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A historiometric analysis of leadership in mission critical multiteam environments ☆

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ABSTRACT

Perhaps nowhere are leaders more pivotal than in the extreme contexts of responding to the aftermath of natural disasters or orchestrating post-war stability, support, transition, and reconstruction efforts. In the current study, historiometric methods were employed in order to elucidate the aspects of leadership essential in these extreme contexts. These contexts were chosen for two reasons: (1) they capture the external networking required of many complex organizational tasks and (2) they are mission critical – the outcomes of leadership in these contexts are of great importance. One hundred and ten critical incidents were written describing instances of effective and ineffective interaction within these systems, and 55 of them were classified as primarily describing leadership issues. Critical incidents were then sorted, translated, and retranslated in order to inductively derive a set of leader functions essential for orchestrating effort in mission critical multiteam contexts.

> "We assume that leadership is a solution to the problem of collective effort – the problem of bringing people together and combining their efforts to promote success and survival (Kaiser, Hogan, & Craig, 2008, p. 96)."

The scientific study of leadership has long recognized that the behavior of leaders can have extraordinary effects on collectives including teams, units, and organizations. While much of the empirical research on leadership focuses on predicting outcomes that reside at the individual level of analysis (Kaiser et al., 2008), many of the situations where leaders are potentially most pivotal require complex collective interactions (Zaccaro, Rittman, & Marks, 2001). Wildland firefighting, hurricane disaster response, and provincial reconstruction are examples of goals that require collective effort, and so require leaders to impact the organization of effort within the collective (Weick, 1993).

Two features of these situations have clear implications for leadership: (1) Often times these situations are non-routine, unpredictable, involve rapidly changing events, high decision urgency, inadequate information, and a reduced ability to control the situation, and (2) The organizational structures (i.e., collectives) these leaders are leveraging are ill-defined, and involve high levels of interdependence both within and among various teams often representing multiple embedding organizations. We submit that these mission critical multiteam situations represent a point on the organizational environment continuum precisely where

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leaders are most needed, and where understanding the functional behaviors needed by leaders in these situations is of great value to organizational science (Klimoski, 2005). Hence, the purpose of this study is to elucidate the specific behaviors and functions of leaders operating in these extreme multiteam contexts.

1. Multiteam systems

When we describe these situations as multiteam contexts, we are essentially describing a task situation where the role of leadership is to orchestrate effort at a level of analysis higher than the individual and team, but lower than the organization, and quite possibly spanning the boundaries of multiple organizations. This intermediate unit of analysis is referred to as the multiteam system (MTS) level (DeChurch & Marks, 2006; DeChurch & Mathieu, 2009; Marks, DeChurch, Mathieu, Panzer, & Alonso, 2005; Mathieu, Marks, & Zaccaro, 2001). MTSs are present within most organizations. Importantly, they describe networks of teams who work towards at least one shared goal, in addition to their individual team goals. In extreme environments such as wildland firefighting and disaster response, these systems offer a valuable level of analysis for examining the attainment of critical goals such as saving lives and property, which ultimately require the coordinated effort of multiple distinct teams. Furthermore, MTS tasks often require the coordinated efforts of multiple previously unacquainted teams by demanding new skills sets and areas of expertise residing across the boundaries of individual teams to be brought together in new ways to tackle novel challenges. Formally defined, a MTS is comprised of "two or more teams that interface directly and interdependently in response to environmental contingencies toward the accomplishment of collective goals" (Mathieu et al., 2001, p. 290).

Multiteam settings represent an important and under-researched context for the study of leadership for at least two reasons. First, leading in a multiteam system involves complex interactions playing out in the middle of organizations. Abundant research attention is focused on the strategic behaviors needed by leaders at the top of organizations (e.g., Finkelstein & Hambrick, 1996) and by front line managers as they interact with their direct subordinates. Yet these approaches leave a gap in understanding the behavior of leaders who, while guiding their immediate groups of subordinates, are also bridging their actions with those of other important teams, and with the leaders of those teams.

Second, multiteam systems are an important context for leadership as they are often used to handle non-routine, dynamic task domains, where the consequences for system failure are severe. Key features impacting leadership include a highly networked operating environment, and tasks characterized by unpredictable and rapidly changing circumstances, a high threat of loss, inadequate information, a disruption of routine functioning, and reduced control.

The need to study leadership in MTSs is perhaps most clear when we consider that recent laboratory investigations of MTSs demonstrate the reality that misaligned teams may in fact succeed individually, but yet fail collectively (DeChurch & Marks, 2006; Marks et al., 2005). MTSs are complex entities, varying in terms of levels and configurations of interdependence, temporal pacing, proximal goals, leadership, and team permeability. These complexities present new challenges for understanding team leadership. Laboratory investigations have provided initial evidence of the value of examining multiteam level phenomenon. In particular, as interdependencies across teams increase, so does the importance of effective cross-team linkages (Marks et al., 2005). A limitation of approaching the problem of multiteam leadership from the individual or team leadership perspective is that much of the richness of the context is not yet well understood.

Thus, as a next step in this line of research, we begin with highly representative MTSs, and then explore the leadership issues deemed important in those events. We focus on understanding the ability of leaders to enable teams to coordinate both *internally* and *across* the system. Due to the inherent complexity of MTSs, we expect additional aspects of leadership to emerge and predict system level outcomes, beyond those identified at the team level.

2. Functional leadership perspective

The functional view of leadership seems particularly well-suited to the analysis of leadership in multiteam systems because it is directly considers the role of leadership in guiding the group as a collective. Multiteam systems are themselves collectives, comprised not of individuals, but of teams. Functional leadership theory defines leadership in terms of the needs of the system within which the leader operates (e.g., team, multiteam system). Leadership is a form of social problem solving (McGrath, 1984) where it is the leader's responsibility to ensure team needs are met; accordingly, it is the leader's job to (1) diagnose problems that could impede goal attainment, (2) generate solutions, and (3) implement solutions (Fleishman et al., 1991; Mumford, Zaccaro, Harding, Fleishman, & Reiter-Palmon, 1993; Zaccaro et al., 2001).

Importantly, this view examines "what needs to be done for effective performance (Hackman & Walton, 1986, p. 77)." This is a valuable perspective for understanding leadership in a given context, such as in multiteam systems. Understanding leadership requires that we first understand the needs of a particular social system. Functional leadership does not specify that the formally designated leader must personally accomplish these needs, but rather that the leader is responsible for ensuring that these needs are met. Functional leadership theory posits that leaders meet four overarching functions: the search for and structuring of information, the use of information in problem solving, the management of personnel resources, and the management of material resources (Fleishman et al., 1991) that vary in their instrumentality based on situational constraints and context (Lord, 1977).

Zaccaro and his colleagues (Zaccaro et al., 2001) made an important point about functional leadership in collective settings. They argue that leadership functions are not universal to collectives, and that a key task for furthering knowledge on leadership in collectives is to more clearly define the contextual influences which render some leadership functions more and less critical to system functioning. Towards this aim, we examine the overarching question of what are the key functional leadership

requirements in multiteam systems, by first focusing on the contextual features of multiteam systems and the leadership demands they present.

3. Historiometric events

In particular, we examine two prototypical multiteam systems where extensive writings enable a detailed examination of the leadership behaviors enacted within these systems: disaster response systems and provincial reconstruction teams. We focus on these two types of systems as they capture many of the core features where leadership demands are most pressing. In particular, leaders of these MTSs operate within stressful situations and make rapid decisions with life or death consequences, and these decisions are most often made in dynamic and ambiguous environments based on incomplete information.

Furthermore, these two cases were selected as they differ in ways which may meaningfully affect the manifestation of certain leadership behaviors. Importantly, one represents a system that is planned and put in place a priori to solve a task: provincial reconstruction teams, whereas the other represents an MTS that while planned in advance, evolves in structure considerably in tandem with task demands: disaster response systems. Another interesting distinction in these two systems is that they represent, on the one hand, an acute task scenario with high urgency where the MTS is largely composed of previously unacquainted teams (disaster response), and on the other, a task scenario that is more ambiguous, difficult to gauge its effectiveness, evolving over a much longer time span, and involving previously acquainted teams.

