Creating and Leading Analytic Teams

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CREATING AND LEADING ANALYTIC TEAMS

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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 both on technological aids and on input from others, ultimately it is the human brain that organizes and interprets data to generate an assessment or prediction. A great deal of research has been conducted 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, research by Gerd Gigerenzer and his colleagues [1999] on "fast and frugal" heuristics, and the other chapters in this volume).

Yet 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. The threats to the validity of analytic conclusions that can develop when those relationships become politicized are well known. 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. Most of the analysts who participated in a recent study of 64 analytic units in six U.S. intelligence organizations, for example, worked in groups of various kinds (Hackman & O'Connor, 2004). As intelligence data increase in quantity and diversity, teamwork is likely to become increasingly prominent in the production of analytic reports. This chapter
explores the different kinds of teamwork that can be used in analyzing intelligence data, identifies the organizational conditions that foster analytic team effectiveness, and suggests strategies for competently structuring, leading, and working within analytic teams.

**The Nature of Analytic Collaboration**

We use the term “collaborative analysis” to refer to work performed by a set of professionals who share responsibility for using data that are incomplete and/or of uncertain reliability to generate conclusions about something that has happened, is happening, or is likely to happen. Such work involves multiple steps about which considerable research has been done—the identification of an issue of concern, the definition of the problem, the creation or selection of the information to be considered, pooling of knowledge, coordinating members’ inputs, and decision-making about analytic conclusions. [2] However, there is wide variability in the types of analytic problems organizations face, and in the ways they structure collaborative analysis.

In a field study of analytic teams in the medical, financial, and intelligence communities, we identified three different "zones" of analytic work, which are characterized by differences in (1) the scope of the information being processed, (2) the temporal urgency in generating an analytic product, and (3) the level of interdependence among the collaborators. The mini-cases supplied by our interviewees showed that collaboration dynamics for teams that fall within each of the three zones are remarkably similar across the intelligence, financial, and medical domains. There are, of course, significant differences among the domains in the character of the work itself. For example, intelligence teams often must deal with data that are incomplete and/or of
uncertain validity, medical analyses guide actions taken with the same persons who
provide the data that are analyzed, and the criteria of success in financial analyses are
primarily economic. But it is the commonalities across the domains that provide some
new insights into the dynamics of analytic collaborations.

The Inner Zone

Teams in the inner zone typically enjoy the best of conditions for fostering
analytic collaboration—a fairly narrow scope of information, high time urgency, and
intense interdependence among analysts.

Crisis action teams in the intelligence community exemplify inner zone teams. These teams are created to provide analytic support to decision-makers during times of
crisis. Because of the highly sensitive nature of their work, such teams often work in a
secure “vault” in which members are seated in close proximity to one another while being
physically separated from everyone else. They often operate around the clock in
staggered shifts to insure that someone always is available to receive and respond to
information as it arrives from the field. Since such teams are convened specifically to
work on a particular critical situation, their work has a narrower focus than is
characteristic of problems addressed by other types of intelligence teams. Members'
close proximity, the intensive nature of their work, and their near-continuous discussions
about what is being learned results in considerable overlap in the information known by
members even though they typically have quite different functional specialties.

Inner zone teams also are found in the financial and medical communities. In
investment banking, for example, analytic work for mergers and acquisitions typically is
handled by small, clearly bounded, interdependent teams of analysts who focus on a
relatively narrow scope of information under high time urgency as well as great secrecy. Similarly, emergency room teams in hospitals work in close proximity to one another and focus on a fairly limited set of presenting problems that are dealt with as quickly and efficiently as possible. One emergency department physician described how his team narrows the scope of information members must deal with by focusing first on “what can kill you,” instituting precautionary measures to protect against subsequent problems only after the most imminent threat has been dealt with. Emergency room teams explicitly exclude less pressing concerns and refer patients back to their primary care physicians for follow-on care whenever possible.

When asked to give an instance of good analytic collaboration, almost all of the examples interviewees supplied fell within the inner zone. It appears that when teams work highly interdependently and under great time pressure on small-scope analytic tasks, the conditions that foster effective teamwork are almost always present as a natural feature of inner-zone analytic contexts rather than as something that must be created deliberately through managerial action.

