

CREATIVITY IN EMERGENCY RESPONSE AFTER THE WORLD TRADE CENTER ATTACK

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Abstract

This paper discusses the role of creativity in mounting an emergency response, using the World Trade Center attack as an exploratory case study. The paper observes that the exercise of creativity by emergency managers is the source of positive adaptive responses to unexpected or rapidly-changing situations. The paper notes however that creativity, because of its different manifestations, can introduce a random, unpredictable element into the response milieu, varying with the magnitude of the event, and can lead to tensions within an organization that vary with the timeframe over which decisions must be made. Volunteers and others who converge to a disaster site also exhibit creativity in the pursuit of their objectives, which can present both benefits and challenges to emergency managers. Nevertheless, creativity will remain an important component in initiating and sustaining the emergent methods and organizational networks that researchers recognize as important in emergency response. The paper suggests that plans and exercises should include a dimension that considers creativity.

Introduction

In this paper, we examine creativity as an important contributor to successful disaster response. While advance planning and preparedness serves as a backbone to disaster response efforts, creativity enhances the ability to adapt to the demands imposed upon individuals and organizations during crises and bolsters capacities to improvise in newly emerging physical and social environments. Borrowing from the literature on entrepreneurial creativity, we apply a framework developed by Amabile (1997) to categorize creativity in private sector firms to the activities of responders working in the disaster context of the September 11th, 2001 World Trade Center attack and describe how individuals and organizations involved in various aspects of New York City's management of the disaster generated and implemented novel ideas to deal with challenges posed to them during the early response.

Creativity

The literature on creativity is vast, spread among the arts, psychology, business and management, and philosophy. In a summary, Clemen (1996: 188) describes creativity as "...new alternatives with elements that achieve fundamental objectives in ways previously unseen. Thus, a creative

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alternative has both elements of novelty and effectiveness, where effectiveness is thought of in terms of satisfying objectives of a decision maker, a group of individuals, or even the diverse objectives held by different stakeholders in a negotiation.” He also observes that “All definitions include some aspect of novelty. But there is also an element of effectiveness that must be met” (188). In looking at entrepreneurial creativity, Amabile (1997: 18) defines creativity “as the production of novel and appropriate solutions to open-ended problems in any domain of human activity; we have defined innovation as the implementation of those novel, appropriate ideas.” In other words, creativity involves both success as well as newness: it is both positive and adaptive.

Amabile (1997: 20) further dimensionalizes *entrepreneurial creativity*: “(a) the products or services themselves, (b) identifying a market for the products or services, (c) ways of producing or delivering the products or services, or (d) ways of obtaining resources to produce or deliver the products or services.” These dimensions, though derived with respect to business enterprises, provide a useful way of conceptualizing the kinds of creativity that are often exhibited by responders in disaster situations. At the same time, they allow us to make connections with other well-developed literatures on creativity that will both enrich our understanding of creativity in disasters and, through further research, allow us to use disaster experiences to advance understanding of creativity more generally. Relatedly, Woodman et al (1993: 293) have defined “*organizational creativity*” as the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system,” which they further characterize as a common conception of creativity “placed within an organizational context.” Amabile (1993: 20) is also careful to distinguish between what is and what is not entrepreneurial creativity:

It is not limited to the establishment of new businesses, because it can be found when new enterprises are established within existing businesses. Moreover, it is not necessarily present in the creation of any new business; some significant degree of novelty must be involved, at some stage of the process... Entrepreneurial creativity is not present in many of the incremental product or service improvements within established systems or paradigms, unless some significant novelty is required... Moreover, even when a truly novel product or service idea is present, or when there is a novel insight about a market opportunity, entrepreneurial creativity does not exist unless the ideas are implemented in the creation of a new business or enterprise.