3.1. Disaster response systems

Under the Homeland Security's newly released National Response Framework, a guide for disaster response, the primary objectives of a disaster response system include "immediate actions to save lives, protect property and the environment, and meet basic human needs" (Department of Homeland Security, 2008, p. 1). In most instances, such disaster response efforts begin at the local and state level and include action on the part of police, fire, paramedics, public health and medical, public works, and others, to manage the immediate needs of the response. However, for large scale disasters, such as a major hurricane, response efforts also require the joint action of teams at the State (e.g., State Troopers; Highway Patrol), and National (e.g., FEMA; National Guard) levels, and charitable organizations (e.g., RedCross).

The formation of disaster response systems is both structured and impromptu. Structured aspects of disaster response system formation are typically restricted to the interaction of various government agencies, with policies (at least loosely) specifying procedures for operation. For example, when Hurricane Katrina made landfall in 2005, the National Response Plan guided aspects of system formation by specifying that a State's governor is "responsible for coordinating State resources to address the full spectrum of action…" (Department of Homeland Security, 2004, p. 8), and that assistance from the Defense Support of Civil Authorities only be provided when the lead federal agency responding to a disaster reports that the local, state, and other federal resources are insufficient to manage the response. However, following Katrina, the governor of Alabama did not *ask* for assistance, and thus assistance and resources which could have been utilized were greatly delayed (Select Bipartisan Committee, 2006).

In contrast, not all groups which contribute to the disaster response system have a structured role. These impromptu responders often consist of non-profit humanitarian organizations, churches, and additional volunteer groups. Such responders are very valuable in that they provide additional resources and man-power; however, these groups are often not aware of the standard operating procedures of the structured disaster response groups which can lead to disorganization.

Another key challenge for disaster response systems is that the events in which such systems are required are largely unpredictable. Disasters, such as earthquakes, tornadoes, and fires, provide little to no warning before they strike. Though not entirely predictable, hurricanes are semi-unique from other disasters in that there is often an indication of the approaching storm before it reaches land. Because of this forewarning, hurricane disaster response systems often have an opportunity for prepare (at least to some extent) and plan for how the response should be managed following the event. For example, 4 days prior to Katrina's landfall, the State of Louisiana began preparations for the arrival of the storm, including the activation of their emergency operations centers and the evacuation of residents (White House, 2006). Louisiana was aided in these efforts by the Department of Defense and the National Guard. Though national level organizations may join in the preparation, much of this early action is directed and performed by those at the local and state level. A few of the state level entities involved in this early response included the Louisiana State Police and National Guard. Furthermore, during the evacuation, Louisiana State Troupers worked closely with Troupers in boarding states to help manage traffic flow (Select Bipartisan Committee, 2006). The preparation efforts prior to landfall serve proactive steps to help mitigate the effects of impending disaster.

In the immediate aftermath of a disaster, there is often great uncertainty as to the extent of the destruction, difficulties in communication, and significant time pressure. Disaster response system efforts shift from planning and preparation to a highly active period in which the focus is on saving lives and managing immediate dangers. Effective system operation during this period is especially critical because delays in search and rescue, or the human or material resources for medical treatment can mean the loss of life. During this phase of the response, teams are highly interdependent, often needing to work together to share resources and expertise.

Over time, as the immediate dangers from the disaster are managed, the work of the disaster response system again decreases, along with the number of groups required within the system. Remaining organizations take on more specialized roles as the structure is simplified, such as in performing the task of water clean-up.

3.2. Provincial reconstruction teams (PRTs)

Another complex multiteam task is performed by PRTs: joint civilian–military systems designed to deliver aid and assist local communities in reconstruction projects while providing security for those involved in the projects (Feickert, 2006). These systems facilitate the interaction of military and non-government organizations (NGOs) in order to advance the welfare of a particular community, as well as promote good relations with local authorities so that a more stable environment can be constructed. While the basic goals of PRTs are relatively simple, their complexity requires precise coordination of numerous specialized and diverse teams within the PRT system. Furthermore, the ability to reduce terrorism and build local communities and their governments is contingent upon the success of these teams, which increases the importance of their effective coordination and implementation.

PRTs emerged originally from small outposts comprised of Civilian Affairs officers set up in Afghanistan to assess humanitarian needs, implement small scale reconstruction projects, and establish relations with agencies already in the field. These outposts were expanded upon in order to deal with some of the primary causes of instability in Afghanistan, including terrorism, unemployment, and poverty, as well as provide additional security for civilian aid groups (U.S. Agency for International Development, 2007). Although they were initially implemented in Afghanistan, PRTs have since been established in Iraq as well.

While both countries utilize PRTs in similar ways, their structures vary. In Afghanistan, U.S. PRTs are primarily military-centric, consist of approximately 100 members, and are led by an Army commanding officer who is supported by Army Civil Affairs Teams, Military Police Units, and civilian representatives from the Department of State, the Agency for International Development (USAID), and the Department of Agriculture (USDA; Dorman, 2007). Local Afghan Ministry representatives and interpreters are also usually a part of the PRT. In Iraq, the model of U.S. PRTs has been revised multiple times, beginning with only six to eight team members to the now expanded 50–100 member model. Iraq PRTs are primarily civilian-centric, and are led by a State Department foreign service officer who is supported by Army staff and other State Department officers as well as USAID contractors and representatives (Perito, 2007).

Although these are the general structures of PRTs, in practice they can morph due to the availability of staff members from both civilian and military organizations. The size and composition of each PRT is also dependent upon the current needs of the community and other local circumstances. Furthermore, many PRTs are international collaborations in which organizations and militaries from other countries aid in reconstruction efforts (Dorman, 2007).

This morphing and restructuring can be problematic for PRTs, particularly as it is difficult to establish a consistent relationship with the local community when their points of contact within the PRT are constantly changing (Perito, 2007). Other challenges to PRTs include the complexity in coordinating many different organizations and agencies. For example, USAID teams must work with military teams so that ample security is available in order for USAID workers to focus on their efforts to rebuild infrastructure. However, both teams must also coordinate with local government officials in order to determine the needs of the community and make sure that reconstruction projects are appropriate to these needs, such as ensuring that the location of a health clinic is convenient before its built (Szlanko, 2008).

PRT interactions are further complicated by the fact that there are no established sets of rules and responsibilities regarding how projects should be accomplished and who is in charge of which aspects (Dorman, 2007). Furthermore, there is always the pressure of time on any given PRT project, with some projects being extremely urgent and highly reliant upon successful team coordination, whether roles and responsibilities are clear or not. Overall, PRTs face many critical challenges that must be overcome in order for them to successfully accomplish their mission of reconstructing and advancing the development of war-torn countries.

It is clear that these two real world organizational tasks, disaster response systems and provincial reconstruction teams, provide especially interesting systems within which leadership can be studied. From the perspective of functional leadership, such contexts provide an opportunity in which effectiveness, or ineffectiveness, of leader behaviors may be clearly seen. This is due to the characteristics shared between these unique environments, including considerable time pressure, ambiguity, dynamism and critical outcomes. With such hurdles affecting the ability of individuals and teams to perform, the positive or negative effect of certain leader behaviors may be distilled even further.

4. Method

The study of leadership has been driven primarily by quantitative research, in which quantitative data collection and analysis have advanced the deductive logic used to develop many prominent leadership theories (Parry, 1998). However, in recent years the advantages of taking a qualitative approach to leadership research have come to light, as many questions regarding leadership processes remain unanswered (Avolio, 1995; Conger, 1998; Yukl, 2006). Because leadership is a social influence process in which leaders are part of a complex social system, an approach to studying leadership that takes into account this context allows for a more complete understanding of leadership (Yukl, 2006). Qualitative research methods, particularly inductive approaches such as grounded theory, do just this as they provide a systematic method from which theoretical relationships are derived based on an iterative process driven by rich contextual data (Glaser & Strauss, 1967).

These inductive approaches to research promote a departure from biases and preconceived notions so that a true understanding of theoretical relationships can emerge (Conger, 1998). Qualitative methods such as the grounded theory approach begin with data instead of hypotheses, and involve the constant comparison of results to new data in order to refine ideas before an explanatory theory is constructed (Glaser, 1978). This is particularly important for new and unknown aspects of a construct, such

as leadership in MTSs, where preconceived notions of what leadership is may not necessarily fit and could actually detract from theory development (Glaser, 1992; Parry, 1998). Therefore, the current study adopts this inductive qualitative method so that we can establish and define the processes involved in leadership of MTSs operating in extreme environments. Specifically, we draw inferences from actual MTS leaders and leadership units within their social contexts, promoting a more realistic and accurate understanding of the dynamics and processes that occur.

