

What Makes for a Great Analytic Team? Individual vs. Team Approaches to Intelligence Analysis

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The analysis of intelligence information invariably involves both cognitive and social processes. At core, analysis is a *cognitive* activity. Although intelligence analysts often draw on both technological aids and input from others, it ultimately is the human brain that organizes and interprets data to generate an assessment or prediction. A great deal of work has been done in the intelligence community and in the scholarly community more generally to identify both the cognitive biases that can compromise the validity of analytic conclusions and the heuristics that can help analysts do their work efficiently and well (see, for example, the well-known book by Richards Heuer (1999) on the psychology of intelligence analysis, and research by Gerd Gigerenzer and his colleagues (1999) on "fast and frugal" heuristics).

Analytic work also is an inherently *social* process. The conduct of intelligence analysis always involves relationships with those who assign analytic tasks and receive analytic products, of course. And both commentators and policy makers have addressed threats to the validity of analytic conclusions that can develop when those relationships become politicized. Less widely recognized is the fact that analytic work itself is highly social in character. The lone analyst working in isolation to extract the meaning from a set of data is the exception rather than the rule. Instead, analysts typically draw heavily on the expertise, experience, and insights of their colleagues in developing and testing their conclusions. As intelligence data increase in quantity and diversity, teamwork appears likely to become increasingly prominent in the production of analytic reports.

These different perspectives on analytic work have significant implications for the design and leadership of analytic units. The cognitive perspective puts the individual analyst at center stage. Managers who hold this perspective tend to organize the work to encourage and support

excellent individual performance. They are likely to give special attention to selecting highly talented analysts, training them well (including in strategies for minimizing the effects of cognitive and perceptual biases), and providing them with sophisticated technological and informational supports. Analysts still work in units where others are doing similar work, of course, and individual contributions may be aggregated into a unit-wide product. But individuals work in parallel and each analyst is held accountable for his or her personal output. Units of this kind are called *coacting groups*. Although members of coacting groups typically interact and consult extensively with one another, such exchanges are mainly in the service of helping individual members competently fulfill their personal responsibilities.

The social perspective, by contrast, focusses more on the importance of collegial interactions in competently assessing data of uncertain reliability, dealing with datasets that have holes where one would not want there to be holes, and managing relationships both with those who supply data and those who receive analytic reports. Managers who hold this perspective are likely to form *interdependent work teams* whose members are collectively responsible for a significant piece of analytic work--work that, since it is being performed by a team, can be larger in size and potential significance than usually is possible for a task performed by any single individual. Members of work teams bring their own special expertise to the work, of course, and over time evolve specialized team roles--but it is the team as a whole that produces and is accountable for the analytic product.

Both coacting groups and work teams, as defined above, are real social entities. But they almost certainly have different group dynamics and, potentially, different levels of effectiveness. The present report compares group behavior and performance for these two types of groups--a comparison that, we must note, was not the original purpose of the research. We initially set out

to identify the conditions which, when present, foster the effectiveness of analytic teams regardless of type, and we will indeed report our findings about that. In the course of collecting the data, however, it became apparent that the teams we were studying tended to be of one or the other type. And, as will be seen, some highly significant differences were found between these two types of groups, differences that may have implications for the design and leadership of analytic units throughout the intelligence community.

Sample and Procedure

Data were collected for 64 groups located in six different agencies within the intelligence community (see table). Groups were identified as either coacting groups or work teams depending on whether individual members or the group as a whole had primary responsibility and accountability for outcomes. Of the 64 groups studied, 38 (59%) were coacting groups, and 26 (41%) were work teams. Agencies C and E consisted mainly of coacting groups and agency B consisted entirely of work teams; the two types of groups were about evenly split in the other agencies.

Agencies	Groups	Individuals
A	3	23
B	5	25
C	19	143
D	9	76
E	15	114
F	13	69
Total	64	450

Survey, interview, and observational data were collected on site for each team. The survey data were gathered using the Team Diagnostic Survey (TDS), an instrument specifically designed to assess the degree to which the design, context, and leadership of task-performing teams are supportive of team effectiveness. The TDS has been validated with a large number of teams in many kinds of organizations (for details, including the psychometric properties of the instrument, see Wageman, Hackman, & Lehman, 2004). Only teams for which more than 50

percent of the members completed the TDS were included in the sample. TDS measures showed satisfactory reliability (median reliability was .72), and intra-class correlations affirmed that the TDS data, which were collected from individuals, could be aggregated meaningfully to the group level of analysis.