The Outer Zone

All three communities also provided examples of analytic work conducted in contexts characterized by the opposite extremes— that is, broad scope of information, little interdependence among collaborators, and low temporal urgency. Indeed, teams in the outer zone often are teams in name only, with analysts functioning more as individuals with well-developed collegial networks than as real teams whose members share collective responsibility and accountability for a specific piece of analytic work.
In the medical community, for example, primary care physicians typically work in outer-circle contexts--tracking data on each patient on a variety of issues over a long span of time and referring them to non-collocated colleagues and specialists when problems come up that require special expertise. The scope of information involved in primary medical care is extensive, many collaborators can be involved in a particular patient’s care at different points in his or her history, and the level of interdependence among these collaborators is low. Primary medical care rarely is provided by teams working together interdependently in real time.

The intelligence and financial communities also make use of analysts who track data on a particular region or sector over a long period of time. The major responsibility of these analysts is to notice trends that signal important changes and to alert policy makers or investors. The potential number of indicators that may be tracked is virtually unlimited. Moreover, because indicators vary in reliability and importance, information from all sources must be weighed and integrated by an experienced analyst to extract its meaning and implications. Seasoned analysts in both the financial and intelligence communities spoke of the importance of developing and maintaining extensive networks of contacts to access potentially relevant new information and to check on the veracity of data already in hand. One intelligence analyst said it was essential that he know the people at other agencies who worked the same issues in the same region so they could alert him to new developments—but that it also was important that he and the other analysts not be on the same team, since their independence provided a greater breadth of data and objectivity of interpretation.
Real-time team analytic collaboration is extremely difficult when the work is wide in scope, with neither a pressing need for interdependence nor temporal urgency. Analytic work of this type appears to be best done by individuals who have rich networks of experts with whom to consult and ample time to integrate and interpret data obtained from them. Indeed, it may be nearly impossible to create bounded teams in the outer zone whose members are collectively accountable for analytic products.

The Middle Zone

Between the inner and outer zones lies a middle area in which the quality of analytic collaboration has the greatest variance. Projects in this zone have a moderate scope of information, have established but not immediate deadlines, and are performed by a group of analysts whose members have their own functional specialties but who also must work interdependently. Sometimes such teams are formed to follow up on issues uncovered by analysts in the outer zone; other times they are convened to provide on-going monitoring of an issue that initially was an inner-zone crisis but that subsequently lessened in temporal urgency and broadened in scope. In the medical community, for example, teams that treat illnesses such as breast cancer exemplify the middle zone when they use collaborative forums such as "tumor boards" to assess patients' evolving medical issues. In the financial community, middle zone teams include those that are convened to assess issues that are important but not urgent, such as exploring the potential uses of new financial instruments or tracking changes in a particular currency.

Several intelligence analysts reported that carrying out collaborative analytic work in the middle zone, such as producing a National Intelligence Estimate, often is laden with inefficiency and frustration. Problems included group size (too large), group
process (too unstructured), and team leadership (too inexperienced to manage collaborative work well). Yet interviewees also provided positive examples. One political analyst described how she and the engineers who were working on an estimate devised a unique way of working together sequentially. The engineers would supply the calculations needed for estimating a nation's weapons capability, and then she and the other social scientists on the team would work with that information to assess its policy implications. The entire group would then elaborate on those contributions to create the final product. The analyst reported that the ability of this team to respect and draw upon the capabilities of members from diverse specialties was relatively unusual in her experience with collaborative analysis.

Middle-zone teams require members with different specialties and expertise, but they also need a mechanism to ensure that the diverse inputs of those members are shared and integrated. This tension can be a considerable challenge for such teams, and leadership interventions often are needed to help members manage it.

**Alternative Types of Analytic Teams**

Good teamwork is relatively easy to achieve in the inner zone, difficult in the outer zone, and highly variable in the middle zone--a matter about which we will have more to say later. But there remains the question of whether a team should be used at all for analytic work and, if so, how the team should be set up. We turn to these matters next.

Managers often form teams without much deliberate thought about whether a team actually is the best way to get a piece of work accomplished. Some managers, for example, hold an implicit assumption that teams produce higher quality products than
individuals--in effect endorsing all of the potential benefits of teamwork trumpeted in the popular management literature. Other managers may decide to assign a controversial piece of work to a team in hopes of diluting, or at least distributing, their own accountability for whatever is produced. Still others may use a team to engage those who serve on it and, they hope, thereby foster members' commitment to whatever is produced. All of these, and more, are common reasons for using teams to perform analytic work.

There are, to be sure, many potential advantages to team work (for a summary of the positive case for teams, see Leavitt, 1975; for the contrary view, see Locke et al., 2001). A team task can be larger in scope, more meaningful, and more consequential than would be possible for work designed for any one individual, and these attributes have been shown to foster high work motivation (Hackman & Oldham, 1980). Moreover, since the work is not parceled out in small pieces to individual performers, it is easier to establish direct two way communication with the clients of the work which, in turn, can provide performers with meaningful feedback about their performance. Finally, a large 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.