An important difference between the disaster and the business environment, of course, is the time pressure involved and the overall urgency of the creative decisions to be made; nevertheless, the types of creativity are analogous. Some or all of them can be seen in different instances of creativity and creative action that occurred in New York City. Not every instance of creativity in New York City involved creating a new product or item; some of the creativity involved “the means for creating or delivering the product—the identification of new market opportunities, or the organization and the systems that are established for bringing the product to market” (Amabile, 1993: 18, citing Stevenson, 1984; Timmons, 1977; Timmons, Muzyka, Stevenson, and Bygrave, 1987).

According to Comfort (1999: 29), creativity is also strongly related to the capacity for “sensemaking” that Weick (1993) has described: the ability to comprehend aspects of the environment and to make decisions. She draws on Luhmann’s (1989) conception of “autopoiesis,” calling that process “a powerful, driving force for creative self-expression...in individuals that, if extended to social groups and organizations through articulated communications processes, serves as a vital source of creativity, renewal, and regeneration in social systems undergoing change.” Comfort (1999: 59) observes that “Autopoiesis necessarily involves interaction with the environment.” Woodman et al (1993: 294) draw on Woodman and Schoenfeldt’s (1989, 1990)

interactionist model of “creativity [as] the complex product of a person’s behavior in a given situation;” “group creativity is a function of individual creative behavior ‘inputs.’” What emerges from these different research approaches is a view of collective creative action rooted in gathering environmental information, considering the implications of that information with respect to ambient challenges, and the generating, identifying, and selecting of actions that are anticipated to meet those challenges.

Creativity as a Contributor to Improvisation

A disaster is an event that is defined, at least in large part, by the improvisational aspects of the response (Tierney 2002). Since disasters break down the patterns of what can be governed or absorbed by routine procedures, an event that does not demand the exercise of improvisation does not, by definition, constitute a disaster. Indeed, Kreps and Bosworth (1993) argue that disaster research was meant by the pioneers of the field to place a theoretically based focus on organizational stability and change in the crisis context. This research is well represented by a large body of literature examining emergent groups (Stallings and Quarantelli, 1985), organizations that form new or altered organizational structures and perform non-routine tasks in a disaster (Dynes 1970), organizational adaptation in disaster (Stallings, 1970), improvisation in organizational domains, human and material resources, tasks, and activities (Kreps et. al 1994), role improvisation (Webb, 1998), and enhancing improvisation through decision-support tools (Mendonca et al, 2001). The catastrophic collapse of the World Trade Center following the September 11th, 2001 terrorist attacks and the magnitude of the impact on New York City necessitated a wide range of improvised activities (see Wachtendorf and Kendra, 2002). Hundreds of thousands of people were evacuated by boat from lower Manhattan; telephone communication was, in large part, temporarily disabled in parts of the city due to the destruction to telephone lines and cellular phone towers; the city’s Emergency Operations Center (EOC) at 7 World Trade Center was evacuated and eventually collapsed, necessitating the establishment of interim and then semi-permanent EOC facilities; the damage to the World Trade Center area necessitated complex site management, security, safety, and clean-up processes (while response and recovery activities overlapped), processes not previously seen in this way or to this extent by any of the organizations involved. Organizations and individuals improvised, some more successfully than others, to meet the demands generated by these and other emerging challenges. We argue here that entrepreneurial creativity, not unlike that described by Amabile (1997), played an instrumental role in the success of the improvised action.

Planning and creativity work in concert to produce effective improvisation. The new social arrangements that emerge following a disaster and in response to an evolving crisis situation cannot be divorced from previously existing arrangements (Kreps & Bosworth, 1993). Prior preparedness increases the ability to improvise (Kreps, 1991). This planning forms the basis for decision-making in emergent environments, informs decisions by anticipating possible challenges or pitfalls that could come as a consequence of improvised activities, and often provides some element of stability – whether of organizational structure, role, task responsibility, resources, or the physical environment – when other elements are in flux or demand unplanned-for action. At the same time, the very need for improvised action points to an inability of plans to adequately take into account one or more specific demands – sometimes quite understandably so, since it is not practical or feasible to adequately plan for every possible scenario. Existing social arrangements also are always subject to change (Kreps & Bosworth, 1993), particularly when coupled with the ambiguity and confusion that often accompanies large-scaled disasters (Webb, 1999). For these reasons, creativity emerges as an instrumental contributor to successful improvisation.