We combined Historiometric analysis (Simonton, 2003) with the critical incident technique. The Historiometric approach was chosen as it is ideal for ensuring findings are relevant to important situations, as unimportant situations are typically not historically documented. Historiometric analysis has additional advantages including the minimization of experimenter biases, as we rely on data produced by historians, biographers, and archivists. Most importantly for our purpose of generating a new conceptualization of leadership in complex system environments was the ability to examine behavior as it is embedded within its natural social context. Historiometric analysis has made significant contributions to social psychological research such as Janis's Groupthink phenomenon, and more recently, leadership theory (O'Connor, Mumford, Clifton, Gessner, & Connely, 1995; Strange & Mumford, 2002). While we used Historiometric methods to guide the inclusion of material to review, we further used the critical incident technique as a way to systematically generate descriptions of behavior involving MTS component teams.

4.1. Historiometric analysis

The first step in our approach was to identify specific events or situations in recent history which would likely have large scale involvement of entities at the level of interest. In this case, the unit of inquiry is the MTS, minimally constituting two or more teams who may or may not share proximal goals, but must share distal system level goals. With this focus, our interest was specific to highly complex, ambiguous and dynamic situations. To identify situations from which we could derive appropriate information about our topic of interest, certain specific criteria was to be met. First, for a situation or event to be included it must have occurred outside of a single identifiable organization, such as a social group, company or government agency. Second, the characteristics of the situation must have stayed dynamic over the relative medium to long term. Finally, in line with the unit of inquiry, distal goals must have been identifiable across the interested entities within the situation.

Using the criteria listed above, potential events and situations were identified for further analysis. Through our analysis it was decided that provincial reconstruction teams (PRTs) and cross-regional hurricane emergency response teams were best captured the contextual organizational features of interest. With the unit of inquiry and interested situational characteristics identified, our approach continued with the identification of available archival material describing focal processes. A team of graduate students accessed several governmental and civilian resources including the Center for Army's Lessons Learned, Defense Technical Information Center archives, and several other newspapers, books, and documents available through the EBSCOhost database, Google, Google Scholar, amazon.com, blogs, and communities of practice. Overall, approximately 100 documents were content analyzed for applicability and potential for yielding suitable incidents for inclusion in the study.

4.2. Critical incident technique

The critical incident technique is "a method for obtaining specific, behaviorally focused descriptions of work or other activities" (Bownas & Bernardin, 1988, p. 1120). The complete process of the critical incident technique has several steps and is focused on the overall goal of defining unique dimensions related to actions or behaviors of interest. To derive these dimensions, specific behaviors which have already been observed must be identified. Such behaviors should be reasonably concise and have a specific outcome to which they can be linked. Information on behaviors can come from any number of different sources as long as reasonable accuracy can be assumed. Once the behavioral information has been transcribed into critical incidents, subject matter experts are given the task of sorting each incident into exactly one dimension. A behavioral dimension is defined as a grouping of "behaviors that share some common theme" (Bownas & Bernardin, 1988, p. 1128). Once the SMEs agree on the unique dimensions within which the observed behaviors fit, a second, independent, set of SMEs attempt to sort the same incidents back into the identified dimensions. This process, known as retranslation, allows the distinctiveness of the dimensions derived in the original content analysis to be reconfirmed (Bownas & Bernardin, 1988).

The critical incident technique is particularly well-suited to the goals of this study for several reasons. Critical incidents are, by definition, behaviorally based and have four distinct characteristics: specificity, a focus on observable behaviors, a context in which the behavior occurred, and the outcome associated with the behavior. This fits with the historiometric perspective of this study in that specific behaviors will be identified in the context in which they occurred and their direct impact on interested outcomes can be assessed. Additionally, critical incidents lack "judgmental inferences" which may not be accurate or applicable outside of a single specific event (Bownas & Bernardin, 1988, p. 1120). These aspects of critical incidents allow for qualitative content analysis from which a fully grounded theory may emerge.

Five psychology graduate students reviewed all of the materials gathered and identified specific critical incidents related to effective or ineffective actions. In all 110 incidents were generated, 47 representing PRTs and 63 hurricane response systems. Tables 1 and 2 present a list of archival sources from which these incidents were generated broken out by hurricane response systems (Table 1) and PRTs (Table 2).

Table 1
Sample list of archival sources reviewed for the construction of disaster response systems critical incidents.[a]

Document title	Source/author
	Newspapers
Hurricane Andrew: Troops arrive with food for Florida's storm victims.	*The New York Times*/Rohter
Hurricane Andrew: Breakdown seen in U.S. storm aid	*The New York Times*/Pear
An architect with plans for a new Gulf Coast	*The New York Times*/Pogrebin
Yet another victim of Katrina	*The New York Times*/Treaster & Dean
On Gulf Coast, clean-up differs town to town	*The New York Times*/Lipton
New Orleans is now off limits; Pentagon joins relief effort	*The New York Times*/Treaster & Kleinfield
After hurricanes come tempests over cleanups	*The New York Times*/Eaton
Senators at Louisiana hearing criticize federal recovery aid	*The New York Times*/Nossiter
Powerful storm threatens havoc along gulf coast	*The New York Times*/Treaster & Goodnough
Homeland security chief outlines FEMA overhaul	*The New York Times*/Lipton
National Briefing | South; Louisiana: Extension of guard watch in New Orleans	*The New York Times*/The Associated Press
	Journals/Trade Magazines
Hurricane Katrina and the paradoxes of government disaster policy: Bringing about wise governmental decisions for hazardous areas	*The ANNALS of the American Academy of Political Science and Social Science*/Burby
Failing narratives, initiating technologies: Hurricane Katrina and the production of a weather media event	*American Quarterly*/Fleetwood
Organizing for homeland security after Katrina: Is adaptive management what's missing?	*Public Administration Review*/Wise
DHS failed to use catastrophe response plan in Katrina's wake	*GovernmentExecutive.com*
From forest fires to Hurricane Katrina: Case studies of incident command systems	IBM Center for The Business of Government/Moynihan
Communication in a disaster: Success of text messages	AIDS Treatment News/James
	Congressional and Government Reports Sources
Humanitarian assistance and disaster relief: Are the national/international coordinating agencies capable of fulfilling the mission?	National Defense University National War College/Svitak, Wilson, & McIntyre
A Failure of Initiative: Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina	H. Rep. No. 109-377/Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina
Evaluation report: EPA's and Mississippi's efforts to assess and restore public drinking water supplies after Hurricane Katrina	U.S. Environmental Protection Agency, Office of Inspector General
Lessons learned: EPAs response to Hurricane Katrina	U.S. Environmental Protection Agency, Office of Inspector General
EPA's and Louisiana's efforts to assess and restore public drinking water systems after Hurricane Katrina	U.S. Environmental Protection Agency, Office of Inspector
EPA provided quality and timely information regarding wastewater after Hurricane Katrina	U.S. Environmental Protection Agency, Office of Inspector
EPA provided quality and timely information on Hurricane Katrina hazardous material releases and debris management	U.S. Environmental Protection Agency, Office of Inspector
Response to Hurricane Katrina: Region 4 (Reports from August 2005–April 2006)	U.S. Environmental Protection Agency, Office of Inspector
Hurricane Katrina: DOD disaster response	Congressional Research Service/Bowman, Kapp, & Belasco
The Federal response to Hurricane Katrina: Lessons learned.	The Bush/Townsend
President discusses Hurricane relief in address to the nation	Office of the Press Secretary/White House
A tribute to our heroes in blue: Hurricane response 2005	Bayou Militia Press/Louisiana Air National Guard, 159th Fighter Wing
	Books
Hurricane Katrina: CNN reports: State of emergency.	Book – Andrews McMeel Publishing/Van Heerden
Disaster: Hurricane Katrina and the failure of homeland security	Book – Times Books/Cooper & Block
City adrift: New Orleans before and after Katrina	Book – Louisiana State Press/Bergal et al
Unacceptable: The federal government's response to Hurricane Katrina	Book – Surge Publishing/Brasch

[a] A complete list of archival source information is available from the first author upon request.