Interviews with team members and their supervisors, and observations of the teams at work, were collected opportunistically as circumstances permitted. After the data were collated and analyzed, each team was given a tailored feedback report that showed its areas of relative strength and other areas where improvements might be called for in how it was structured, led, or supported. (To access the online version of the TDS, or to view sample pages from a typical feedback report, see the web site for the instrument: <http://www.wjh.harvard.edu~tds/>).

Criteria of Team Effectiveness

Because the research sample included a diversity of groups that did different kinds of analytic work for different clients, it was necessary to develop a measure of performance effectiveness that would be comparable across groups and agencies. Our measure was based on the three-dimensional definition of team effectiveness proposed by Hackman (2002, Chapter 1).

Dimensions of effectiveness. Each of the three criterion dimensions is specified below. To illustrate them, we provide examples of teams that scored especially high, and especially low, on each one (details have been altered or omitted so that none of the illustrative teams can be identified).

1. *The productive output of the team (that is, its product, service, or decision) meets or exceeds the standards of quantity, quality, and timeliness of the team's clients--the people who receive, review, and/or use the output.* One group in our sample prepared reports that, after review, usually reached the desk of a senior policy official. Word frequently came back from the

official that he found the group's analyses quite helpful. By contrast, another team generated a regular monthly report on certain cross-border transactions--a report that, it turned out, was never even looked at by the team's presumptive customer. It is not how many pages the group produces or even a report's technical quality that counts for effectiveness; it is, instead, the degree to which the group's client(s) find its products to be of value.

2. *The social processes the team uses in carrying out the work enhance members' capability to work together interdependently in the future.* One group's task was to refine certain quantitative indicators of an activity that was of special interest to its client. Over time, members of this group developed deep knowledge of one another's special strengths and weaknesses and became so highly skilled in coordinating their activities that members anticipated one another's next moves and initiated next steps even as colleagues were completing previous steps. In another group, by contrast, the longer members worked together the more dissension and conflict they experienced. Eventually group work became so distressing that members concluded that they could agree about only one thing--namely, that they should ask their manager to disband the group. Effective groups operate in ways that build shared commitment, collective skills, and task-appropriate coordination strategies--not mutual antagonisms and trails of failures from which little is learned. They are more capable performing units when a piece of work is finished than they were when it began.

3. *The group experience, on balance, contributes positively to the learning and personal well-being of individual team members.* One group needed to draw upon state-of-the-art knowledge about certain aspects of information technology to carry out its work. Members of this group reported that working with other members was akin to attending a continuing seminar on cutting edge developments in computer science. By contrast, members of another group

spent the majority of their time monitoring systems for signs of possible trouble--essentially staring at screens that rarely signaled that anything was amiss. Members of this group reported not just that they were bored, but also that the work actually atrophied their professional skills. Groups can be wonderful sites for learning--for expanding one's knowledge, acquiring new skills, and exploring perspectives that differ from one's own. But groups also can stress their members, alienate them from one another, and undermine their confidence in their own abilities. We do not count as effective any group for which the net long-term effect of the group experience on individual members' learning and well-being is more negative than positive.

These three criteria can be used to assess the effectiveness of any work group, regardless of task or setting. The relative *weight* of the three criteria, however, does vary across times and circumstances. If, for example, a temporary task force were formed to perform a single task of extraordinary importance, then the second and third dimensions would be of lesser relevance; the opposite would be true if a main purpose of the group work were to help members gain experience, learn some things, and become competent as a performing unit. Truly great groups continuously manage the tradeoffs among the three criteria as their circumstances change.

Measuring the criterion dimensions. Achieving the three criteria requires neither extraordinary accomplishment nor exemplary social processes. All that is necessary is output judged acceptable by those who receive or use it, a group that winds up its work at least as capable as when it started, and members who are at least as skilled and fulfilled as they are frustrated by what has transpired. Obtaining quantitative measures of the criteria, however, is far from straightforward when, as in the present case, it is impractical to obtain comparable assessments from a large and diverse group of clients.