This fact is not surprising. Of course, the application of creativity in established planning efforts, whether in new activities or making changes to existing activities, can improve the effectiveness of those actions. Creativity in the disaster context, however, must be performed under increased time

constraints and in environments that have higher degrees of ambiguity. In both disaster and non-disaster periods, the generation and implementation of novel approaches to a challenge can result in positive or negative outcomes. A creative activity may, in fact, generate new problems, have not adequately taken into consideration the social environment, or quickly become ineffective in a dynamic and changing disaster context. Therefore, improvisation is most successful when existing structures and planning are in conversation with creativity.

Along with researchers, practitioners appreciate the creative aspects of their work; creativity is a trait or characteristic that is strongly associated with emergency managers and is often cited as a prime job-related skill, as the following passages indicate:

“The Texas Emergency Manager (TEM[®]) certification is an indicator of experience, hard work, continuing education, dedication to integrity, and creativity.”

(Emergency Management Association of Texas, nd)

"A disaster is any event that overwhelms your ability to respond," [Judi Van Swieten] says. "You have to be prepared for the worst and work from there, often changing the plan as you progress.

Flexibility, adaptability and creativity -- those words guide my career."
(Thomson, 2002)

One publication by The International Emergency Technical Rescue Institute notes that

“the future belongs to those who can recognize the needs of an emergency situation and respond with speed, accuracy, creativity, innovation and calm leadership”.

(USARAA News, 1999: 1)

Though most of the emphasis on creativity relates to the response phase of a disaster, creativity should not be seen as being limited to the emergency response, which distinguishes it from improvisation, normally used in the literature to refer to actions taken when the disaster occurs. Creativity is an important quality for disaster managers even outside the environment of a disaster: it is important during hazard identification, developing plans, and communication and outreach to the public, processes which often have strong entrepreneurial aspects as well. A disaster plan may have to be developed and “sold” to elected officials or corporate officers, for example. Yet even though creativity and flexibility are regarded as important qualities of emergency managers, and though people involved closely with emergency response recognize that emergencies demand these qualities, having to exercise creativity during a response is, paradoxically, often regarded as dysfunctional for emergency personnel: an indication of failure to plan properly ahead of time. This is because emergency management plans, apart from their function as guides to action, also serve rhetorical or political purposes (Clarke, 1999). Clarke argues that they are meant to attest to the competence of emergency planners to foresee events and also that plans fulfill the symbolic function of converting the uncertainty that surrounds hazards or accidents into the kind of certainty that can then be managed. Sometimes the planning process can be stretched beyond credulity; at that point plans become “fantasy documents” (Clarke, 1999) that accept as possible that which is improbable. In other words, planning is such an important activity that plans must be written for situations in which the event will almost certainly differ from what is anticipated, and the anticipated response will be based on preconditions that are likely to be radically altered.

Given the emphasis on plans, even those that are impossible to execute, it is not surprising that departing from them is often defined as evidence of a failure. Disasters, however, break the rules that frame the ordinary conduct of business and government, at least for a period of time. Disasters create a new environment that must be explored, assessed, and comprehended. Disasters change the

physical and social landscape, and therefore require a period of exploration, learning, and the development of new approaches.

