Before they even think it: How high performance teams learn to anticipate critical incidents.

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ABSTRACT

Organizational scholars have only recently begun to consider the study of groups as a building block of high reliability organizations (Wesner, In Press). This study focuses on organizational teams faced with the challenges of maintaining high levels of reliability. As Wesner establishes, high reliability teams have the unique ability to facilitate rapid adaptation when faced with critical incidents. This study takes that line of research a step further by investigating how teams learn from, and begin to anticipate, critical events and the factors associated with each. In this study, I (1) explore existing literature surrounding the impact of knowledge consciousness and temporality considerations on team and individual level adaptation, (2) present a qualitative analysis of Special Weapons and Tactics (SWAT) teams to identify what teams learn from experiencing critical events and how these teams begin to integrate knowledge and training activities to anticipate critical events before they occur, and (3) discuss the implications of these findings in the theory and research surrounding high reliability teams. The findings of this study find strong connection with the work of Weick, and Perrow while serving to advance and clarify previous characteristics associated with high reliability organizing, temporality, and decision making behaviors.

Key Words: High reliability teams, resilience, critical incident, temporality, purposive sampling, SWAT.

INTRODUCTION AND LITERATURE REVIEW

Certain lines of work and organizational types must remain error free. As established by Wesner (In Press), High Reliability Teams (HRT's) can, due to their size relative to larger High Reliability Organizations (HRO's), maintain high reliability through rapid communication and adaptation during operations. Even when faced with unexpected anomalies, defined as a critical event or critical disruption, HRT's are capable of rapid recognition and adaptation which allows them to maintain reliability at the highest levels (Wesner, In Press). Continuing this line of theorization, this study attempts to determine the long-term impact of HRT experiences in the field in which adaptation is necessitated to maintain resilience. Of particular interest how these teams "learn" from these experiences and then use that knowledge to enhance reliability in future operations when faced with similar critical events.

Resilience is defined as the ability to bounce back from adversity and resume normal levels of functionality (Gittell, Cameron, Lim, & Rivas, 2006). The ability to recover from a critical disruption has long been considered important and is typically associated with debriefing processes that occur after events such as Post Project Appraisals (PPA's) and After Action Reviews (Baird, 1999; Decety et al., 1997; Lipshitz, Popper, & Oz, 1996; Popper & Lipshitz, 1998; Schindler & Eppler, 2003). These reviews may be very brief (a few minutes) or more detailed (several hours), but in every case the team must evaluate four crucial elements: (1) what was planned to happen, (2) what actually happened, (3) why differences occurred between what was planned and what actually occurred, and (4) what was learned from the experience. The goals associated with after action reviews include team learning, team accountability, and development of team trust (Schindler & Eppler, 2003). These evaluations focus on how participants reflect on the critical disruption and develop new strategies for success long after the event has transpired (Gittell et al., 2006; Heldring, 2004; Luthans, Norman, Avolio, & Avey, 2008; Powley, 2009; Youssef & Luthans, 2007). However, recent research has indicated that such after action reviews are only part of the resilience equation and that resilience is possible during the immediate aftermath of the critical event itself (Wesner, In Press). Yet, scholarship has yet to determine the impact on learning and process adaptation when such in-the-moment adaptation occurs.

Managing Critical Disruptions

At the individual level, resilience is associated with hearty or persistent persons (Masten, Cutuli, Herbers, & Reed, 2002) or as a genetic attribute (Tugade & Fredrickson, 2004). At the organizational level, resilience is often characterized as a set of social processes allowing the system to get back on track following a severe disruption (Gittell et al., 2006). Gittell et al. suggest that resilience is informed by two assumptions: (1)

resilience is a latent capacity within an organization, constructed through social interactions over time, and (2) resilience most often manifests when an organization experiences a disruption. Other scholars suggest that resilience silently builds within an organization through years of interaction, training, and preparation; and it is only made evident at the time that it is needed. Those scholars note that resilience takes place over an extended time frame during periods of reflection and recovery (Gittell et al., 2006; Heldring, 2004; Luthans et al., 2008; Powley, 2009; Youssef & Luthans, 2007). Powley (2009) describes these reflective periods as a "temporary holding space" in which the normal activities of the organization are suspended for readjustment. Yet, only limited research has been dedicated to how individuals and organizations recover from within the moment of a crisis (Crichton, 2001; Freedman, 2004; Paton et al., 2008; van der Schaaf, 1995; van der Schaaf & Kanse, 2004).