Our strategy was to obtain measures of each of the criterion dimensions using three different sets of indicators--each of which was in some way flawed, but which were flawed in *different* ways. If those three independent measures converge (that is, show strong positive intercorrelations) one can be reasonably confident of the reliability and meaningfulness of a composite effectiveness measure obtained by arithmetically combining them.

The first of the three measures was generated using data from the Team Diagnostic Survey. Although the TDS does not directly ask respondents how well they think their group has performed, it does ask them to describe, as objectively as possible, aspects of their group processes--specifically, how the group manages its effort, its utilization of member talent, and the group's performance strategy. Previous research has shown that if a group does a good job of managing these three processes (that is, if members work hard and efficiently, draw well on one another's talents, and develop a work strategy well-suited to the task and situation) it is highly likely that it also will excel on its task (Hackman, 2002). Therefore, a composite measure of a group's standing on the three performance processes was taken as a surrogate indicator of the degree to which the group produces an acceptable analytic product. The TDS also yields measures of the second and third criteria--that is, members' reports of the degree to which members are working together increasingly well, and the degree to which individual members find more learning and fulfillment than frustration in the group work.

The second type of criterion measure was an independent rating by the on-site observer (O'Connor) of each group's standing on each of the three dimensions of team effectiveness. To maintain independence, these ratings were made after observations were completed but before TDS data were examined. The ratings were made separately and independently for each team (that is, without reference to the standing of any other teams), using five-point rating scales that

included concrete descriptions of each scale point (for details, see Wageman, Hackman, & Lehman, 2004).

The third type of criterion measure was a multi-attribute ranking of all groups in the sample. This ranking, which was done after data collection was complete, involved successive sorts of the groups using all data from all sources. It generated an overall rank order of the groups in the sample from most to least effective.

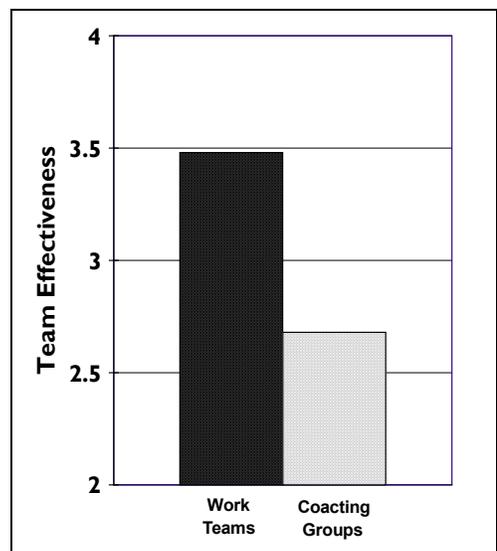
Data from the three types of measures were standardized for comparability and then intercorrelated to assess the degree to which the measures converged. The median intercorrelation among the three types of measures was .71. For the analyses presented here, we also combined across the three criterion dimensions, since they also were positively correlated (median $r = .46$). The reliability of the final composite measure of team effectiveness was .88, which is more than satisfactory.

Coacting Groups vs. Work Teams

As is seen in the following figure, work teams clearly outperformed coacting groups on the composite measure of performance effectiveness.

(Unless otherwise noted, all differences discussed in this report are statistically reliable at $p < .01$ or better.) Why might this be the case?

The most straightforward possibility is that work teams have a higher standing than coacting groups on those factors that have been shown to foster team effectiveness for other kinds of work in other



organizational settings. In brief, research has identified five conditions which, when present,

increase the chances (but do not guarantee) that a work group will perform effectively (for details, see Hackman, 2002). These five conditions, which served as the conceptual basis for the present research, are listed below.