Method

The data used for this paper are qualitative in nature and were gathered during exploratory fieldwork commencing within two days of the terrorist attack on the World Trade Center and continuing for two months thereafter. We base our findings on over 750 collective hours of systematic field observations. In particular, we closely observed key planning meetings at highly secured facilities, including the Emergency Operations Center, incident command posts, and the federal Disaster Field Office; we spent extensive periods observing operations at volunteer, supply, and food staging areas, the “Ground Zero” area, family assistance centers that were established for victims’ families, and respite centers that were established for rescue workers; we spent time observing activities at major security checkpoints in Lower Manhattan and at locations central to the emergency response. In the course of our fieldwork, we generated a large volume of notes providing rich description of observations and experiences, took over 500 photographs, and sketched and collected floor plans of various facilities to track the spatial - organizational changes over time. Of primary interest to the field research teams were the activities of formal and informal organizational and the multi-organizational response elements that were underway. That is, we were concerned with identifying which organizations were involved in particular response and early recovery functions, the activities in which these organizations were engaged, the level and success of interorganizational interaction or lack thereof, the degree to which planned emergency response activity was implemented and the extent to which alternative response strategies emerged, and the successes and challenges encountered by those responding to the disaster.

In addition to direct observation in New York City, we collected a wide array of documents produced by local, state, and federal agencies as well as by individuals and organizations with less formal ties to response efforts. These documents included but were not limited to internal and public reports, requests for information or resources, information handouts, internal memos, schedules, meeting minutes and agendas, maps, and internal directives.

DRC also compiled an extensive electronic database of articles and web-based information. Newspaper articles from major local New York City papers were collected for six months following the attack. Articles from major periodicals, selected articles from newspapers from around the world, and information from the many government, charity, community-based, individual, and private Internet sites that emerged after the disaster event were included in this database. The subject matter included in this collection is diverse; however, all of the information was later coded according to relevance to the response and early recovery as well as to the primary functions related to the response effort. The functions according to which this information was coded were informed by the literature on disasters and based in large part on the activities observed during the fieldwork component of the research.

The use of multiple methods and data sources – direct observation, reports and other documents produced internally by New York City responding agencies, analysis of documents produced by victims of the disaster and informal supporters of the official response, analysis of newspaper accounts, and coding of Internet-based data – allowed us to triangulate the data collected. That is, we were able to compare the information collected from one source with other sources as a means to check for accuracy and validity of the data (Denzin, 1998).

In this paper we apply the framework provided by Amabile (1997) to the World Trade Center disaster context. Adopting Amabile’s definition, we will look at (a) new products or services that responding agencies provided or used; (b) situations in which responders identified a particular market or need to the services they wished to provide; (c) creativity in producing or delivering

response-oriented products or services; and (d) obtaining resources for the disaster response. We emphasize that, in our use of this entrepreneurial model, we are not suggesting that responders were acting like business entrepreneurs. Instead, we use the model in a more strict analytical sense because of its usefulness in conceptualizing the different manifestations of creativity and in characterizing an operational environment in which new ideas, strategies, and methods came to fruition under extreme conditions.

Having introduced our methodological approach and theoretical orientation for our discussion, we turn next to describing instances of creativity with respect to the four dimensions described above.

Creativity in New York City

Responding to a disaster is from the beginning a task of both creativity and improvisation, in which plans end up providing, not a blueprint for action, but at most an orienting framework. In extreme cases, such as the September 11 attacks, plans may offer very little guidance on how to address disaster-related problems. The emergency response in New York City following the Trade Center attack was created on virtually a daily basis as needs were identified, solutions considered, and actions implemented.

New Products; New Market; New Ways of Producing or Delivering the Products or Services; New Ways of Obtaining Resources