4.3. Coding

4.3.1. Step 1: Classify all incidents

Our inductive process began with a panel of five subject matter experts (none of whom were involved in generating the incidents) independently classifying the incidents into meaningfully distinct behavioral categories. The five then met as a panel to discuss their categories and placement of incidents, and collectively arrived at a schema. This process of first working independently and then coming together as a panel was used in order to first maximize the range of ideas about classifications (i.e.,

Table 2
Sample list of archival sources reviewed for the construction of PRT critical incidents.[a]

Document title	Source/author
	News Articles
Al Qaeda in Iraq leaders killed or captured, but threat continues	*American Forces Press Service: News Articles*/Miles
America supports you: Command makes difference with victory boxes	*American Forces Press Service: News Articles*/White
Army medics lauded for actions in Taliban attack	*American Forces Press Service: News Articles*/Wollenberg
Coalition forces continue to hunt down terrorists in Iraq	*American Forces Press Service: News Articles*
Radio Interview with Secretary Rumsfeld with Jeff Katz, WBT, Charlotte NC	*United States Department of Defense: DefenseLink News*/ Rumsfeld(Presenter)
Engineers build new housing for provincial reconstruction team	*American Forces Press Service: News Articles*/Saenz
Face of defense: Airman reflects on saving team leaders' life	*Air Force Print News Today*/Meridith
General says infiltration down in eastern Afghanistan	*American Forces Press Service: News Articles*/Garamone
Provincial reconstruction team supports Iraqi farmers	US Federal News Service/Task Force Ramadi Public Affairs
Soldiers help Afghan girl shot in tribal conflict	*American Forces Press Service: News Articles*/Hutchinson
Suspected Al Qaeda leader, others captured; Weapons cache found	*American Forces Press Service: News Articles/Pike*
Team delivers medical aid to Afghans	*Defend America: U.S. Department of Defense News About the War on Terrorism*/Weckerlein
	Journals/Trade Magazines
A means to what end? Why PRTs are peripheral to the bigger political challenges in Afghanistan	*Journal of Military and Strategic Studies*/Stapleton
Civil–military coordination: Challenges and opportunities in Afghanistan and beyond	*Journal of Military and Strategic Studies*/Olson & Gregorian
Civil–military coordination practices and approaches within United Nations peace operations	*Journal of Military and Strategic Studies*/De Coning
Interagency and civil–military coordination: Lessons from a survey of Afghanistan and Liberia	*Journal of Military and Strategic Studies*/Olson & Gregorian
Linking provincial reconstruction teams to security enhancement in Afghanistan	*Journal of Peacebuilding and Development*/Rietjens & Bollen
Managing civil–military cooperation: Experiences from the Dutch provincial reconstruction team in Afghanistan	*Armed Forces & Society*/Rietjen
Iraq PRTs: Pins on a map	*Foreign Service Journal*/Dorman
No room for humanitarianism in 3D policies: Have forcible humanitarian interventions and integrated approaches lost their way?	*Journal of Military and Strategic Studies*/Cornish
Rising from the ashes: Fallujah's healthcare at center of transformation	*Healthcare Executive*/Buell
The civil–military effort in Afghanistan: A strategic perspective	*Journal of Military and Strategic Studies*/Capstick
A clash of mindsets? An insider's account of provincial reconstruction teams	*International Peacekeeping*/Piiparinen
Afghanistan: Getting it right, eventually	*Transitions Online*/Szlanko
	Government & Congressional Reports
Afghanistan Experience Project: Interview #1	United States Institute of Peace, Association for Diplomatic Studies and Training/Kennedy
Afghanistan Experience Project: Interview #33	United States Institute of Peace, Association for Diplomatic Studies and Training/Neilson
Afghanistan Experience Project: Interview #42	United States Institute of Peace, Association for Diplomatic Studies and Training/Neilson
Provincial reconstruction teams in Afghanistan	United States Institute of Peace, USI Peace Briefing/Perito
Iraq PRTs	U.S. Agency for International Development./Barber, Pressfield, Dayal, & Tinder
Provincial reconstruction teams in Afghanistan	George C. Marshall European Center for Security Studies/Gauster
Provincial reconstruction teams	United States Agency for International Development
Provincial reconstruction teams in Afghanistan	International Security and Economics Policy Project Course/ Hoshmand
Provincial reconstruction teams Afghanistan vs. Iraq – Should we have a standard model?	Strategic Studies Institute/Drolet
REO Al-Hillah: Karbala PRT	United States Embassy, Baghdad, Iraq
Review of the effectiveness of the provincial reconstruction team program in Iraq	Office of the Inspector General for Iraq Reconstruction
Stabilization and reconstruction in Afghanistan: Are PRTs a model or a muddle?	*Parameters: US Army War College*/McNerney
	Websites
Army, Navy: Sister services, brothers in arms	NAVY.mil/Clifton
Khost PRT winning the fight in Afghanistan	NAVY.mil/Clare
Medical engagement more than just a health care mission	NAVY.mil/Leary
Provincial reconstruction team (PRT) Pike	GlobalSecurity.org/Asadabad
Sailors play major role with 354th Civil Affairs Brigade	NAVY.mil/Sanford
PRT assesses district, medical centers	NAVY.mil/Collier
Reconstruction team helps bring water, lift to Afghans	NAVY.mil/Weis
Afghan PRT treats patients, prepares village for winter	Air Force Link/Campbell

Table 2 (*continued*)

Document title	Source/author
	Other
Civil-miliary relations in Afghanistan: The provincial reconstruction team debate	Canada Asia Pacific Research Network/Sedra
Provincial reconstruction teams and humanitarian-military relations in Afghanistan	Save the Children/McHugh & Gostelow
Smoke and mirrors	*The Atlantic Online*/Kaplan
The provincial reconstruction teams (PRTs) and their contribution to the disarmament, demobilization and reintegration (DDR) process in Afghanistan	Hiroshima University Partnership for Peacebuilding and Social Capacity/Uesugi
The U.S. experience with provincial reconstruction teams in Afghanistan: Lessons identified.	United States Institute of Peace/Perito
ACBAR (Agency Coordinating Body for Afghan Relief) policy brief: Provincial reconstruction teams and the security situation in Afghanistan	Agency Coordinating Body for Afghan Relief (ACBAR)

[a] A complete list of archival source information is available from the first author upon request.

divergent thinking) which individuals are best suited for, and then work as a panel to collectively converge on a schema. The panel noted a distinction in incidents; specifically whether incidents described leadership processes or organizational processes irrespective of leadership. The panel also identified a meaningful distinction around the level of process. Both organizational processes and leadership were aimed at interaction within component teams, between component teams, and across the MTS boundary. The initial group that generated the incidents was instructed not to include behaviors that were exclusively enacted within a single component team, and so most of the incidents reflected actions at the other two focal levels: between and across. Nonetheless, examples of within team actions were apparent in some of the incidents.

4.3.2. Step 2: Identify leadership-relevant incidents

The next step was to identify the subset of incidents indicative of leadership, as opposed to organizational processes. For example, information sharing was identified as an organizational process, whereas managing information flow would be a leadership processes. A separate panel of four SMEs then independently retranslated the 110 incidents into the categories identified by the first panel. Incidents were deemed representative of a given category if at least two of the four panel members placed it there. Within the superordinate leadership dimension, a total of 55 of the 110 identified critical incidents met this criterion.

4.3.3. Step 3: Translate leadership-relevant incidents

Next a panel of three SMEs independently sorted all of the leadership incidents, and then met to discuss the common themes. The panel noted a higher order category reflecting leadership processes aimed at either strategy or coordination. Strategy was derived from the incidents usually occurring before the MTS began their necessary tasks and was related to analysis, planning and structuring the MTS composition and actions. Coordination emerged as often occurring after the MTS has initiated their actions and was related to maintaining unity of efforts through backup behaviors, information management and compensatory actions. Additionally, the distinction noted by the first panel emerged again within this panel who observed leadership behaviors or actions may have one of three potential foci or points of impact. These three points are: (1) *Within*, actions occurring within a single component team, (2) *Between*, actions occurring between two or more teams within the defined MTS, and (3) *Across*, actions occurring between a component team of the MTS and an external entity. Table 3 presents a description of this 2 (leadership function) × 3 (leadership point of impact) categorization scheme. All 55 leadership incidents were used in the development of this classification scheme.