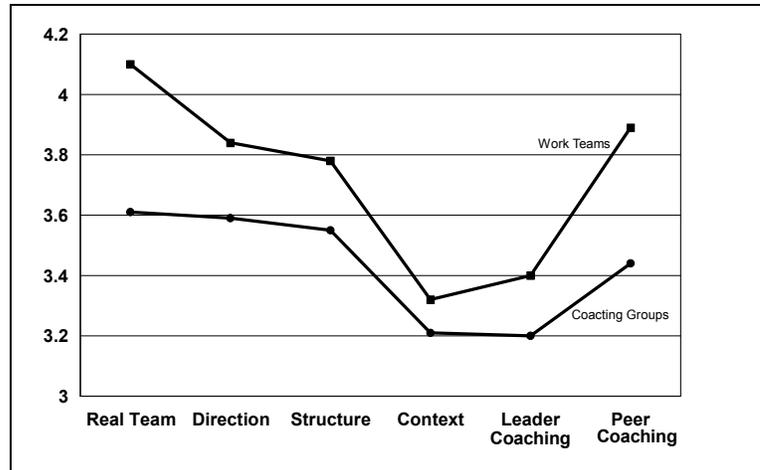
To assess the degree to which these conditions shape the effectiveness of analytic teams, we computed a linear regression using the entire sample of 64 groups (that is, both work teams and coacting groups). Results show that, together, the five conditions control 74 percent of the variation of the composite measure of analytic team effectiveness--an extremely strong effect.

Conditions for Team Effectiveness	
1. Is the unit a <i>real team</i> ?	(bounded, stable, members interdependent)
2. Does it have a <i>compelling direction/purpose</i> ?	(challenging, clear, consequential)
3. Does its <i>structure</i> facilitate team work?	(task design, team composition, norms about behavior)
4. Is its <i>organizational context</i> supportive?	(rewards/recognition, information, education, resources)
5. Does it have access to competent team <i>coaching</i> ?	(available, expert, and focussed on task processes)

Regardless of whether they are work teams or coacting groups, the very best analytic teams tend to be stable and bounded as a performing unit, with members interdependent for some shared purpose. They have a clear and compelling direction for their work. They are the right size to perform their task, have a whole and meaningful piece of work to accomplish (for which they receive trustworthy feedback), and have clear norms about what behaviors are and are not acceptable within the group. The organizational context within which they work is supportive--providing recognition for excellent performance, and ample informational, consultative, and material resources. And, finally, they receive whatever coaching, teaching, and hands-on assistance as are needed to help members take full advantage of their favorable performance circumstances.

Do work teams and coaching groups differ in their standing on these five enabling conditions? The answer is a clear “yes.” Work teams scored significantly higher than coaching groups on four of the five

conditions, the exception being the supportiveness of the organizational context, which is understandable since the two types of teams shared the same contexts. As is seen in the chart, differences were especially

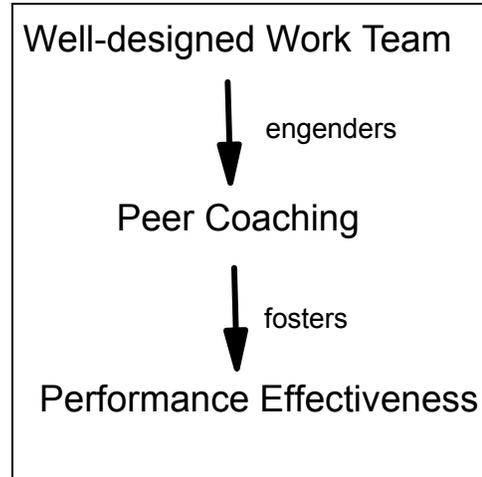


pronounced for the degree to which the group was a real team, which would be expected, and in the amount of hands-on coaching the group received, which was a surprise.

The chart breaks out coaching from two different sources--that received from the team’s designated leader, and that received from fellow team members (peer coaching). Work teams exhibited substantially more peer coaching than did coaching groups. This is of special interest because peer coaching unexpectedly turned out to be more powerfully associated with team effectiveness than any other factor assessed in the research--the zero-order correlation between peer coaching and the composite effectiveness measure was .84, which approaches the reliability of the criterion measure and therefore is about as large as can be obtained.

The apparent causal flow, then, is as shown in the following figure. Members of teams that are well designed (that is, that are interdependent groups with a compelling purpose and an enabling structure) experience stronger impulses to teach and assist one another than do members of coaching groups. And, our findings show, this kind of peer coaching turns out to be critical to a team’s eventual performance effectiveness.