Resilience requires that participants recognize obstacles to their progress and then make decisions allowing them to overcome those obstacles. Such decision making is associated with the participant's ability to draw on existing knowledge or mental constructions in order to figure out how to move forward productively (Schon, 1975, 1983; Weick, 1987, 1988, 2001). There are at least two dimensions that we can use to distinguish among strategies for recovery. One dimension regards the issue of consciousness, distinguishing among strategies and practices that use either tacit or explicit knowledge. The former is more preconscious with the latter being associated with mindful conscious activity. A second dimension regards temporality (Polanyi, 1966). Some strategies involve preparation, an engagement with activities such as planning and environmental scanning occurring prior to a critical disruption (Aguilar, 1967; Mendonça, Pina e Cunha, Kaivo-oja, & Ruff, 2004; Schuler, 1989a), while other strategies are distinguished by periods of reflection which take place after the event transpires (Baird, 1999; Lipshitz et al., 1996; Popper & Lipshitz, 1998; Schindler & Eppler, 2003).

Consciousness: Explicit and Tacit Knowledge

Consciousness is typically defined as an actor's awareness that they are accessing data from their memory (Conner & Gunstone, 2004; Gutbrod et al., 2006). Consciousness assumes a level of awareness in the actor of how knowledge is accessed and used to take action. Conversely, a growing number of scholars contend that people's activity may also be more preconscious and intuitive (Conner & Gunstone, 2004; Morgeson, 2005; Raelin, 2007; Schon, 1983). It becomes important, therefore to distinguish between two types of knowledge and how they are used—explicit and tacit knowledge.

Explicit knowledge is information accessed through the mindful effort of an actor for application in a given situation and can be explicitly articulated by the individual (Conner & Gunstone, 2004; Gutbrod et al., 2006). This knowledge type can be seen when participants face question and answer sessions in which the actor is cognizant of the fact that the knowledge he or she possesses is being called upon with the participant making an active effort to bring such knowledge to the forefront of their mind to address a specific inquiry. In contrast, tacit knowledge is intuitively drawn upon during practice within a specific context and is rooted simultaneously in both the context and the practice itself (Polanyi, 1966). This knowledge is normally drawn upon and demonstrated in the moment and is engrained within the mind of the individual prior to the moment itself (Morgeson, 2005). This type of decision making is often described by researchers and observers as intuitive or precognitive, with participants often incapable of articulating the moment-by-moment nature of processes involved in arriving at the correct decision. Rather, the participants have some sense of what action might be inferred as correct without having the capacity to indicate why they behaved in the particular way (Gelenbe, Seref, & Xu, 2001; Lighthall et al., 2003; Maudsley & Strivens, 2000; Mitchell, Fioravanti, Founds, Hoffmann, & Libman, 2009). Here participants carry out actions bordering on the instinctual without conscious effort to stop and think. Here individual draws upon previous experiences organized into mental schemas. This process has been referred to as "withness" thinking and is rooted in actions which appear "off the cuff" or spontaneous and unplanned (Shotter, 2006) and demonstrate what Schon (1983) refers to as reflection-in-action or the process of reflecting on pervious events in motion in order to rapidly access cognitive schemas and make sense of a currently unfolding situation through application of those previous experiences.

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Tacit knowledge is accumulated through experiences accruing over many years taking place in similar contexts. By drawing on our previous experience, we become able to recognize similar situations and quickly recall information which can be applied to those situations allowing us to move forward (Schon, 1983; Simon, 1989). That process of moving forward is highly applicable to critical incidents, as such incidents allow little if any time for the actor to critically reflect on and evaluate the situation at hand via explicit knowledge application. Rather, during such a moment, the actor is forced to react within the moment itself and make decisions allowing the participant to make enough sense of the moment, connect with existing cognitive schema, and react. Even when facing situations that have not been previously experienced or simulated, existing schemas may find enough similarity to "fit" the new situation. Raelin (2007) suggests that when such a situation is encountered we may, at first, see no way forward, yet we still "plod along" in an effort to make sense of and overcome the new experience. This effort can also be aided by the company of other individuals who are simultaneously working to overcome the situation and who are in dialogue and cooperation with us (Conner & Gunstone, 2004; Morgeson, 2005; Raelin, 2007; Schon, 1983).