4.3.4. Step 4: Retranslate leadership-relevant incidents

Finally, a fourth panel was organized, consisting of three subject matter experts. This panel sorted all of the 55 leadership-based incidents identified by the second panel across the leadership subdimensions (i.e., strategy and coordinating) and the MTS point of impact (i.e., within, between, across). Table 4 presents an example of critical incidents that fell within each of these cells. The purpose of this final panel was to retranslate the leadership incidents into exactly one leadership subdimension and one point of impact. Because this was treated as two separate sorts by the panel members, it was analyzed the same way. The Kappa statistic, which distinguishes the level of inter-rater agreement of categorical variables from that of expected chance agreement, was used to assess the degree of reliability between the SMEs (Siegel & Castellan, 1988). At the $\alpha = .05$ level, it was found that both the agreement within the point of impact dimension ($Z = 3.25$) and the leadership subdimensions ($Z = 1.97$) were significant. This indicates inter-rater agreement beyond what would be expected due to chance alone. Because agreement on both dimensions was found to be significant, it was deemed appropriate to assess overall agreement across all 6 levels between the two dimensions. This analysis also found that agreement was stronger ($Z = 2.13$) than what would be expected by chance.

5. Results

The results of the analyses depicted within the methods section yielded several interesting findings. We begin with high-level results working our way down to the more detailed findings. The first major conceptual distinction that emerged from the analysis dealt with the focal point of impact of leadership. Some incidents reflected leadership that was aimed at orchestrating actions within a particular MTS component team, others were aimed at bridging the boundaries between teams in the MTS, and a third set

Table 3
Description of leader functions and impact points in multiteam systems.

		Leadership functions	
		Strategy – Leader analysis of the MTS performance environment, structuring the work, roles, prioritization of tasks, planning and goal setting.	Coordinating – Leader facilitation of MTS work processes during task engagement.
Leadership Points of Impact	Within	Leader strategy directed at members of a component team. *Gathering information about the team's performance environment and framing the team's task, setting objectives for the team, and planning how team members will work together to accomplish their goals.*	Leader coordinating directed at members of a component team. *Managing the flow of information and coordinating the actions of the members of a component team.*
	Between	Leader strategy directed at the interface between component teams within the system. *Gathering information about the MTS's performance environment and framing the MTS's task, setting objectives for the MTS, and planning how component teams will work together to accomplish MTS goals.*	Leader coordinating directed at the interface between component teams within the system. *Managing the flow of information across component teams; coordinating the actions of component teams with one another; prompting component teams to provide backup and helping behavior to other teams.*
	Across	Leader strategy directed at the interface between MTS teams and entities/constituencies outside the MTS boundary. *Gathering information about the MTS's performance environment from outside the MTS, framing the MTS's task to external constituents, integrating MTS plans with those of outside constituents.*	Leader coordinating directed at the interface between MTS teams and entities/constituencies outside the MTS boundary. *Managing the flow of information from external constituents to MTS component teams and vise versa; coordinating the actions of component teams with external constituents.*

reflected leadership aimed at synchronizing the MTSs actions with external constituencies. The first two impact points are consistent with initial empirical research on MTSs which demonstrate that work processes commencing both within and between teams are important to MTS performance. The third impact point is more analogous to the work of Ancona (i.e., Ancona & Caldwell, 1992; Ancona & Bresman, 2007) extended from the team to the system of teams (i.e., MTS) level. Leader functions identified as important in the current set of critical incidents show one important point of impact of leadership is in bridging the actions of the system to external forces. In the case of the PRTs, this often meant bridging PRT efforts with the local people and governments, and for hurricane response systems, these externals were often federal government officials and private businesses.

The second major conceptual distinction identified by coders was aligned with the function of leadership. Coders noted a distinction in leadership aimed at planning task activities, designing the role structure of the MTS, and setting direction for the MTS versus leadership aimed at managing the MTS during task engagement which included reactively adjusting the structure of the MTS, orchestrating actions, and managing the flow of information. Table 3 summarizes this initial taxonomy distinguishing leadership along two overarching dimensions: leadership function (strategy v. coordinating) and leadership point of impact (within team, between team, across MTS boundary). Within each of the higher order leadership functions (strategy and coordinating), several subdimensions were identified. Within the strategy function, dimensions included: situation analysis, information gathering, understanding the big picture, roles & responsibilities, planning, and taking initiative (see Table 5). Within coordinating, subdimensions include: reactionary/adaptive unity of command, orchestrating actions, and managing information flow (see Table 5). Next, we further elaborate on these dimensions.

5.1. Leader strategy

The first overarching leadership function was strategy development. This function reflected leadership activities that were primarily cognitive in nature. Specifically, strategy development related to the cognitive and behavioral processes by which leaders ensure that the MTS is designed properly and has an integrated plan by which to accomplish the mission or task at hand (see Table 4 for CI examples). This includes cognitive processes such as analyzing the situation, establishing roles and responsibilities, development of plans, as well as behavioral processes such as initiative. Analyzing the situation was a process that was reflective of the transition phase (see Marks, Mathieu, & Zaccaro, 2001) within MTSs and was comprised of two subprocesses, gathering information and understanding the big picture. A unique aspect that emerged within analyzing the situation was that often the process of gathering information included boundary spanning not only across component teams, but outside the system in order to not only develop an accurate picture of the problem, but also to build ties that later facilitate coordination. This often caused problems when it was not accomplished. For example, a new governor arrived in the city of Heart during a time of great political upheaval so the American Task force brought him to a government safe house. The Task Force did not look outwards and continued to occupy the safe house for 2 months, despite the fact that many within and outside the MTS requested they leave due to the visibility of the location. This lack of information gathering and corresponding lack of understanding the larger picture created undue tension across the MTS as well as with outside entities (e.g., civilian advisor to PRT commander, UN, ISAF, and Kabul) (Kennedy, 2005).

Table 4
Examples of critical incidents reflecting each category broken out by emergency response system (ERS) and provincial reconstruction teams (PRT).

	Strategy		Coordinating	
	ERS	PRT	ERS	PRT
Between MTS Component Teams	Governor Blanco and her staff determined that a major evacuation of coastal Louisiana and New Orleans would be required, so she and Governor Barbour discussed implementing their respective contra-flow plans for interstate highways and other major roadways; the plan would reverse the flow of traffic on inbound lanes to facilitate the evacuation of the New Orleans metropolitan area. The contra-flow plans were implemented and ultimately facilitated the safe evacuation of hundreds of thousands of people. (p. 25, 29, The White House, 2006)	In Herat, the task force commander charged with general security responsibilities and specifically with helping in the collection of weapons and disarming military police who had illegal weapons, had a great deal of money to spend on projects. He rejected the advice or assistance of anyone who was trained in civil affairs missions to help him spend his money wisely or logically, rather selecting projects he liked and demanding they be pushed through. As a result many of the projects were unsuccessful in gaining clearance at the highest levels in Kabul. (Kennedy, 2005, pp. 15–16)	As Katrina passed through the Gulf Coast, the storm was greater than had been anticipated. The Adjutant General of the Mississippi National Guard established a Forward Operations Center at Gulfport that eventually combined state and federal logistics support personnel and which linked directly with each county. This provided a direct link with each county allowing for coordination of relief efforts, greater command and control and situational awareness of all operations. (Select Bipartisan Committee, 2006, pp. 61–62).	When a new political advisor (POLAD) was assigned to NL PRT in March 2005, she kept to her assignment as political advisor of NL PRT strictly and focused less on coordination and cooperation with humanitarian organizations, with regard to assistance activities. Until July 2005, however, this was not clear to some of the (deputy) commanders of the mission teams. In their meetings with the local authorities they promised to pass their requests on to the appropriate humanitarian organizations. In the daily debriefing meetings of NL PRT these (deputy) commanders mentioned the requests of the local authorities and assumed that the POLAD would pass these through to the humanitarian organizations. As the POLAD was not officially responsible for this, she often did not pass these on, which led to a lack of follow-up and many unfulfilled expectations by the local authorities. (Rietjens, 2008 p. 182)
Across MTS Boundaries	President Bush signed a Federal Emergency declaration for Louisiana, Mississippi, and Alabama following requests from the governors of these respective states. By declaring emergencies in these three states, the President directed the Federal government to provide its full assistance to the area to save lives and property from Hurricane Katrina's imminent impact. (The White House, 2006, p. 27).	In the city of Herat in Afghanistan, Karzai (a political leader of some sort) suddenly announced that Ismael Khan was no longer the governor and that he was sending a new governor, which led to large scale rioting in opposition to the new governor. Several UN buildings were gutted and burned and the rioters were suspected to be associated with Ismael Khan. An civilian in the PRT, whose role was to advise the Commander, evaluated the situation and thought it was important to go talk to Ismael Khan directly to try to get him to stop the rioting. He established permission with the Commander, called the embassy to state his intentions, and made appropriate arrangements for his visit with Ismael Khan. As a result, he was able to visit with Ismael Khan and convince him that continued rioting was not in his, nor the cities best interest and Ismael Khan got the rioting to stop. (Kennedy, 2005, pp. 8–9).	Following Katrina it was not immediately possible to know the status of the public water systems. Less than 48 h after Katrina, the Department of Health issued a blanket boil water notice for all public water systems in MS's six most impacted counties. This alert informed the public that the water might not be safe, and 2 months following Katrina neither the EPA, DOH , nor local water system operators had identified or heard of occurrences of waterborne illness or diseases from drinking contaminated public water supplies. (Officer of Inspector General, 2006)	Representatives from Anbar, the Anbar PRT, and MNF-W traveled to the Regional Embassy Office in al-Hillah to meet with their counterparts from Karbala regarding security issues. The meeting allowed for both sides to air their concerns and the infractions of the past, but mostly centered on how to approach security and cooperation in the future. The two sides signed an agreement to establish a joint security committee that will coordinate joint border patrols, arrest orders and other relevant security issues. (iraq.usembassy.gov)