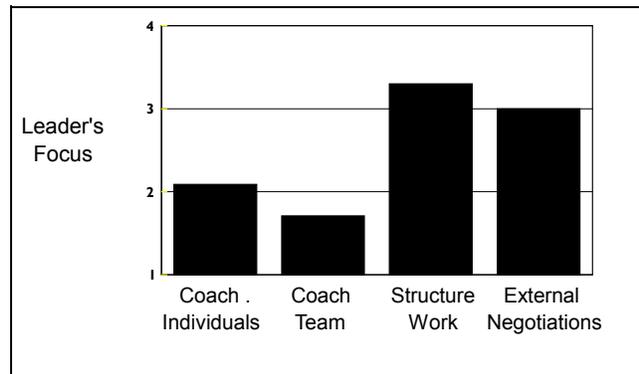
What about the designated team leader, the person who normally would be expected to do most of the coaching of the teams for which he or she has managerial responsibility? Our findings show that leader coaching also is positively associated with team effectiveness--but not nearly as strongly as is coaching by teammates. At least for analytic teams in the



intelligence community, the reason for this may simply be that team leaders are busy doing other things and do not have (or take) the time needed to provide hands-on coaching of their teams.

We asked members of the teams in our sample to describe the focus of their leaders' time and attention, and the findings are summarized in the following figure. Leaders responsible for intelligence analysis teams appear to give most of their attention to getting the work itself structured properly. Then comes running external interference--making sure that their people have the resources they need for the work and

removing roadblocks that could compromise performance. Third comes coaching individual members--dealing with personal issues, and helping individuals overcome any performance difficulties they may be having.



And then, last, comes coaching the team as a *team*. Peer coaching, then, may indeed emerge prominently in well-designed work teams because it is engendered by members' interdependent pursuit of important purposes. But it may also be observed, at least in part, because members

realize, perhaps implicitly, that at least some level of coaching is needed--and that their designated leaders just do not have the time to do it.

Conclusions and Implications

A great deal of organizational work is performed these days by sets of people who are called “teams” but that actually are not. Managers in organizations where this is done may harbor the hope that they can harvest the widely touted benefits of teamwork while continuing to directly manage the behavior of individual members. The present findings suggest that this hope is misplaced: If one wants the benefits of teamwork, one must give a *team* the work. Yet, as will be seen below, teams are not always the best way to design analytic work. And even when teams are an appropriate design choice, it can take considerable managerial savvy and skill to provide them with the leadership and organizational supports that they require for success.

Work teams have nontrivial benefits, but they are not appropriate for all types of work.

When work is designed for a team rather than for individuals, the task to be performed can be larger in scope, more meaningful, and more consequential--attributes that have been shown to foster high work motivation (Hackman & Oldham, 1980). Moreover, since the work is not parceled out in small pieces among multiple performers, it is easier to establish direct two way communication with the clients of the work which, in turn, can provide performers with regular, meaningful feedback about their performance. Finally, a large team task often requires that the team be composed of individuals with different expertise and specialties, which can foster the kinds of cross-functional exchanges that, occasionally, result in unanticipated insights and syntheses.

It can be a design challenge to create large, consequential work for a team while still keeping the team itself as small as possible--a challenge that must be confronted because the

many potential advantages of large-scope tasks can be more than offset if a team is so large that members cannot work together interdependently in real time. As a rule of thumb, a team size in the double digits is almost always cause for concern.

The present findings suggest that when the design challenges can be overcome, the performance benefits of having a diverse group of analysts working interdependently on a consequential task can be considerable. The level of peer helping, teaching, and learning that occurred in these teams exceeded even what was seen in coaching groups whose leaders exhorted members to communicate and coordinate with one other. Shared accountability for a collective outcome is a key feature of real work teams, one that drives the favorable performance outcomes documented in this report--and one that cannot be obtained merely through education or exhortation.