Temporality: Preparation and Reflection

The temporal dimension relates to the ways that individuals prepare for action, alone or in concert with others, the assessments that they make after the action, and the knowledge that they gain from these assessment for future endeavors. These kinds of activities can occur prior to a disruption to sensemaking when people prepare for the possibility of disruption or afterwards when people reflect on the event itself.

A critical component of the recovery process is preparation occurring prior to the disruption. The concept of preparation is quite distinct from that of planning in that planning implies the application of a strict structure or set of ground rules for managing the event. Preparation in contrast implies an orientation of self to the context that surrounds us or may soon surround us in anticipation of our interaction within that context (Anderson, Baxter, & Cissna, 2004; Shotter, 2009). In the context of groups this implies recognition of "otherness" and how our own outgoing activities will be accepted and reflected back to us by others as we coordinate our activity. In the course of preparation, we adjust bodily to the situation we will face as our muscles and nerves become attuned to the events surrounding us. This understanding of the scene we will face prepares us for what we will soon interact with: what we will see, feel, hear, and experience (Shotter, 2009).

Preparation extends to how we make use of the scene we face in order to anticipate how we should orient ourselves to others in the scene as it unfolds and anticipate how others will orient themselves to us. One tool for anticipating the action of others within the organizational literature is environmental scanning. Aguilar (1967) notes that scanning the environment is the activity of acquiring information through purposeful searching as well as through undirected or less formal means. Environmental scanning is a process of surveying the environment and interpreting results to identify events, elements, and conditions that have the potential to impact an organization or organizational strategy (Mendonça et al., 2004; Schuler, 1989b). It provides a means to focus on continuously changing environments which require constant evaluation and systemic adaptation (Albright, 2004; Engau & Hoffmann, 2011, 2011; Graefe, Luckner, & Weinhardt, 2010; Hiltunen, 2008; Kohn, 2005; Mendonça et al., 2004; Sarker & Sarker, 2009; Schuler, 1989b). Environmental scanning connects with Weick and Sutcliffe's (2007) notion of preoccupation of failure as well as Schon's (1983) reflection-in-action as it directs attention outward, paying close attention to people and processes in the larger environment.

While environmental scanning has normally been studied at organizational levels, it is also a preparation process that we all go through in our daily interactions with others particularly when experiencing new situations. For example, as Shotter (2009) points out, we orient ourselves to others via our expectation of what they will do in return during the interaction and, in particular, how we would like them to orient themselves to us. Using Shotter's example of meeting a new person for the first time, we prepare ourselves by adopting a pleasant tone of voice, hold out our hand to meet theirs and react appropriately to them doing the same. This process of continuous preparation and assessment through constant scanning and reaction to that scanned information allows us to orient ourselves to the situation as it develops so that our actions are appropriate and effective. Finally, by scanning the environment continuously we also can begin to prepare ourselves for critical

events by anticipating them based on the context of the situation as it unfolds. For example, if we consider a fireman entering a burning building, the context of the situation itself would drive the fireman to a heightened level of awareness of the developing situation, and through continuous assessment of the developing fire as he/she made entry into the building the potential of a ceiling collapse could be assessed and that event could be anticipated based on the assessment of the variables impacting it.