Table 5
Summary of inductively derived leadership processes in multiteam systems.

Leadership function	Subtask	Description
Strategy	Analyze the situation/ Mission analysis	This is a cognitive process which is most seen within the transition phase of MTS process. It involves such actions as gathering information, figuring out what's going on, determining constraints, awareness of the situation, and problem definition.
	– Gather information	This is a subprocess involved in the higher level process of analyzing the situation. It involves searching for information within teams, across component teams, and outside the MTS regarding the environment, situational factors, MTS member abilities and resources. This information is then used to assist in mission analysis
	– Understanding the big picture	This is a subprocess involved in the higher level process of analyzing the situation. It involves the integration of gathered information such that an understanding of the MTSs, and correspondingly its component teams, place in the larger mission context is created. This also involves developing an understanding of the situation or problem model, and correspondingly environmental constraints.
	Establish roles and responsibilities	This process occurs within the transition phase of MTS and refers to the a priori establishment of roles and responsibilities for the components of the MTS and the system as a whole. It includes specification of coordinating elements and command/reporting structure for the elements of the component teams within the MTS system.
	Planning	This occurs during the transition phase of MTS process and refers to the process of developing a plan of action either at the component team level or for the MTS as a whole. This involves specifying the end state, delineating the actions needed to achieve the end state, including the timing and synchronization and elements involved.
	Taking initiative	This refers to the process of initiating action without being specifically told to do so (e.g., getting the ball rolling). Often times failure to take the initiative were seen at the system level, even when it was clear what should happen next.
Coordinating	Reactionary/Adaptive unity of command	This process occurs within the action phase of MTS and refers to the adjustment of roles and responsibilities for the components of the MTS and the system as a whole. It may include adapting the initial command structures based on changes in the environment. It happens near real time versus during the transition phase.
	Orchestrate actions	This is a behavioral process which is associated with the action phase of MTS process. It involves facilitating communication (sometimes acting as a communication hub), determining who's going to do what and specifying the corresponding timing, and creating the conditions to get things done.
	Manage the flow of information	This is a behavioral process which is associated with the action phase of MTS process. It refers to the process of information exchange in real time as well as the management of the flow and timing of that information (i.e., who needs what information). This includes a recognition of the best manner in which to distribute information.

Establishing roles and responsibilities was a second leadership process that emerged within the strategy development function. There were many instances where the MTS was not successful due to a failure of roles and responsibilities across the MTS component teams being delineated. For example, as reported in the Congressional Report by the Select Bipartisan Committee (2006), pp. 185–186:

> At the Superdome in New Orleans, National Guard and New Orleans Police Department officials were both on site. Despite the ability to personally talk to each other face to face, there was no consensus as to who was in charge, each stating the other was in control. This was problematic in many ways, however, a specific example was that when FEMA tried to contact the leadership at the superdome to coordinate FEMA activities, nobody was in charge, and there was no unified command. This limited the organization of the processes at the center and planning to address “next steps”.

Thus, this aspect of leadership pertains to specifying how the different component teams were to interact, reporting procedures, and flow of command. While clarity of roles and responsibilities is seen as important at the component team level, its importance as a factor across component teams was overwhelming as in many instances leadership across component teams was not hierarchical, but peer-to-peer. Not surprisingly, given the complexity of the environments within which the MTSs operated, and the tight interdependencies often present among component teams, planning emerged as another leadership process within the strategy development function (see Table 5 for a definition). Finally, reflecting more of a behavioral bent than many of the processes identified within strategy development is the final process of initiative. The critical incidents revealed several instances where although the roles and responsibilities were clear, there was a failure of initiative or someone stepping forward to ‘get the ball rolling’.

5.2. Leader coordinating

The second overarching leadership function was coordinating. Coordinating describes leadership aimed at managing effort within, between, and across the MTS while component teams are actively engaged in performing tasks. An example of leadership coordinating enacted across the MTS boundary occurred when Louisiana and federal officials acted as a leadership unit to secure a new location for Hurricane Katrina evacuees.

Additional subdimensions of leader coordinating were also identified, and these include: reactionary or adaptive unity of command, orchestrating actions, and managing the flow of information (see Table 5). While the number of incidents to categories was too small to allow meaningful retranslation, we include these additional dimensions in the interest of richly describing the range of leader activities represented within the larger coordinating function. Next each of the processes that emerged within the coordinating function will be described in more detail. With regard to the first process, reactionary unity of command, incidents revealed that often the structures set up a priori needed to be revised once the MTSs were in the 'heat of the action'. Incidents revealed that this may have been due to the misspecification of unity of command structures during the strategy development stage but was often due to the ambiguity of the situation on the ground and the need for adaptation in order for the MTS to remain effective. This was especially evident within the disaster response MTSs (e.g., Katrina) in which goal accomplishment was often slowed due to a lack of adaptive action. For example, despite the fact that state command and control facilities were generally intact after Hurricane Katrina the magnitude of the storm and a variety of operational factors impaired their unity of command. This struggle was also apparent within the federal government who had difficulty maintaining unity of command across different agencies (Select Bipartisan Committee, 2006). While reactionary unity of command was a large problem for the Hurricane Response MTSs, there were a few positive examples such as when the FBI command post was able to create a virtual command center for the Law Enforcement Online Internet site to facilitate coordination among law enforcement entities nationwide (Select Bipartisan Committee, 2006).

Orchestrating action and managing the flow of information were the other two aspects of the leadership coordinating function that emerged. An example of orchestrating action within Hurricane Katrina was seen when large crowds began to appear at the New Orleans Convention Center even though it was never intended to be a shelter. In response DOD and DOT worked with state and local officials to reactively deliver food and water to the Convention Center (The White House, 2006). Hurricane Katrina also provides an example of the importance of managing the flow of information. Strohm (2005) reports that federal, state, and local officials were insufficiently educated about the NRP; more specifically the catastrophic annex. This, in turn, contributed to the office of Homeland Security not assuming command as it was supposed to (Strohm, 2005). While the above examples illustrate 'orchestrating action' and 'managing the flow of information' in the context of Hurricane Response MTSs these coordinating actions also appeared within PRTs. For example, there were critical incidents revolving around the PRTs in Afghanistan managing the flow of information and orchestrating action. Specifically, there were instances where they acted as mediators between components outside the MTS in order to facilitate action and critical information flow from these entities to the MTS (Gauster, 2008). Additionally, there were several instances where there was misinformation communicated pertaining to various aspects of the PRT's activities, and once on the scene, members of the PRT would work to manage the flow of information often by going door to door (Leary, retrieved August 2008 from http://news.navy.mil). More details on these actions and corresponding critical incidents can be found in Tables 4 and 5.