Some kinds of analytic tasks are inappropriate for group work, however, such as those that require sophisticated use of highly specialized individual knowledge or expertise. Another task that often is carried out by a team but should not be is creative writing. Writing inherently involves bringing to the surface, organizing, and expressing thoughts and ideas that initially are but partially formed in one's mind, and such work is inherently more suitable for individual than for collective performance.
One of the first decisions that a leader must make in creating a work team, then, is to make sure that the work to be done actually is appropriate to be performed by a team and, if it is not, to find alternative means of accomplishing it. Leaders who are not trapped by implicit cognitive models or emotional imperatives that are biased toward teamwork weigh carefully the advantages and disadvantages of creating work teams, and avoid assigning to a team work that actually would be better performed by an individual.

If a leader decides that a piece of work really should be assigned to a team, then he or she must next decide what kind of team to form. The most common choice, of course, is the face-to-face interacting group. But there are other options as well, each of which is appropriate in some circumstances but not in others. The types of teams most commonly used for analytic work can be placed in a four-cell table, shown in Table 1, that is defined by two axes: (1) the degree to which responsibility and accountability for work outcomes lie primarily with the group as a whole vs. with individual members, and (2) the degree to which members interact synchronously in real time vs. asynchronously at their own pace. As will be seen, different types of teams are indicated for work that lies in the inner, middle, and outer zones.

---Table 1 about here---

**Surgical teams.** Teams in the upper-left quadrant are what Frederick Brooks (1995) has termed "surgical teams." Responsibility and accountability for outcomes lies primarily with one person, the surgeon, but accomplishing that work requires coordinated interaction among all members in real time as the work unfolds. Brooks, who managed IBM’s System 360 programming effort many years ago, argued that programming teams should be structured like a surgical team, with members working closely together but
with one individual having primary responsibility for the quality of the output. In surgical teams, the team's job is to ensure that the lead person has all the information and assistance that members can provide. This kind of team is indicated for middle-zone analytic work that requires an extremely high level of individual insight, expertise, and/or creativity.

**Coacting groups.** Individual members also are primarily responsible for outcomes in coacting groups (the lower-left quadrant in the table). Each member’s work does not depend upon what the others do, and the output of the group is simply the aggregation or assembly of the individual contributions. Members of coacting groups typically have the same supervisor, and may or may not work in proximity to one another. Coacting groups are indicated for outer-zone tasks in which there is minimal need for coordinated, interdependent work by members who can, in effect, operate in parallel and assemble their collective analytic product later.

**Face-to-face teams.** In face-to-face teams (the upper-right quadrant of the table) members are co-located and work together interdependently in real time to generate an analytic product for which they are collectively accountable. These teams are what leaders usually have in mind when they use the term "work team," and the bulk of the existing research literature on team behavior and performance is about them. Face-to-face teams are indicated for inner and middle zone work for which a high quality product requires coordinated contributions in real time from a diversity of members who have complementary expertise, experience, and perspectives.

**Distributed teams.** In the lower right-hand quadrant of the matrix are distributed teams (which also sometimes are called "virtual teams"). These teams are responsible
and accountable for analytic products, but their members need be neither co-located nor interacting with one another in real time. With the rapid recent advances in information and communication technologies, members are able to interact mainly, and sometimes exclusively, electronically and on their own schedules. Because there is no requirement for co-location, distributed teams can be larger, more diverse, and collectively more knowledgeable than those whose members interact face-to-face. When they function well, such teams can bring widely dispersed information and expertise to bear on the team's work quickly and efficiently (Townsend, DeMarie, & Hendrickson, 1998).

Distributed teams are especially useful in performing outer zone work that requires relatively low levels of interdependence among members. They also can be used for middle zone work when it is difficult or impossible for team members to meet regularly, perhaps because they are located in widely dispersed time zones. As increasing numbers of organizations have logged experience with distributed teams, it has become clear that electronic means of communication among members is not a panacea. Distributed teams do relatively well with innovation tasks for which ideas and solutions need to be generated, for example, but generally underperform face-to-face teams on decision-making tasks (Hollingshead & McGrath, 1995). Although decision support systems can improve performance slightly, decisions made from afar still tend to take more time, involve less exchange of information, and result in less participant satisfaction with the outcome than is the case for face-to-face teams.