Despite their potential benefits, interdependent work teams assuredly are *not* appropriate for all types of work or in all organizational circumstances. As seen in the table, there are at

least five different kinds of teams that can be used to accomplish analytic work, each of which is appropriate in some circumstances, but not in others. Wise managers consider all of these options before settling on the one that is most appropriate and feasible for the work to be done and the organizational circumstances in which it will be done

Five Options for Teamwork	
A. Individual-centric teams	
1. Surgical team (all feed the key person)	
2. Coaching group (informal helping)	
B. Real work teams	
3. Face-to-face (what we usually imagine)	
4. Virtual and/or distributed (special needs)	
C. Dynamic teams	
5. Sand dune teams (strong culture needed)	

The first two options are individual-centric, in that the primary responsibility and accountability for outcomes rests with individual performers. The term *surgical team* was

coined by Frederick Brooks, who was the manager of IBM's System 360 programming effort many years ago. A programming team, Brooks argued, should be structured like a surgical team, in which members work together but one individual has primary responsibility for the quality of the output (for details, see Brooks, 1995). In surgical teams, the focus of the team work is to ensure that the lead person has all the information and assistance that members can provide. This kind of team is indicated when the work requires an extremely high level of individual insight, expertise, and/or creativity--metaphorically, the writing of a play rather than its performance.

Coacting groups, whose members all have their own tasks to perform but in a group context, have been discussed throughout this report. Coacting groups are indicated when there is minimal need for interdependent work by group members and they can, in effect, operate in parallel. The group output, then, is simply the aggregation of the separate contributions of individual members.

In real work teams, which also have been discussed extensively here, members do work together interdependently and share responsibility and accountability for the collective outcome. The most common type of work team, and what we usually have in mind when we use the term, is a *face-to-face team*, whose members are co-located and rely heavily on direct interaction with one another in real time to accomplish the work. Such teams are indicated when a high quality product requires contributions from a diversity of members who have complementary expertise, experience, and perspectives.

With the rapid recent advances in information and communication technologies, *virtual teams*, which are real work teams whose members are not co-located, are becoming increasingly popular. Virtual teams are of course indicated when interdependent work is required but team

members are widely dispersed or frequently moving from place to place. As more and more organizations have logged experience with virtual teams, however, it has become clear that electronic means of communication among members is not a panacea. Researchers are now working to identify the special conditions, beyond the mere availability of sophisticated communication capabilities, that are required to for such teams to function well (Gibson & Cohen, 2003).

Finally, what we refer to as *sand dune teams* are dynamic social systems, in that they have fluid rather than fixed composition and boundaries. Just as sand dunes change in number and shape as winds change, teams of various sizes and kinds form and re-form within a larger organizational unit as external demands and requirements change. Typically, the larger unit is relatively small (perhaps less than 30 members), and membership in that unit is relatively stable, which allows the development of norms and routines that make it possible for teams to be formed and re-formed highly efficiently. We believe that dynamic teams of this general type have great potential for the kinds of work done in the intelligence community, especially under conditions of resource scarcity, but further research is needed about the conditions that are required to support them.

Coaching by team leaders helps most when teams are otherwise well designed and well supported. Coaching by the designated leaders of the analytic groups in the present research was not among the strongest influences on team effectiveness, perhaps mainly because those leaders were, in the main, so preoccupied with other duties that they did not actually *do* much hands-on team coaching. Although members of the interdependent work teams in the study took up the slack and coached themselves, apparently quite competently, team effectiveness might be further

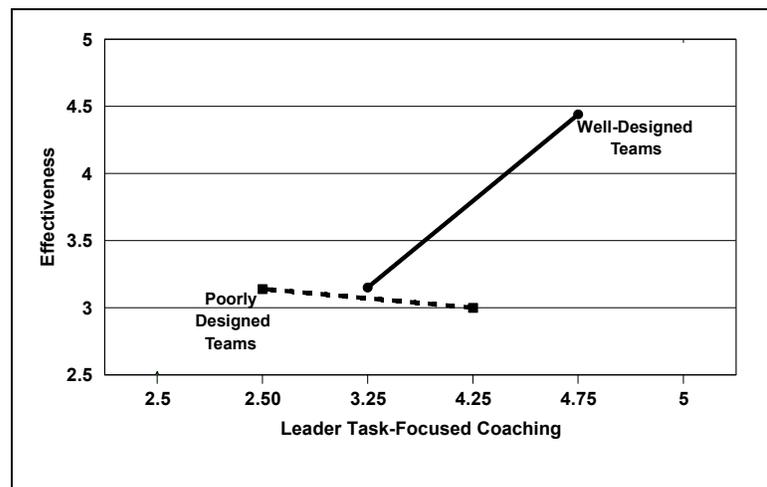
enhanced if leaders were to allocate a greater portion of their time to working actively with their teams.