Critical reflection, in contrast to the prospective nature of preparation, is the retrospective process of looking back at prior actions and determining if those actions constitute the best way to do things (Raelin, 2007). Raelin stipulates that those engaged in critical reflection exhibit seven characteristics: (1) they question why things are done in particular ways, (2) they accredit local and informal types of knowledge which has been accumulated over time, (3) they consider historical and social processes which impact decision making process, (4) they allow for nontraditional forms of knowledge such as emotion and intuition to enter into inquiry processes, (5) they question their own questions and never quite trust even their own mastery of knowledge, (6) they look for discrepancies between whey they and others say and what is actually done in the end, (7) and they try to become aware of how their reasoning may become self-confirming. By engaging in the process of critical reflection, the practitioner maintains an ever-vigilant status in which he or she is constantly looking to themselves, others, and the processes they are engaged for ways in which processes may be refined and improved. This vigilance and unwillingness to accept that things are "good enough" creates an environment where practitioners never stop learning.

While reflection of this nature is normally considered a solitary process of self-critique, the process can involve others who contribute to the process by providing knowledge the individual does not yet have or by reinforcing concepts that are already known. The process of critical reflection within a societal or organizational group has the capacity to transform us through exposure to concepts that we can learn and begin to use or it can reinforce that previously learned concepts are now being put into practice correctly. The concept of having our performance examined by others may at first be disconcerting, but if those involved are themselves committed to improvement through critical analysis an environment is formed in which continuous improvement is possible creating new schema for individuals to draw upon (Gutbrod et al., 2006; Raelin, 2007; Schon, 1983).

Consider the debrief or after action review. This type of review referred to by Schon (1983) as reflection-on-action, is an opportunity for team members and observers to reflect on the actions of the team following operations with a critical eye for what went well and what went wrong (Baird, 1999; Decety et al., 1997; Lipshitz et al., 1996; Popper & Lipshitz, 1998, 2000; Schindler & Eppler, 2003). This process allows organizational learning to occur in which members begin to learn and develop their own skill set based not only on their own experiences but the experiences of others as well. This communal cognitive process allows for constant adaptation and learning producing communal cognitive schemas necessary for tacit knowledge development (Baird, 1999; Gelenbe et al., 2001; Lipshitz et al., 1996; Popper & Lipshitz, 1998; Schindler & Eppler, 2003; Swaak, van Joolingen, & de Jong, 1998).

Taken together, the two dimensions of consciousness and temporality provide a framework for distinguishing among different kinds of recovery strategies or activities that foster resilience. In turn, they provide a way to understand how high reliability teams are able to develop their capacity for anticipating potential disruptions as well as how they learn from them. Still, what has yet to be explored fully is the process of how that learning takes place and the impact of that learning on future situations in which critical incidents manifest during operations.

Rationale and Research Questions

Previous research has been effective in identifying various types of critical disruptions experienced by high reliability teams and the methods taken to recover from such disruptions (Wesner, In Press). Yet, an additional hallmark of HRT's is the ability to reflect and learn (Powley, 2009; Sutcliffe & Vogus, 2003; Weick, 1988, 1993, 1998). Few studies have examined the learning process and how HRT's develop knowledge for use in the future. The first research question addresses this gap.

RQ1: How do high reliability teams learn from experiencing critical events that disrupt their ability to make sense of and coordinate their activity?

Perrow and Weick differ on whether HRO's can anticipate systemic failures. Shrivastva (2009) notes, "Perrow (1984) however, argues that it is pointless to talk about warning signals and possible interventions in hindsight. He asserts that it can be very difficult, if not impossible, to decipher the meaning of, and attend to, dozens of simultaneous signals against the background of noise and false alarms before an accident" (p. 1371). Weick (1988, 1993, 1998), in contrast, seems to argue that it is possible to anticipate the onset of critical disruptions. The second research question explores this difference between Normal Accident Theory and High Reliability Organization inquiring into whether HRT's can anticipate crucial events.

RQ2: What facilitates high reliability teams' anticipating the onset of critical events?

METHODOLOGY

This study examines thirty-six (36) members of Special Weapons and Tactics (SWAT) teams drawn from three law enforcement agencies in the southwest United States. SWAT teams represent HRT's as: (1) they routinely function in contexts where functional decision making and adaptation to irregularities are commonplace; (2) they are forced to function in intensely variable high tension situations with every operation requiring them to manage the unexpected or unpredictable behavior of suspects which they are attempting to subdue; and (3) they are forced to adapt to these unexpected events in the critical moment without the possibility of withdrawing from the operation (Clark, Jackson, Schaefer, & Sharpe, 2000; Compton, Demir, Oliva, & Boyce, 2009; Davidson, 1979; Kolman, 1982).