Researchers are now working to identify the special conditions, beyond the mere availability of sophisticated communication capabilities, that are required for such teams to function well. [3] One thing that is clear from research to date is that dispersed teams
benefit greatly from having a face-to-face “kick-off” meeting. At that meeting, members can get to know one another, clarify team goals and member roles, develop initial norms about how they will work together electronically, and share information and expertise about the efficient use of communications technologies. Ideally, the team also will punctuate its work with additional face-to-face meetings at critical decision or transition points. Research also has shown that team leaders can enhance the work of dispersed teams by playing a “caretaking” role--supporting regular, detailed, and prompt communication, scheduling regular “chat” sessions with all team members present, and using humor to lighten the mood when things get tense.

In sum, distributed teams are appropriate for many, but not all, team tasks. Using them well requires careful attention to team structure, a face-to-face "launch" when the team first comes together, and leadership support throughout the life of the team to keep members engaged and aligned with collective purposes.

**Sand dune teams.** Not included in Table 1 is a special kind of team that is not in any traditional sense a bounded work team at all. We refer to such teams as "sand dune teams" because they are dynamic social systems that 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. Sand dune teams can assume different forms for different tasks, which allow them to perform work across all three analytic zones. They may be especially well suited for analytic units in which the work that does not lend itself to the formation of single teams whose members are dedicated to those teams for extended periods.
Sand dune teams were used to good effect in a small analytic unit in the U.S. Office of Management and the Budget that conducted economic analyses for senior policy makers (Davis-Sacks, 1990a; 1990b). Some unit tasks required research that extended over many months; others required members to track legislation making its way through Congress in real time; and still others were one-shot analyses for clients that had to be completed in a matter of hours by teams created on the fly. Teams in the unit were continuously forming and re-forming as task requirements changed, with different individuals serving simultaneously on multiple teams that had different tasks, clients, and expected life spans.

The organizational units within which sand dune teams operate typically are relatively small (perhaps less than 30 members) with relatively stable membership, which makes possible the development of norms and routines that allow teams to form and re-form smoothly and efficiently. Dynamic teams of this type appear to have great potential for carrying out analytic work in the intelligence community, but considerable research remains to be done to identify and document the conditions required to support them.

**Summary.** The term "team" is something of a projective test, used by both scholars and practitioners to refer to a wide variety of different social forms for accomplishing collective work. Additional research is needed to deepen understanding of the properties of each of these entities, to identify the organizational circumstances in which each one is most appropriate, and to establish the conditions under which each type of team is most likely to perform effectively. In the pages that follow, we address the last of those questions for the work teams on the right-hand side of the Table 1.
matrix--namely, teams whose members share responsibility and accountability for collective outcomes.

**Conditions for Analytic Team Effectiveness**

Our research suggests that intelligence community managers sometimes give insufficient attention to the design of the teams they create, and often are far more optimistic about team dynamics than research evidence warrants--hoping, in the words of one manager who had tossed a piece of work to a team he had formed on the run, that "the team will work out the details." In fact, the capability of a team to competently work out the details depends substantially on how well it was set up in the first place. We summarize below the design conditions that research has shown to substantially increase the likelihood of team effectiveness.

**Criteria of Effectiveness**

Before exploring what leaders and members can do to make their analytic teams more effective, we need to say a few words about what we mean by "effective." There almost never is any single indicator that, by itself, reliably and validly summarizes how well a team has performed--effectiveness inherently is multidimensional. Here are the three dimensions that we use to assess how well a team is performing.

1. The team's product 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. It is clients' standards and assessments that count in assessing team products, not those of the team itself (except in those rare cases when the team is the client of its own work), nor those of the team's manager (who only rarely is the person who actually receives and uses a team's output).
2. The social processes the team uses in carrying out the work enhance members' capability to work together interdependently in the future. Effective teams become adept at detecting and correcting errors before serious damage is done, and at noticing and exploiting emerging opportunities. They are more capable performing units when a piece of work is finished than they were when it began.

3. The group experience contributes positively to the learning and personal well-being of individual team members. Work teams can serve as sites for personal learning and can spawn satisfying interpersonal relationships, but they also can de-skill, frustrate, and alienate their members. We do not count as effective any team for which the net impact of the group experience on members' learning and well-being is more negative than positive.

Rarely is it possible for an analytic team to maximize all three criteria simultaneously. The best teams recognize this and continuously manage the trade-offs among them--sometimes focusing intently on a deliverable for a client, but other times attending explicitly to the development of the team and its members. Over the long term, these teams achieve a higher standing on all three criteria than do those that focus mainly on any one of them.