In earlier work (Kendra and Wachtendorf, 2001a) we describe how the New York City Emergency Operations Center was reconstituted following the destruction of their very advanced facility at 7 World Trade Center. After moving to a succession of intermediate facilities and making use of a mobile communications van, the Office of Emergency Management finally moved to Pier 92, a cruise-ship pier that had been scheduled to be used for a bioterrorism exercise on September 12. The Office of Emergency Management re-constructed the emergency operations center in this space, bringing in, or facilitating the delivery of, computers, fax machines, printers, desks, chairs, even carpet. Emergency managers, in many respects, faced a new operational environment, comprised of many more agencies than previously dealt with in a cityscape that was fundamentally altered, both by the destruction itself as well as by road closures, detours, and facilities that were put to new, unusual uses: a hotel and a university student center became respite areas for rescue workers, for example. Stated most generally, emergency managers had to explore and reclaim an altered environment. They had to develop a new “map” of a response that had not been previously envisioned, and identify the important locations, which themselves were changeable as the response evolved. The term “mapping” can be used in a literal and not just metaphorical sense. Ground Zero, itself a new term for a transformed area, was an entirely altered landscape, difficult even for New York residents to orient themselves with respect to the familiar features of the area. Command posts, respite centers, warehouses, and washdown stations were among the needed facilities for which space had to be found, locations mapped, and maps made available to responders. Apart from the reconstitution of the EOC as a whole, development of the mapping capability within the EOC shows creativity as well (see, ArcNews, 2002 for an extensive narrative) which exemplified all of Amabile’s (1997) creative dimensions involving product and process. This capability involved bringing in hardware and software from a variety of sources, including both private vendors such as ESRI and also local colleges along with a process of learning, by cartographers and emergency managers, what spatial information was required for the response and what was possible to produce given the available information. The use of maps was an instance of creativity in this case, but so too was the development of a mapping infrastructure. Here were aspects of creativity that focused not just on creation of new maps, displaying information such as the extent and orientation of the debris pile and the direction of ash movement, but on the development of the network of creators and users of the end product. They created new

relationships to supplement those that already existed, and they used technologies that had been designed for other purposes (Tierney, 2002).

New Ways of Producing or Delivering the Products or Services

The waterborne evacuation of lower Manhattan after the World Trade Center attack provides an excellent example of creativity (especially along two dimensions identified by Amabile: “ways of producing or delivering the products or services,” and “ways of obtaining resources”) and emergence, in which responders departed from their normal and even their disaster-related roles and in which many responders took part on an unplanned basis. An evacuation of that magnitude was not planned; one Coast Guard officer referred to it as an “ad hoc” event, while another described it as an extension of the agency’s existing catastrophic search and rescue plan (which had been designed for the thousands of people who might be, for example, involved in a ferry accident) that the Coast Guard is now working to codify (“memorialize”). Available vessels arrived to assist and were assigned by Coast Guard officers working aboard the Sandy Hook Pilots’ pilot boat and then aboard a cutter (Sherwood and Schoenlank, nd). According to Coast Guard officials, between 500,000 and 1 million people left Manhattan by boat, whether by tour boat, military vessel, passenger ferry, or private craft. In another instance of people using existing skills and capabilities to perform new tasks, the Pilot Boat *New York* fueled fire trucks and other vehicles (Sherwood and Schoenlank, nd). It was a creative exercise, in which people rose to the occasion with all sorts of vessels, and it is also an example, especially initially, of the kind of self-organization that is important in complex adaptive systems (Comfort, 1999).

“We moved about 30,000 people on our six boats,” says Peter Cavrell, senior vice president of sales and marketing for Circle Line. “It wasn’t any kind of coordinated effort. We just started doing it.” Continues Cavrell, “In its own small way, Circle Line is a symbol of New York. We just wanted to do our part.”

(Snyder, 2001)

New Products: New Ways of Producing or Delivering the Products or Services

Though creativity is accepted by researchers and practitioners as significant in managing emergencies, and though feats of creativity were significant in New York City’s response on September 11, exercises of creativity during the pressure of a response to an emergency may give rise to future complications. We can anticipate that, the greater the magnitude, scope, and/or duration of a disaster, the greater or more frequent the complications might be. Plans promise coherence in a dynamic situation, and the ability to comprehend and respond to a disaster as a total unit. Response strategies that involve creativity, though, approach disasters as more segmented entities, comprised of micro-events to be managed which may or may not be anticipated. Difficulties may therefore arise later.