6. Discussion

Following the aftermath of Hurricane Katrina, President Bush acknowledged that "the system, at every level of government, was not well-coordinated, and was overwhelmed in the first few days." Hurricane response systems aim to save lives and property following a hurricane. Provincial reconstruction teams seek the establishment of stability and reconstruction after a war. Both systems require complex systems of teams to self-organize, and present unique challenges for leaders. The current paper employed an inductive approach to these two highly representative context-rich MTSs in order to derive a taxonomy of leadership functions in MTSs. Our taxonomy makes two important contributions to the science of leadership. First, we identify the point of impact of leadership in such systems, and second, we identify the critical functions of leadership in multiteam systems. We now consider these contributions in more detail, and lay out seven propositions suggested by the current findings intended as a guide for future research on multiteam leadership.

6.1. Multiteam leadership functions

Whether the MTS was formed to rebuild and stabilize an Iraqi province or to save lives and property following the landfall of a major hurricane, leaders at multiple levels needed to enact two core functions: strategy and coordination. These two functions involved many of the same leader behaviors, such as determining the role structure of teams within the system, but differed according to whether they were enacted anticipatorily in the design of the MTS, or reactively while the MTS was engaged with task activity.

Building on Zaccaro et al.'s (2001) model of team leadership, we submit that just as team leadership is effective to the extent that functions impact the important outcomes of teams, multiteam leadership is effective to the extent that it impacts system level outcomes. These outcomes can be grouped into three categories of indicators of team functioning (Kozlowski & Ilgen, 2006): emergent states, behavioral processes, and performance. Thus, we submit that multiteam leadership strategy and coordinating functions will impact the emergent states such as cognition and motivation, the behavioral interaction processes such as coordination and information sharing, and the degree of goal attainment of the system (i.e., system performance).

Proposition 1. *Functional leader strategy behavior is positively related to multiteam system processes, emergent states, and performance.*

Proposition 2. *Functional leader coordinating behavior is positively related to multiteam system processes, emergent states, and performance.*

These functions are consistent with the episodic perspective of teams (Marks et al., 2001) which views team task work as being temporally segmented according to the intervals within which a team plans its actions (i.e., transition phase) and carries out its work tasks (i.e., action phase). The incidents we content analyzed described the interactions commencing within a large system of interdependent teams, but seemed to reflect the same temporal distinctions in terms of functions necessary within transition phases and those necessary within action phases. Considering this match between leadership functions and team task episodes, we would expect multiteam systems to show higher levels of collective functioning to the extent that leaders engage in functional behaviors when they are needed in the task cycle.

Proposition 3. *Multiteam systems whose leaders engage in functional strategy behaviors during transition phases will exhibit higher quality multiteam system processes, emergent states, and effectiveness than systems whose leaders who do not engage in these behaviors during transition phases.*

Proposition 4. *Multiteam systems whose leaders engage in functional coordinating behaviors during action phases will exhibit higher quality multiteam system processes, emergent states, and effectiveness than systems whose leaders who do not engage in these behaviors during action phases.*

This feature of the current research extends prior research on functional leadership theory. Functional leadership theory identifies the roles of leaders including: the search for and structuring of information, the use of information in problem solving, the management of personnel resources, and the management of material resources. However, these functions have yet to be integrated with a larger temporal lens, to consider when in the team task cycle particular functions are needed. The current findings suggest future research efforts aimed at identifying functions of leadership and linking them to team and other collective outcomes explicitly consider the interplay between functions and task cycles.

Transition leader functions played out at multiple hierarchical levels within the systems, but involved advance analysis of the task, situation, contingencies, and available resources, gathering and utilization of information, constructing a big picture understanding of how the array of entities involved would work together, setting up roles and responsibilities, planning, and taking initiative. Some of these actions are similar to functions identified as being important to leading teams (Zaccaro et al., 2001), while others share similarity to functions important to leading an organization (Zaccaro & Klimoski, 2001). For example, at the team level, leaders need to define the problem, identify obstacles, and analyze the situation (Kozlowski, Gully, McHugh, Salas, & Cannon-Bowers, 1996; Zaccaro et al., 2001). Our inductive analysis showed many instances of leader functioning similar to this more team-aligned mission analysis. On the other hand, "understanding the big picture," was an aspect of strategy that more closely resembles top level leadership (Finkelstein & Hambrick, 1996). Notably, both mission analysis and big picture analysis were not tied to the level of the leader within the system and rather were leader functions identifiable in leaders ranging in level from the operational component team to the overarching command leader.

An important implication of this finding is that future efforts aimed at understanding leadership in mid range collectives such as multiteam systems ought to consider both the strategic leadership literature and the more micro-oriented leadership literature. Interestingly, the problem space of understanding leadership in multiteam systems essentially requires three generally siloed research streams to come together: strategic leadership, traditional leadership, and team effectiveness. Current findings indicate that leaders must fulfill top level functions such as sense-making and strategy, and also fulfill more microfunctions such as managing the flow of information. In addition, leadership is inherently tied to the functioning of a complex collective comprised of multiple teams. Hence, functions differ by temporal task cycle of the collective, and by focal level of analysis within the collective.

Some of the functions identified in the current effort reflect those examined in prior research on team leadership (Zaccaro et al., 2001) and in initial experimental research on multiteam leadership (DeChurch & Marks, 2006). For example, DeChurch and Marks examined the causal relationship between strategy behavior and system effectiveness. The current research expands the possibilities of future research in these complex collectives by widening the scope of functions to be considered in relation to system outcomes. The contextual richness afforded by these cases of collectives operating in extreme contexts and inductive orientation revealed some new aspects of the leader strategy function which need to be examined further. In particular, there was an initiative component to leader strategy which went beyond designing how the system would function, but rather focused on putting the pieces in play, lighting the match, or hitting the first domino. In both the PRTs and hurricane case studies, there were numerous incidents reflecting leadership strategy functions that were needed in order to start the MTS in motion.

6.2. Multiteam leadership points of impact

The multilevel perspective on leadership emphasizes the meaningful distinction between leadership effects that manifest in individual level outcomes, dyadic relationships, and team and higher level unit outcomes (Yammarino, Dionne, Chun, & Dansereau, 2005). The team leadership perspective clarifies that the role of leadership in a collective is to impact the functioning of the system of relationships. Leaders in collectives create meaning in events, foster cohesion and a sense of shared identity, develop working relationships among followers, and coordinate member actions. The current work extends that research to consider additional levels of analysis at which leaders meaningfully impact collective functioning. Thus, the second major distinction to emerge in this research was the focal point of impact. Leadership impacted the functioning of three relevant collectives. First, *within*, involves leadership which ultimately impacts the interactions of individuals nested within component teams; leadership at

this impact point serves to unite the members of a team toward their component team's objective. Second, *between*, involves leadership which ultimately impacts the interaction between component teams. Here leadership is serving as a linking mechanism between multiple teams who are simultaneously working towards team goals, but whose efforts are also jointly formative of a higher order goal. Third, *across*, leadership was aimed at external alignment of the system with entities that do not necessarily share common goals with MTS component teams.

These points of impact likely track aspects of functioning at different levels of analysis in multiteam systems. Furthermore, functional leader behaviors would be expected to contribute to overall multiteam system effectiveness by impacting the emergent properties manifest at each of these levels. At the within team level, functional leadership behaviors would impact the emergent states and behavioral processes of distinct teams. At the between team level, functional leadership behaviors would impact the emergent states such as transactive memory systems that shape and routinize effective interactions of multiple teams, and the behavioral processes between teams such as cross-team information sharing and coordination. Lastly, at the across-boundary level, functional leadership behavior aimed at integrating the system with external constituencies would contribute directly to team and multiteam performance. Whereas the first two points of impact are needed to shape and develop the functioning of a collective, and therefore, we expect those leader actions to translate into improved emergent states and processes, the across leadership functions are essentially mediating between the overall system and the environment. In this way, leaders are gathering resources (e.g., information) needed for the teams to perform successfully.