We discuss next the conditions that, when in place, increase the chances that an analytic team will achieve a high standing on the three effectiveness criteria (for details about the conditions, see Hackman, 2002, or Wageman, Nunes, Burruss, and Hackman, in press). There are two sets of conditions. The first set, which we call the "essentials," are prerequisites for competent teamwork. If the essential conditions cannot be established, it probably is better not to create a team at all. The second set, which we call
the "enablers," facilitate the work of the team. They help a team take advantage of the full complement of member resources in accomplishing the work.

**Conditions I: The Essentials**

The three essentials are (1) creating a real team (rather than a team in name only) that is (2) composed of the right number and mix of members and that (3) has a clear and compelling direction or purpose. When present, these three conditions provide a sturdy platform for teamwork.

**Real team.** Real work teams are intact social systems whose members work together to achieve a common purpose. They have clear boundaries that distinguish members from non-members. They work interdependently to produce an outcome for which they have collective, rather than individual, accountability. And they have at least moderate stability of membership, which gives members time and opportunity to learn how to work together well.

Real work teams can be small or large, can have wide-ranging or restricted authority, can be temporary or long-lived, can have members who are geographically co-located or dispersed, and can perform many different kinds of work. But if a team is so large, or its life is so short, or its members are so dispersed and out of touch with one another that they cannot work together interdependently, then prospects for team effectiveness are poor.

**Proper composition.** Well-composed teams consist of members who, collectively, have ample task and interpersonal skills. Moreover, they have a good mix of members--people who are neither so similar to one another that they duplicate one another's resources nor so different that they are unable to communicate or coordinate.
well. And they are as small as possible given the work to be accomplished. Members of teams that are too large (for example, those with more than seven or eight members) often find it difficult to remain engaged in the team's work and to efficiently coordinate their activities. A well-composed team ensures that the team has the full complement of knowledge and skills required to achieve its purposes, and sets the stage for the team to actually use members' diverse talents in carrying out the collective analytic work (Woolley, Hackman, Jerde, Chabris, Bennett, & Kosslyn, in press).

**Compelling direction.** A team's direction is the specification of its overall purposes. Direction is critical in energizing the team, in getting it properly oriented toward its major objectives, and in engaging the full range of members' talents. There are numerous choices to be made in the course of work on almost any task, and decision-making about such matters almost always is facilitated by having a clear, concrete, and challenging direction. Purposes such as "serving our customers" or "staying on top of developments in our sector," for example, are so vague and general that they neither challenge members to give their best to the team's work nor guide them in developing a good strategy for carrying out the work.

The most energizing statements of direction are those that are insistent about the *end-states* the team is to achieve but that leave open the *means* the team is to use in pursuing those ends. Those who create analytic teams should be insistent and unapologetic about exercising their authority to specify end-states, but equally insistent about not specifying the details of the procedures the team is to use in executing the work. That state of affairs fosters energetic, task-focused work (in the jargon of the day, team "empowerment"). Specifying *both* ends and means mitigates the challenge to team
members and, moreover, under-employs the full complement of team members' resources; specifying neither invites anarchy rather than focused, purposive team work; and specifying means but not ends is the worst of all possible cases.

Direction comes first, because everything else depends upon it--how the team is structured, the kinds of organizational supports that are provided, and the type of coaching by team leaders that will be most helpful. Moreover, leaders who create a compelling direction for their teams reduce considerably the amount of attention that they must give to monitoring and managing team processes in real time.

**Conditions II: The Enablers**

Four additional conditions enhance the performance effectiveness of real analytic teams that have been well-composed and well-purposed. These conditions are: (1) a well-designed team task, (2) task-appropriate team norms, (3) a supportive organizational context, and (4) team-focused coaching.

**Well-designed team task.** Well-designed team tasks are those that are both aligned with the team's purpose and high on what Hackman and Oldham (1980) call "motivating potential." This means that the team task (a) is a whole and meaningful piece of work, (b) for which members have autonomy to exercise judgment about work procedures, and that (c) provides members regular and trustworthy data about how well the team is doing. Well-designed team tasks foster high, task-focused effort by team members. [4]

Each of these three features can pose difficulties for analytic teams. For workload and/or security reasons, a large analytic task may be partitioned into a number of smaller segments, with different groups of analysts performing different subparts of the work.
None of the teams may have a good perspective on the overall issue, which can both create motivational decrements and invite errors in judgment. Moreover, team autonomy sometimes is compromised by technical or procedural constraints that, perversely, were implemented to prevent errors and foster product quality. Finally, analytic teams may not receive much feedback from the clients of their work--sometimes because it is unclear who the actual client is, but also because some high-status clients are unaccustomed to giving feedback to those who provide them with analytic products. The absence of regular, trustworthy feedback can both compromise team motivation and make it difficult for members to correct their errors and learn what is needed to generate products of the highest quality. It can take considerable managerial ingenuity, and occasionally some real political skill, for a team or its leaders to find ways around such flaws in the design of the team task.