There was tension within the formal disaster response organizations regarding the nature and scope of creative efforts, in particular over what timeframe to consider emergent needs. The time horizon is an important consideration when planning courses of action; some officials have jobs which compel them to look at different spans of time when contemplating actions. Creativity within the response milieu developed as an iterative process among various officials and, as in any work setting, there were clashes over the direction of the creative endeavor. One of the needs identified early in the response was washing down debris and vehicles, especially trucks and heavy equipment that would be leaving the Ground Zero area. Much of the debris was dangerously hot after having been extracted from the rubble pile (hot enough in some instances to ignite the tarpaulins on the trucks), and in addition, the dust and ash posed a health hazard. Officials from the Department of Health and the Department of Design and Construction quarreled over whether it was better to have washdown apparatus in place as quickly as possible, or whether some time

should be taken to design an engineered structure that would be heated (“winterized”), in anticipation of the cold weather that would arrive in December. The official from DDC, an engineer, argued that building winterized facilities required a “substantial planning process,” and that they were at the position of being able to plan how to develop that plan. The official from the Department of Health was perplexed by what he saw as unreasonable delay in meeting immediately pressing needs as opposed to problems that could develop a couple of months later. The longer a crisis lasts, the more tension there will be among officials whose jobs and whose professional imperatives involve different timeframes for action.

New Ways of Producing or Delivering the Products or Services

Creativity doesn’t necessarily mean building something; rather, solutions can take the form of altered procedures, e.g., by doing or not doing something that would be done ordinarily. Working closely with Department of Health officials, New York State Department of Environmental Protection officers slackened the issuance of citations to truckers without tarpaulins, recognizing that it was impossible for them to comply with the regulations requiring trucks with bulk cargoes to be covered. With respect to the seagoing evacuation of Manhattan, Coast Guard inspectors at the point of loading were authorized to use their discretion to permit vessels to exceed their certificated passenger capacity. In these examples of process adjusted with respect to ambient conditions, authority devolved to personnel closer to the scene for greater flexibility.

Detailed plans developed in advance of an emergency are intended to provide coherence and predictability to the response; a plan with which everyone is familiar should be a source for re-establishing an orderly, predictable response in the uncertain and dynamic post-event environment. The prime difficulty with the exercise of creativity is that, by necessity, it occurs outside of a framework of control. Sometimes individuals exercise creativity; other times groups or organizations do so. Creativity is a function of inspiration and artistry (Kendra and Wachtendorf: 2001a). It doesn’t emerge on schedule, and as a consequence creative and innovating steps can occur out of sequence with other actions being undertaken by responding organizations and groups. Therefore it introduces a random and unpredictable element into the response milieu. One person’s or group’s creative insight can become another’s challenge, and it also becomes a new part of the operational environment about which people must learn and to which they must adjust, just at the time when people want stability.

Prior to the September 11 attack, the Office of Emergency Management had decided to adopt the E-Team emergency management software, a web-based application that allows for tracking of resource requests and deliveries. The decision had only recently been made, but OEM decided to make use of the software in this emergency, though the agency had little experience with it. OEM brought in E-Team personnel, as well as other emergency management specialists familiar with its use, to install the software at Pier 92. Few of the workers in the EOC had any experience with E-Team, and it was necessary to run training sessions to acquaint people with its use. One logistics officer said that the middle of an emergency was a bad time to bring in new software. Yet this is also an example of the importance of the timescale over which creativity operates; bringing E-Team, a new process for this organization, in early allowed it to be used during nearly the entire course of the response. When American Airlines Flight 587 crashed in November, EOC staff were experienced with E-Team and able to use it.

Procedures that developed around security and credentialing constitute an additional instance of “creative ways of obtaining resources to produce or deliver products or services.” Not only was the Trade Center attack a high impact disaster that produced numerous casualties, it was a complex emergency with added ambiguous dimensions such as the ongoing terrorist threat, the criminal investigation, an ongoing process of remains recovery and identification that persisted more than six months after the attack, and a very dangerous collapse site situated within close range of an

extremely dense urban population. Early in the response, it became clear that controlling access to various affected sites would prove a significant challenge. In addition to standard concerns about discouraging the movements of sightseers and preventing non-essential personnel from exposing themselves to dangers at the collapse site, security was a major consideration because of the persistent terrorist threat and the perception of continuing vulnerability. In addition, the standard OEM visitor badges had been lost in the destruction of the EOC at 7 World Trade Center and even if available, these badges would have been entirely inadequate for the hundreds of people who passed through the reconstituted EOC on a daily basis or who require access to other secured zones and facilities throughout the area.

