Often a leader's selective attention to one or a few ingredients relates to his or her particular areas of personal competence and experience--and therefore helps the leader keep his or her performance anxieties under control.

Our approach posits that effective leaders are those who, first of all, have valid personal models of team effectiveness--models that specify desired outcome states, identify conditions that foster their attainment, and specify

useful points of leverage for altering those conditions. The ability to work backward from outcomes (or anticipated outcomes) to implicate precursor conditions (such as a poorly-designed task, or a flawed reward system) requires both that leaders have trustworthy data about outcomes, processes, and conditions, and that they have the analytic ability to draw inferences and test hypotheses about relationships among the various factors in their models.

Assuming that a leader does have a reasonably valid general model of team effectiveness, and that he or she has trustworthy diagnostic insights into the conditions that are currently impeding team effectiveness, then the leader's effectiveness depends on whether he or she can competently generate and select among actions intended to deal with conditions that are serving as performance bottlenecks.<sup>10</sup> Ideally, the action actually selected would be influenced by two considerations: (a) how potent it is--i.e., how much leverage would likely be gained by altering a given condition, and (b) how feasible it is to change the condition--taking account of the leader's own power and skill as one relevant factor. The more imaginative the leader is, and the more options he or she considers, the greater the likelihood that inventive options can be developed that will have high potency, high feasibility--and, ultimately, constructive consequences for the work of the team, its capabilities as a performing unit, and the well-being of individual team members.

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<sup>10</sup> Note that the major categories of enabling conditions in our model are comprised of successively more detailed subordinate conditions. For example, "an enabling performance situation" includes as a subordinate condition "a well-composed team" which includes as a subordinate condition "a balance between homogeneity and heterogeneity of member skills and interests," which in turn can be broken down even further. It is not necessary for a leader to keep all these subordinate conditions in mind. What is important is that the leader's model prompts and directs a search for subordinate conditions that are appropriate to the present situation, and that it provide a criterion for testing the adequacy of ideas for actions that emerge.

References

- Barnard, C. I. The functions of the executive. Cambridge, MA: Harvard Univ. Press, 1938.
- Bass, B. M. Leadership: Good, better, best. Organizational Dynamics, Winter 1985, 26-40.
- Bennis, W. & Nanus, B. Leaders: The strategies for taking charge. New York: Harper & Row, 1985.
- Blake, R. R. & Mouton, J. S. The managerial grid. Houston: Gulf, 1964.
- Calder, B. J. An attributio theory of leadership. In B. M. Staw & G. F. Salancik (Eds.), New directions in organizational behavior. Chicago: St. Clair Press, 1977.
- Davis, R. C. The fundamentals of top management. New York: Harper, 1942.
- Drucker, P. F. The effective executive. New York: Harper & Row, 1966.
- Fayol, H. General and industrial management (C. Storrs, translator). London: Pitman & Sons, 1949. (Original work published in 1916)
- Fiedler, F. E. The Contingency Model and the dynamics of the leadership process. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 11). New York: Academic Press, 1978.
- Fleishman, E. A. Twenty years of consideration and structure. In E. A. Fleishman & J. G. Hunt (Eds.), Current developments in the study of leadership. Carbondale: Southern Illinois Univ. Press, 1973.
- Gersick, C. J. G. Life cycles of ad hoc groups. T. R. No. 3, Group Effectiveness Research Project, School of Organization and Management, Yale University, 1983.
- Gersick, C. J. G. The life cycles of ad hoc task groups: Time, transitions, and learning in teams. Unpublished doctoral dissertation, Yale University, 1984.
- Graen, G. Role-making processes within complex organizations. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology. Chicago: Rand-McNally, 1976.
- Gulick, L. & Urwick, L. Papers on the science of administration. New York: Institute of Public Administration, 1937.
- Hackman, J. R. The design of work teams. In J. W. Lorsch (Ed.), Handbook of organizational behavior. Englewood Cliffs, NJ: Prentice-Hall, in press.
- Hackman, J. R. & Oldham, G. R. Work redesign. Reading, MA: Addison-Wesley, 1980.