**Task-appropriate norms of conduct.** Norms are shared, enforced expectations about acceptable behavior. When clearly and explicitly specified, norms of conduct help members work together in an orderly fashion in pursuing collective objectives. Team norms, which tend either to be "imported" to the team by its members or established very early in its life, generally remain in place until and unless something fairly dramatic occurs to force a rethinking about what behaviors are and are not appropriate (Gersick & Hackman, 1990).

Norms that promote continuous scanning of both the performance situation and the team's own resources are especially helpful to analytic teams because they provide the basis for active planning of the team's performance strategies. Clear specification of core norms of conduct, therefore, frees members from spending excessive time discussing the
behaviors that are acceptable in the group, and facilitates the development of ways of working together that are uniquely appropriate to the team's task and situation.

The specific focus of an analytic team's norms depends on the particular demands of the work and the attributes of the team itself. To illustrate, consider the norms of a counterterrorism task force consisting of analysts from several different agencies who are charged with figuring out from sketchy but worrisome data who may be up to what in a certain geographical area. Two norms might be especially valuable for this team, one having to do with the management of relations among members and the other with the team's task performance strategy. Because members come from agencies that have different cultures and standard operating procedures, the team might decide that it needs a norm for managing the interactions among members. So, for example, the team might adopt a norm of hearing out the ideas of other members without interruption or contradiction, in hopes of capturing and using all potentially valuable ideas and perspectives—even those that come from people whom some members are predisposed to dismiss as ignorant of how this type of work should be performed.

The joint task force might also decide to establish a norm about its task performance processes. For work on this kind of task, for example, the team might decide to adopt a strategy of "constrained brainstorming" in the early phases of its work. Constrained brainstorming, whose main tenets are summarized in Table 2, is based on lessons learned from Project Looking Glass simulations (no open citation can be made at this time). In brief, the strategy helps an analytic team that must make sense of complex and highly uncertain information avoid becoming overwhelmed with irrelevant data, and instead focus on the specific kinds of information that are likely to be most informative.
(Woolley, Gerbasi, Chabris, Kosslyn, & Hackman, 2007).

--Table 2 about here--

The particular norms that will be most helpful will vary for different teams and different types of tasks, of course. What is critical is for a team to have some shared norms that bring order and focus to members' actions and interactions, thereby avoiding the seemingly aimless wandering about that too often characterizes teams that do not have them. One of a team leader's highest leverage activities is to help members develop norms that are uniquely appropriate for the team and its work.

**Supportive organizational context.** Analytic teams sometimes find it difficult or impossible to obtain the kinds of organizational supports that are needed for effective team performance, especially in established organizations that have been fine-tuned over the years to support and recognize work performed by individual members. Our research suggests that team performance is enhanced when, in addition to the mundane material resources needed for actually carrying out the work, teams are supported by the following three features of the organizational context.

One, a *reward system* that provides recognition and positive consequences for excellent team performance. It is important that performance-contingent recognition be provided to the team as a whole, not to individual members that a manager believes made the greatest contribution to the team product, because doing the latter risks introducing disincentives for task-oriented collaboration among team members. Two, an *information system* that provides the team with all available data that the team needs to competently plan and execute its work. And three, an *educational system* that makes available to the team, at the team's initiative, technical or educational assistance for any aspects of the
work for which members are not already knowledgeable, skilled, or experienced—
including, if necessary, the honing of members' skills in working together on collective
tasks.

It can be a considerable challenge for leaders to arrange these supports for their
teams in established agencies that have strong traditions and cultures. Aligning existing
organizational systems with the needs of task-performing teams, therefore, can require
sophisticated use of a team leader's political skills in negotiating changes both upward in
the organization and laterally across functional and organizational boundaries.

**Team-focused coaching.** Coaching that is well-timed and competently delivered
can help an analytic team take the best possible advantage of the other performance-
enhancing conditions, discussed above. The role of the coach is not, of course, to dictate
to team members the one best way to proceed with the work. It is, instead, to help the
team minimize its exposure to the dysfunctions that so often are observed when teams
perform work (known as "process losses"), and to maximize its chances of capturing the
potential synergies that teamwork also can bring ("process gains").