SWAT teams are called upon to deal with situations beyond the scope of ordinary patrol officers including: counterterrorism, bomb threats, and high-risk warrants. Due to the danger posed by these suspects, SWAT operations often involve specialized weapons and tactics designed to deal with higher risk scenarios (Angell, 1971; Clark et al., 2000; Compton et al., 2009; Davidson, 1979; Fry & Berkes, 1983; Kraska & Cubellis, 1997).

The para-military nature of SWAT units has drawn scrutiny from the public, press, and academics since their inception (Fry & Berkes, 1983; Kraska & Cubellis, 1997; Kraska & Kappeler, 1997; Williams & Westall, 2003). Due to this high level of scrutiny, these teams strive for the very highest levels of reliability as any deviation or mistake is often highly publicized and immediately criticized (Davidson, 1979; Kolman, 1982; Kraska & Cubellis, 1997; Kraska & Kappeler, 1997). Further, due to the nature of their tasks and the high level of variability that they face, SWAT officers often face unexpected events and are forced to adapt quickly to maintain the highest levels of reliable performance.

I used purposive sampling techniques to recruit participants for interviews, selecting participants based on their tenure in the department (Lindlof & Taylor, 2002). This choice was made in order to ensure a variety of responses across experiential levels and ensure the greatest variety of perspectives on questions asked during the interview process (Creswell, 2009; Fielding & Fielding, 1983; Frey, Botan, & Kreps, 2000; Jick, 1983; Seale, 1999).

Due to the exploratory nature of this study, semi-structure interviews were conducted with SWAT officers to determine what they learned from experiencing critical events during operations and how they began to anticipate critical events before they happened. Qualitative interviews are useful in gaining an understanding of the participant's experience and perspective particularly as these apply to the context and intentionality and allow the emergence of new information during the interview which was not expected by the researcher (Lindlof & Taylor, 2002). Interviews varied in length lasting from 35 to 90 minutes and were conducted in private offices within the departments where the participants normally worked. All interviews were transcribed by a professional transcriptionist service.

Data Analysis

The interview data was analyzed using thematic analysis to identify commonalities in responses and emergent themes to address the research questions (Gummeson, 1991). Thematic analysis proved valuable in determining the common threads within the accounts of officers. This type of analysis was particularly suited to this research project given its exploratory nature.

To identify emergent themes from within the data set I began with a single interview and performed open coding. After independently coding each interview, I compared the various codes across interviews for the entire study and refined and consolidated codes. I then conducted axial coding where I attempted to group the smaller sub-categories into larger "meta-categories" which I will present below. This process involved analysis of emergent themes applicable to each research question and determining saturation for emergent themes (Fox-Wolfgramm, 1997; Perrow, 1967; Yin, 2009).

RESULTS

RQ1: How do high reliability teams learn from experiencing critical events that disrupt their ability to make sense of and coordinate their activity?

Officers repeatedly remarked that the most valuable learning is done through experience, training or operational, in which new situations are encountered. While somewhat reluctant to admit that they had been surprised by variability in training or operations, officers reported that such events often led to learning opportunities significantly improving performance over time. New experiences were discussed individually and at the team level to facilitate communal learning and continuous team level adaptation. Of particular interest was the impact of after action reviews (debriefing) on identifying areas for continuous improvement, the appreciation for the value of mistakes in improving performance, the necessity of accountability by officers in acknowledging personal errors, and the link between critical event experiences and enhancements to innovation and training processes.

Officers noted that learning and improvement was closely associated with assessment after operations. Officers reported debriefing after an operation provided an opportunity for improvement of officer performance by critically evaluating operation execution. Officers noted that debriefing after experiencing a critical incident was also a time to consider innovating to further enhance performance and avoid difficulties if the same critical incident took place in the future. One officer reflected:

> At the time, everybody that had any part of the operation had to write down what happened and what went right, what went wrong, what they saw that needed improvement…if something was not working, or was no longer working in a given situation, we figured out a new way to do it and then trained on it. This is how we continuously innovate so that we don't make the same mistake again.