- Hersey, P. & Blanchard, K. Management of organizational behavior (4th ed.). Englewood Cliffs, NJ: Prentice-Hall, 1982.
- Hollander, E. P. Leadership and power. In G. Lindzey & E. Aronson (Eds.), Handbook of social psychology (3rd ed.). New York: Random House, 1985.
- Hollander, E. P. & Julian, J. W. Studies in leader legitimacy, influence, and innovation. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 5). New York: Academic Press, 1970.
- House, R. J. A 1976 theory of charismatic leadership. In J. G. Hunt & L. L. Larson (Eds.), Leadership: The cutting edge. Carbondale: Southern Illinois Univ. Press, 1977.
- House, R. J. & Mitchell, T. R. Path-goal theory of leadership. Journal of Contemporary Business, 1974, 3, 81-97.
- Katz, D. & Kahn, R. L. The social psychology of organizations (2nd ed.). New York: Wiley, 1978.
- Kennedy, R. F. Thirteen days: A memoir of the Cuban Missile Crisis. New York: W. W. Norton, 1969.
- Kerr, S. & Jermier, J. M. Substitutes for leadership: Their meaning and measurement. Organizational Behavior and Human Performance, 1978, 22, 375-403.
- McGrath, J. E. Leadership behavior: Some requirements for leadership training. Washington, DC: U.S. Civil Service Commission, 1962.
- Mintzberg, H. The nature of managerial work. New York: Harper & Row, 1973.
- Oldham, G. R. The motivational strategies used by supervisors: Relationships to effectiveness indicators. Organizational Behavior and Human Performance, 1976, 15, 66-86.
- Peterson, D. R. Functional analysis of interpersonal behavior. In J. C. Anchin & D. J. Kiesler (Eds.), Handbook of interpersonal psychotherapy. New York: Pergamon, 1982.
- Rauch, C. F., Jr. & Behling, O. Functionalism: Basis for an alternate approach to the study of leadership. In J. Hunt, D. Hoskins, C. Schriesheim & R. Stewart (Eds.), Leaders and managers. New York: Pergamon, 1984.
- Roby, T. B. The executive function in small groups. In L. Petrullo & B. M. Bass (Eds.), Leadership and interpersonal behavior. New York: Holt, Rinehart & Winston, 1961.
- Schlesinger, A. M., Jr. A thousand days: John F. Kennedy in the White House. Boston: Houghton-Mifflin, 1965.



- Schutz, W. C. The ego, FIRO theory, and the leader as completer. In L. Petrullo & B. M. Bass (Eds.), Leadership and interpersonal behavior. New York: Holt, Rinehart & Winston, 1961.
- Steiner, I. D. Group process and productivity. New York: Academic Press, 1972.
- Stogdill, R. M. Handbook of leadership. New York: Free Press, 1974.
- Vroom, V. H. & Yetton, P. Leadership and decision-making. Pittsburgh: Univ. of Pittsburgh Press, 1973.
- Walton, R. E. Establishing and maintaining high commitment work systems. In J. R. Kimberly & R. H. Miles (Eds.), The organizational life cycle. San Francisco: Jossey-Bass, 1980.
- Walton, R. E. From control to commitment: Transforming workforce management in the United States. In R. H. Hayes & K. B. Clark (Eds.), The uneasy alliance: Managing the productivity-technology dilemma. Boston: Harvard Business School Press, in press.
- Walton, R. E. & Schlesinger, L. S. Do supervisors thrive in participative work systems? Organizational Dynamics, Winter 1979, 24-38.

Walton, R. E. & Hackman, J. R. Groups under contrasting management strategies. In P. S. Goodman (Ed.), Designing effective work groups. San Francisco: Jossey-Bass, in press.

Hackman, J. R. & Walton, R. E. Leading groups in organizations. In P. S. Goodman (Ed.), Designing effective work groups. San Francisco: Jossey-Bass, in press.