The best team coaching focuses on three key performance processes: (1) how
much effort members apply to the team task, (2) the appropriateness of the team's
*performance strategy*, and (3) how well the team uses the full complement of members'
*knowledge and skill*. We describe below for each of these three processes the special
process losses, and the potential process gains, that most warrant the attention of analytic
team leaders and members.

For effort, competent coaching can reduce the frequency of the free-rider
problem, which is the tendency of members to work far less hard on a collective task than
they would on one of their own. And, on the upside, coaching can build a level of commitment to the team and its work that significantly heightens the effort members expend on the collective work.

For performance strategy, competent coaching can lessen the likelihood that members will mindlessly invoke the habitual routines they have relied on in their previous analytic work. And, on the upside, coaching can encourage members to actively explore novel ways of going about the work, such as the constrained brainstorming strategy described earlier, that may be especially appropriate for their particular task and situation.

For knowledge and skill, competent coaching can help the team minimize the inappropriate weighting of individuals' ideas and contributions (for example, when the credence given to someone's views is based more on his or her age, race, gender, or organizational role rather than on what the person actually knows about the matter at hand). And, on the upside, coaching can help members actively learn from each other and their team experiences, thereby expanding and deepening the pool of talent available to the team as a whole.

Coaching activities that focus on these task processes have been shown to be significantly more helpful to team performance than those that focus mainly on the quality of members' interpersonal relationships (Woolley, 1998). Yet when the other conditions we have been discussing are not also present, even well-focused and competently provided coaching is likely to be futile. In a study of service-providing teams at Xerox, Wageman (2001) found that the quality of a team's design was far more powerful than the team leader's coaching in determining its behavior and performance
effectiveness. Members of teams that were set up right experienced fewer problems in working together than did members of poorly designed teams--and those problems that did develop were more amenable to correction. By contrast, even highly competent coaching made little constructive difference for teams that had been poorly designed. It is nearly impossible to coach an analytic team to greatness in performance situations that undermine rather than support teamwork.

Moreover, even competent coaching of well-designed analytic teams is unlikely to be helpful if it is provided at a time when the team is not ready to receive it. Indeed, ill-timed interventions may actually do more harm than good by distracting or diverting a team from other issues that do require members' attention at that time. Specifically, there are three times in a team's life when members are especially open to coaching interventions that address each of the three key performance processes: (1) at the beginning, when a team is just starting its work, it is especially open to motivational interventions that focus on the effort members will apply to their work; (2) at the midpoint, when a team has completed about half its work (or half the allotted time has elapsed), it is especially open to consultative interventions that help members reflect on their performance strategy; and (3) at the end, or when a major segment of the work has been finished, a team is ready to entertain educational interventions aimed at helping members draw on their recent experiences to build the team’s complement of knowledge and skill (for details, see Hackman & Wageman, 2005).

In sum, we have seen that team-focused coaching can significantly reduce an analytic team's vulnerability to process losses as well as increase the likelihood of harvesting synergistic process gains. The efficacy of coaching interventions, however,
depends both on the focus of those interventions (that is, on the three key performance processes) and on their being provided when the team is ready and able to receive and use them (that is, at the proper time in the team life cycle).

**Potency of the Conditions**

We have suggested that the chances for analytic team effectiveness are higher when the three "essential" conditions (real team, proper composition, and compelling direction) are supplemented by the four "enabling" conditions just discussed (well-designed team task, task-appropriate norms of conduct, supportive organizational context, and team-focused coaching).

But do these conditions actually make much of a difference in how well analytic teams perform? Findings from a recent study of analytic teams in the U.S. intelligence community suggest they do. Hackman and O'Connor (2004) assessed both the presence of the conditions discussed here and team effectiveness for 64 analytic teams selected from six different intelligence organizations. They found that the degree to which the conditions were present controlled over 70 percent of the variation in a multi-attribute measure of team effectiveness. The study also allowed comparison of the performance of coacting groups of analysts relative to that of teams whose members were collectively responsible for work outcomes (about two-thirds of the units studied were coacting groups and about one-third were interdependent teams). The interdependent teams had a significantly higher standing on the enabling conditions and, as would be expected, performed significantly better than did the coacting groups.

Moreover, the interdependent teams exhibited much more peer coaching--that is, members consulting to and teaching one another--than did the coacting groups. And peer
coaching, in turn, predicted team effectiveness more strongly than any other factor assessed in the research. Peer coaching can help raise the overall level of knowledge and skill in a task-performing team, to be sure. But it also enables members to discover who in their team is particularly good at various aspects of the task and therefore makes it possible for them to properly weight different individuals’ contributions to different parts of the collective work.