Merely spending time on team coaching does not guarantee improvements in team behavior or performance, however. For one thing, coaching is an activity that requires some level of skill. Not everyone who occupies a team leadership role necessarily has that skill, and bad coaching can be much worse for a team than no coaching at all. So it would be insufficient merely to task team leaders to “do more coaching.” Training in coaching skills almost always is required to ensure that the coaching provided will be both well-timed and competently delivered (Hackman, 2002, Chapter 6).

Moreover, research has shown that coaching helps a team most when the basic design of the team is sound--and that coaching generally is ineffectual if the team is poorly composed, structured, or supported (Wageman, 2001). Our data confirm this conclusion for analytic teams. We sorted the teams in our sample into two groups--those with relatively high vs. relatively low standing the design features discussed earlier in this report (i.e., real team, compelling direction, enabling structure, and supportive context). Then we examined the impact of leader coaching on team performance effectiveness,

separately for these two groups.

As is seen in the figure, leader coaching had essentially no impact on the effectiveness of the poorly-designed teams, but a significantly positive effect for the well-designed teams. Coaching is



important, but it operates at the margin. Because the primary determinants of team behavior and performance are how well the team is structured and supported, leaders would be well-advised to give first priority to getting their teams set up right, and only then to turn to coaching activities intended to help teams fully exploit their performance circumstances.

Competition among teams is great for team motivation, but also can bring significant dysfunctions. It is absolutely true that inter-group competition is one of the most efficient and powerful management devices available for spurring team motivation. This fact, perhaps, is one reason why so many organizations in both the public and private sectors explicitly set teams off in competition with one another in pursuit of the psychic and tangible rewards of winning. It also is true, however, that inter-group competition often (research findings tempt one to say “almost always”) generates unintended dysfunctional consequences. These include withholding data needed by other teams, putting the achievement of political advantage or prominence ahead of the quality of the work produced, and even spawning behaviors intended to undermine the work of other teams. Although we have no data about any unintended consequences of the proliferation of units within the intelligence community that are tasked to work essentially the same problem (counter-terrorism centers come to mind), it is at least possible that some of the dysfunctional inter-group dynamics listed above may emerge if the various units come to view themselves as being in competition with one another for the ears of policy-makers.

Is it possible to create conditions that foster high team motivation and simultaneously minimize exposure to the dysfunctions of inter-group competition? The findings of the present study provide some basis for optimism. The conditions for team effectiveness that have been discussed here do foster high, task-focussed motivation--and in a way that promotes cooperation and collaboration among team members. To generalize the present findings from intra-group to

inter-group dynamics is, without question, a stretch. But the possibility that intelligence organizations could be viewed, and managed, as sets of interdependent groups rather than as coacting or competing units may be worth at least a moment's reflection.

* * *

In our time collecting data across the several intelligence community organizations, we heard many exhortations for more and better teamwork. Our findings provide some support for this point of view, in that there is solid evidence that well-designed and well-led work teams can indeed turn in exemplary performances. But it must be emphasized once again that exhortation by itself is insufficient. Capturing the benefits of teamwork requires, at minimum, (1) careful thought about the proper type of team for the work to be done and the setting in which it will be done, (2) knowledge and skill, including political skill, in creating and maintaining the conditions that increase the likelihood that teams will perform well, and (3) skill in coaching teams to take advantage of those enabling conditions.

Postscript

As part of the research project described in this report, we have developed a web-based methodology for assessing the standing of task-performing teams on the five conditions that foster effectiveness. This tool is freely available for use in diagnosing intelligence community teams at the following Harvard University web site: <http://www.wjh.harvard.edu/~tds>

For additional information on the conceptual model on which the present study was based, along with research findings that illustrate the model and its application to the design and leadership of work teams, see the book *Leading teams: Setting the stage for great performances* by J. Richard Hackman (Harvard Business School Press, 2002).

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