Proposition 5. *Component teams whose leaders engage in functional leader behavior aimed within teams will exhibit higher quality team processes and team emergent states than teams whose leaders who do not engage in these behaviors.*

Proposition 6. *Multiteam systems whose leaders engage in functional leader behavior aimed between teams will exhibit higher quality cross-team processes and multiteam emergent states than systems whose leaders who do not engage in these behaviors.*

Proposition 7. *Multiteam systems whose leaders engage in functional leader behavior aimed across the boundary of the MTS and its environment will perform better than systems whose leaders who do not engage in these behaviors.*

Interestingly, previous articulations of multiteam systems have emphasized the importance of within and between team processes, and correspondingly, leadership which unites members within teams versus creates alignment across teams (DeChurch & Marks, 2006; DeChurch & Mathieu, 2009; Mathieu et al., 2001; Marks et al., 2005), but have not discussed the impact point discovered here as external alignment. Notably, half of our leadership-relevant incidents were classified as representing this impact point. This impact point is consistent with the articulation of the multiteam system as a purposive system existing to accomplish a goal requiring joint effort across a network of teams, but had not been previously identified. This leadership impact is consistent with Druskat and Wheeler's (2003) notion of boundary leadership in self-managing teams, and also with Faraj and Yan's (2009) research articulating three team boundary processes: boundary spanning, boundary buffering, and boundary reinforcement. Examining the relationships between the across MTS leadership functions identified in the current study as they relate to spanning, buffering, and reinforcement represents a particularly interesting direction for future research.

The issue of leadership across levels raises an interesting point about the very conceptualization of leadership in complex critical environments. Recently there has been an increasing realization that our understanding of leadership in collectives may be enhanced to the extent that leadership is understood as being a process or function that meets the needs of the collective, but that can be enacted at various levels (Zaccaro & Klimoski, 2001), and that can be enacted by an individual leader, by a team of leaders or leadership unit (DeChurch & Marks, 2006), collectively by a self-managing unit (Druskat & Wheeler, 2003; Hiller, Day, & Vance, 2006), or even in a rotated fashion by various individuals over time (Erez, LePine, & Elms, 2002). Our approach defined leadership broadly as the enactment of the function of leading or social problem solving (Fleishman et al., 1991). In complex collectives such as the ones examined in the current study, it is likely that multiple forms of leadership (e.g., rotated, shared, team) are in place at various positions in the multiteam system simultaneously, and must be aligned in order for the system to function effectively. This is perhaps an additional meaningful aspect of leadership in extreme contexts representing an interesting direction for future research.

6.3. Practical implications

Although future research is needed to further validate the current taxonomy of leader functions in multiteam contexts and to test specific propositions regarding the temporal and mechanistic aspects of the framework and set of propositions, this framework has a number of practical applications to managers. The current taxonomy clearly indicates the types of functional behaviors needed for complex multiteam arrangement. These behaviors were derived using the critical incident method and are descriptive of behaviors that could be used as the basis of leader training. In particular, leaders in multiteam systems would benefit from understanding not only the two overarching functions, but also the focal points of impact which were found to be important in this sample of incidents. These taxons could be used to enhance existing leader training by expanding the focus of targeted behaviors to uniting the efforts of team members, bridging the boundaries across teams, and also integrating the overall system with its external environment.

Similarly, these taxons could be used to develop performance appraisal and feedback tools that reflect these important foci of leader behavior. As multiteam context are complex, informationally rich, and time-limited, the development of automated feedback tools which gather and feed information back to leaders regarding such behaviors as information flow within, between, and across teams in the system would be a particularly valuable practical application.

6.4. Limitations

While this study contributes to theory on leadership in extreme contexts, several limitations need to be considered. First, our emphasis on context-rich cases, and inductive theory-generative approach, afford higher external validity in terms of identifying leadership behaviors meaningful in the context in which we are interested (i.e., extreme, critical, highly networked environments), however, this comes at the expense of inferences related to internal validity. We identify these leadership behaviors as having been written about in analyzing the successes and failures of leadership in relevant contexts, though future research is now needed that empirically examines the impact of these aspects of leadership on system processes and outcomes. In particular, these components of leadership need to be operationalized and relations to behavioral, cognitive, and motivational processes within and across component teams, and to ultimate system level goal attainment need to be examined.

Second, there is some overlap in the overarching strategy and coordinating functions. For example, information flow was part of both aspects of functional leadership identified in the current typology. This overlap reflects the fact that information flow was identified as being an important aspect of leadership in both strategic and coordinative functions, nonetheless, further refinement is needed. Future research is needed considering the particular ways in which leaders optimally gather, utilize, exchange, and disseminate information during both transition and action phases.

Third, in developing critical incidents, the majority of the documents found described incidents that led to negative outcomes for both PRTs and ERTs. Many of the documents used to develop incidents were focused upon lessons learned and ways to improve these systems. It could be possible that different processes may exist for incidents with more successful outcomes.

Fourth, the archival documents used to generate critical incidents were not written for the purpose of analyzing key aspects of leadership, therefore some information may have been written from a biased perspective. These biases may have indirectly impacted the way in which the critical incidents were analyzed and interpreted by the various panel members. One way in which the research team tried to mitigate this limitation was collecting information from multiple sources.

Nonetheless, while the approach taken in this research stands in contrast to the more deductive methods prevalent in leadership research, we deemed this necessary in order to generate an understanding of the aspects of leadership relevant to the functioning of the types of collectively typically tasked with complex, critical goals. Our hope is that this research sparks increased attention to the interplay of leadership and the particular types of collectives they are leading. Future research is needed that both expands theory through the use of novel qualitative methods, and empirically links aspects of leadership to important higher level system outcomes.

6.5. Future directions

The aim of this project was to inductively generate aspects of leadership important to real world collectives operating in mission critical multiteam environments. While there is clearly some correspondence between the functions and impact points identified herein, there are also notable differences which represent fruitful targets for future empirical studies of leadership within such contexts. Future research is needed that explores these functions and impact points in MTSs. While our study identified them from real-world situations, work is now needed that measures and traces the impact of these leadership components in order to draw causal inferences about the effect of these leadership components on system functioning, and the mechanisms through which particular aspects of leadership drive outcomes. We hope the propositions developed herein will facilitate this much needed research.

Although the functions, sub functions, and points of impact provide a clear starting point for empirical work on how to operationalize leadership, equally important is the quantification and tracking of outcomes of leadership. These leadership functions need to be examined in terms of their effect on system level outcomes. This includes both process variables, i.e., unique information sharing across teams, and also outcome variables, i.e., degree of goal attainments of the system of teams. In a PRT, the most important outcomes of leadership to examine would be those existing at the collective level at which leadership is targeted. Thus, we submit that the effects of leadership on outcomes will be most meaningful when a match exists between the impact point-specific enactment of leadership and the outcome residing at the level of that impact point. For example, leader strategy aimed at the boundary between MTS component teams and external constituencies ought to capture the degree to which MTS effort is aligned with and responsive to external constituencies as the dependent variable of interest.

This alignment between level of leadership function enactment and outcome variable is also essential in order to identify potentially conflicting processes within these systems. It seems plausible that leader efforts aimed at one point in the system may impair functioning at other focal levels of the system. For example, as a leader builds a strong sense of identity within the various component teams (i.e., within-focused leadership), this may inadvertently harm team members' collective identification with the overall system (i.e., between-focused leadership) due to intergroup competition.

A final interesting avenue for future research is to consider the intersection of functional leadership in multiteam systems and Mumford and colleagues research on pragmatic leadership (e.g., Bedell-Avers, Hunter, Angie, Eubanks, & Mumford, 2009; Mumford, 2006; Mumford & Van Doorn, 2001). Pragmatic leadership is an outstanding form of leadership, which unlike

transformational and charismatic approaches, involves leaders who utilize their expertise and engage in problem solving. Given the similarity in the functional view of leadership and pragmatic leadership, a valuable starting point for future empirical testing of MTS leadership would be to utilize Mumford and colleagues propositions about the multilevel effects of pragmatic leadership on emergence and performance (Mumford, Antes, Caughron, & Friedrich, 2008). In particular, this work posits relationships between pragmatic leadership and emergent states important to multiteam functioning including justice, cohesion, and interdependence.

7. Conclusion

The idea that leaders enact functions that contribute to system effectiveness is not new. What is new, however, is the insight that (1) particular functions are more and less relevant based on the task subepisodes of the collectives they lead (i.e., temporally) and that (2) leadership functions impact collective functioning at three levels of analysis: within, between, and across teams.

With the renewed interest in understanding the context of leadership comes the realization that the task of leadership is more akin to enabling the functioning of an organizational system than in enacting discrete behaviors to control individual task behaviors. With this in mind, we explore leadership within the context of highly complex "messy" organizational systems whose success or failure ultimately determines the fate of many lives and institutions. It is our hope that the findings resulting from the current effort serve to promote discussion, food for thought, and future research.

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