One of the ways that this complex emergency was dealt with was through the development of a credential system. This system, in the form it took after 9/11, was not a previously existing process. While based on other credentialing procedures, but it evolved over the course of the response. Beginning on Saturday, September 15 and continuing over the course of a few weeks, OEM developed a series of badges and transitioned through several phases from relatively a simplistic credentialing system where anyone given 'clearance' received a blue and yellow badge featuring the OEM insignia -- this computer-printed badge was essentially a piece of paper placed in a name-tag holder, could be easily duplicated and had no information identifying information -- to eventually a plastic white badge with a white background and the title "WTC 2001," a digital color image of the individual, the person's title and organizational affiliation, and a variety of codes indicating particular areas to which the person could have access. At the same time as the more sophisticated WTC 2001 badges were distributed, temporary badges were developed for contractors and volunteers who would require short-term access to specific areas.

The process involved in obtaining badges was at times very time-consuming for some individuals. Although it was important for the city to restrict the number of people with access, there was a real and legitimate need to move along with critical assessment and recovery tasks, including the inspection and repair of many surrounding buildings. Some of the contracted workers utilized in the inspection and repair function of the response employed creativity to obtain resources - in this case, the resource was access badges -- in order to deliver their response services and meet the responsibilities they were assigned to undertake in an expedited fashion.

Supervisors of construction workers were only allowed a certain number of contractor badges. Again, it is important to stress that this procedure was for safety and security purposes. At the same time, demands were placed on the supervisors to rapidly carry out their responsibilities. The number of badges allocated to them did not always match the number needed to undertake or promptly complete these tasks. The supervisor would then contend with a certain competing tensions that needed to be resolved. On the one hand, the contract workers needed to do a task and on the other hand they did not have the resources -- access badges -- that would allow them to complete the task. This tension resulted in some supervisors engaging in creative strategies in order to achieve their ultimate response goal.

This scenario recounted by one supervisor of contract workers illustrates their employment of creativity. This supervisor received approximately twenty badges needed for access to complete the inspection or repair of a building. More workers were needed, however, to complete the task at hand. As a solution, twenty workers would go in, one worker would take their badges, and then this worker would give separate groups of nineteen workers the same badges for access to the building. Temporary badges for contract workers did not have identifying information, but instead expired after a certain time period. Supervisors retained control over the badges and a contract worker could not enter or exit that building or area without a badge. Still this solution enabled responders in charge of inspection and repair to 'make do' with the badges they were allocated by implementing a creative approach to getting access to resources to achieve their ultimate goal.

Identifying a Market

Just as important as the creativity exhibited by emergency managers in the official response structure is that exhibited by the convergers. Creativity is not the sole province of official emergency responders. As noted earlier, the subtext of emergence is creativity: while people may not always be creating something that has never been seen before, the essence of creativity is that the actions undertaken are new to them. Emergent groups and convergers, often display considerable imagination and ingenuity in meeting their objectives. In many instances it was a matter of adapting their existing talents to the new post-disaster environment (for example, boat operators). We encountered, for example, bicycle couriers who delivered food along the secured perimeter when they weren't permitted to help in other ways. (see Kendra and Wachtendorf, 2001b). We observed chiropractors who, by skillfully allying themselves with Red Cross workers, gained access to the EOC and worked on a stack of pallets with a pad thrown across. As Amabile (1997: 18) observed, "[N]ovelty may appear in the means for creating or delivering the product..." and in reaching new markets, not just in creating something new. Some of the volunteers exhibited skills that were quite entrepreneurial, not in a business or financial sense, but there was a kind of volunteer "market" in place; many people were competing for an opportunity to help, not in a direct sense but certainly implicitly. The imagination and resourcefulness of such well-meaning volunteers was sometimes an irritant to emergency managers, to say nothing of the creativity shown by exploiters and the disaster opportunists who also converged. Convergers can often be a source of additional assistance to emergency managers, bringing skills that may not exist when and where they are required, but they can also present challenges, since they are another potentially uncontrollable element in the response milieu whose appearance can create other complications for security and site safety.