It is one thing to show that the conditions we have been discussing make a difference in analytic team performance. It is quite another to get those conditions in place and to sustain them. For example, existing organizational cultures and policies can significantly impede attempts to alter how analytic tasks are designed, teams are composed, and organizational supports are provided. For another, humans have a deep-seated tendency to rely on their well-learned performance routines, especially when the stakes are high (Zajonc, 1965). That tendency can significantly constrain team members' willingness to experiment with and learn from non-traditional task performance strategies. And, finally, inter-group tensions among intelligence organizations can significantly compromise members' ability to recognize, value, and use the special expertise of teammates who do not come from one's "home" organization—even when the work is highly consequential and the team as a whole is responsible for the analysis.

The good news is that the U.S. intelligence community is much more open to research on these and other social and behavioral problems than ever before, and real progress is being made in learning what it takes to solve them. The more daunting news is that there remains a great deal to be done, both in research and in the training of
intelligence community leaders, to bring the knowledge that is being accumulated to bear in further strengthening the capabilities of intelligence analysis teams.

**Conclusion**

In our time collecting data across several intelligence community organizations, we have heard many exhortations for more and better teamwork. Our research 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 exhortation by itself is insufficient. Capturing the benefits of teamwork requires careful thought about the proper type of team for the work to be done and the setting in which it will be done. It requires knowledge and skill, including political skill, to create and maintain the conditions that foster team effectiveness. And it requires both time and a commitment to experimentation and learning for analytic team leaders and members to become ever more competent in taking full advantage of the favorable performance circumstances within which, increasingly, their teams will operate.
References


Footnotes

1. Preparation of this chapter and conduct of the research on which it is based was supported in part by NSF Research Grant REC-0106070 to Harvard University, with support from Fred Ambrose and the Intelligence Technology Innovation Center at the Central Intelligence Agency. Portions of this chapter are adapted from Woolley and Hackman (2006) and Hackman and Wageman (2005).

2. For a review of the research literature on each of these steps, see Woolley and Hackman (2007), where we also provide details about the field study discussed below.

3. For a review of recent research on distributed and virtual teams, see Hertel, Geister, and Konradt (2005), Martins, Gilson, and Maynard (2004), Maznevksi and Chudoba (2000), and Powell, Piccoli, and Ives (2004).

4. It is not by accident that we focus on task design rather than competition between teams as the design condition that fosters collective motivation. It is unquestionably true that inter-group competition is one of the most efficient and powerful devices available for spurring team motivation. This may be 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 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 undermining 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, it is at least possible that some of the dysfunctions listed above will emerge for units whose members view themselves as being in competition with other units for the ears of policy makers.
Table 1
Common Types of Analytic Teams

<table>
<thead>
<tr>
<th>Responsibility/Accountability for Outcomes</th>
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<tbody>
<tr>
<td>Individual Members</td>
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<tr>
<td>Real-Time Interaction</td>
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*Level of Synchronicity*

| Asynchronous Interaction | Coacting Groups | Distributed Teams |

Note: Adapted from Hackman and Wageman (2005)
Table 2

The Constrained Brainstorming Analytic Strategy

When an analytic team is confronted with information that is worrisome but complex and highly uncertain, members risk collecting anything and everything that is available—which can result in large quantities of undifferentiated data. And that, perversely, can make the team's work harder rather than easier. The team risks drowning in the very information it has gathered.

One possible remedy for this problem is the strategy of constrained brainstorming. This strategy involves generating and evaluating ideas about the most likely courses of action being contemplated by adversaries, and then seeking further information mainly about those specific possibilities. The challenge for a team that begins its work essentially in the dark is to determine how most appropriately to constrain its brainstorming.

Lessons learned from Project Looking Glass provide some simple but powerful guidance for narrowing the set of possibilities that a team must consider. Specifically, the team would begin its work by focusing on two kinds of data. One, the biographies of known or suspected adversaries, with special attention to each person's training, professional expertise, and employment experience. And two, the network of relationships the adversaries have with others who have related expertise, or who have access to resources that would be needed for them to actually use their special expertise for nefarious purposes.

With these data in hand, the analytic team would be able to focus its brainstorming on those possibilities that are most probable, given the adversaries' expertise and available resources. In many cases, only one or two possibilities turn out to require serious attention, which can both guide and greatly increase the efficiency of the team's subsequent information-gathering activities.