Implications for Planning

New York's Office of Emergency Management had conducted many drills and exercises that addressed response to different kinds of emergency events. Included at these drills were representatives from a broad range of local departments and agencies. When responding to the World Trade Center attack, these agencies essentially recreated their ongoing and planned relationships on a daily basis, accounting for changes in the social and physical context but also using sets of skills and capabilities that were developed in earlier training and practice. At the same time, other individuals and organizations played important roles in the response that had not been involved in any of the city's exercises. These individuals and organizations, however, were able to draw upon their experiences, informational resources, and existing networks and augmented those established resources with creative ideas in order to achieve their goals or fulfill their responsibilities. For all these groups, the requirement in this disaster was to deploy these skills and capabilities in new ways that were adapted to the emerging situation. Although creativity is generally regarded as emerging from flashes of inspiration or insight, but it is also founded on broadly-applicable abilities. Bruner (1983: 183, cited in Weick, 1993) argues that creativity is "figuring out how to use what you already know in order to go beyond what you currently think."

In earlier work (Kendra and Wachtendorf, 2001) we considered the tension between anticipation and resilience, especially as articulated by Wildavsky (1992). Wildavsky argued that the likelihood of experiencing events that could not be planned for was such that a strategy of developing resilience to stressors would be better than trying to anticipate and plan for every type of event. Since it is not possible to anticipate everything, such an effort would lead to failures in many cases. In our view, however, anticipation and resilience are not in opposition. Rather, the sought-after quality of resilience can be achieved only by developing sets of capabilities that can be applied in a variety of disaster situations. Indeed, we argue that the World Trade Center attack shows that creativity is such a significant feature of response to an extreme event that planning and training

should move explicitly toward enhancing creativity at all levels of responding organizations. Given that creativity undergirds improvisation, and is an important dimension of resilience (Weick, 1993), such a widely recognized and vital component of emergency response should not be left for emergency managers to acquire by chance, nor should it rely on emergency managers fortuitously bringing these skills to the job or developing them on their own.

As mentioned earlier, Mendonca et al (2001) are building a decision-support system with a training mode that features improvisation, and they note that there are other techniques that can be used within organizations to promote creativity, such as brainstorming. Clemen (1996) summarizes some methods that are used in corporate settings to develop creativity skills; these might be applied in the emergency management field as well. He first distinguishes between “fluent” and “flexible” thinking. “Fluency is the ability to come up with many new ideas quickly. Flexibility...stimulates variety among these new ideas” (Clemen, 1996: 203). Relevant exercises that Clemen mentions include thinking of new uses for familiar objects, use of “idea checklists,” and using or generating lists of questions such as Osborn’s “Idea-Spurring Questions” (Clemen, 1996: 204, citing Osborn, 1963).² Emergency managers should investigate other techniques that might be useful in their particular circumstances.

In our discussion, we compared creativity in New York City to entrepreneurial creativity in business settings. Another theme in that literature is the analysis of the impact of organizational factors on facilitating or impeding creativity. Whether the same factors obtain in emergency management organizations is an important question for future research, but it seems that, at a minimum, emergency managers should try to identify and mitigate the features inside and outside their organizations that might suppress or impede creativity, such as deleterious reward structures and other maladaptive motivational influences (See Amabile, 1997 and Woodman et al 1993 for a discussion of some of these).

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² For example: “*Substitute?* Who else instead? What else instead? Other ingredient? Other material? Other process? Other power? Other place? Other approach? Other tone of voice?”

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