Another officer, when reflecting on the debriefing process and the connection to future training events noted:

> The senior team leaders or the sergeants, "Hey, what happened with y'all? Who'd you have? What'd you have?" They talk about it, and, you know, if it's something really bad it'll be brought up the next training day. It'll be the following Thursday, we'll say, "Hey, we want to talk about the search warrant last week." You know, "What happened? This is what we saw happen. What can we do to make it better? "

Officers noted that debriefing is perhaps the team's greatest opportunity to learn from their actions, particularly when an error had occurred or the operation had not gone as planned. Of interest was the link officers made between "trying out" tactics rehearsed in training during operations, and then assessing their effectiveness after use. Officers linked this process with determining what worked and what did not but also noted that even errors fostered learning and improvement. One officer remarked:

> Before they even think it

> Okay, if something goes wrong, that's where we learn. We learn more at what happens wrong out there than what we do in training, because we can train in a static situation and say, "Oh yeah, this is gonna be good." We do it this way, it's wonderful, and then all of a sudden we do it in the real deal and then go, "Oh, wow. We didn't think about that. I didn't know this guy was gonna come out of here."

Less experienced officers noted that the debriefing period also allowed time for senior officers to assess the less experienced and evaluate their performance. Particularly in instances where senior officers noted errors, they would pass on knowledge that they had gained over time about what counted as a mistake and how to avoid it or rectify it. This provided a mechanism for constant assessment of the younger officers, along with an opportunity for continued learning and development. One officer noted:

> Well, they'll definitely let you know if you made a mistake…you know, if anything's bothering anyone or someone that's, you know, senior to you. Like they used to be the new guys…So they're like, "Hey, this is what you need to do. Make sure you do this." You know, all the little things that they learned. They kind of just pass it on.

Officers also noted that personal accountability for actions during debriefing situations was very important to continued learning. During the debriefing process, officers often recounted the value of having accountability within the group, particularly when someone had not performed optimally. Interestingly, even in situations where tempers flared, there was a sense of mutual respect for other officers as long as they admitted fault when it was applicable. As errors were noted as a way that officers learned and improved, officers deemed it essential for each officer to give an accurate account of their part of the mission even if egos were bruised in the process.

> Sometimes people got their feelings hurt because, you know if they were supposed to go right and went left, "Why'd you do that?" You know, but we debriefed it, we talked about it, and we did it on a professional level; it wasn't a name-calling finger-pointing type deal. You do a debrief…see what you can improve on the next time.

Another supervisor noted that if the officer involved in the mistake took responsibility for their actions that it altered the way that he conducted corrective, managerial, activities for improvement:

> I like to address it then and see what their response is. A lotta guys are real good about, yeah, you know, I f'ed up and did this or that, and then I ask 'em, you know, why'd they do it, ya know, and – and I try to go into teacher mode then versus asshole mode.

While there appears to be a common thread of respect between officers when addressing errors or the inability to react to perceived unexpected events during operations, officers did note a need for persons identified as causing the problem to "step up" and take responsibility for their actions and attempting to deflect blame was not tolerated. Officers noted that overall team performance was impaired if people refused to continue to learn, particularly from errors and adaptations to events which were unplanned. One officer, reflecting on individuals who attempted to deflect responsibility, noted:

> I get a little frustrated when I see something happen that I am just, "What are you thinking?" I'm sure people think the same thing about me, too. I make mistakes just like everybody else. But he'll (the supervisor) go around and talk about, "Is there anything we need to look at?" If there's something we see, we're vocal, we're honest, we're open; it's not trying to throw a rock at you, but let's make a decision, "Was this right or wrong, and if it was wrong, how do we need to do it better next time?" It's not about the man that made the mistake, it's about, "Okay, why did it happen, and do you understand why it was wrong?" If you have somebody that says, "Well," you know, kind of blows it off and stuff, that's the first mistake…that guy is going to get somebody killed.

RQ2: What facilitates high reliability teams' anticipating the onset of critical events?

Four categories emerged from the analysis regarding practices that enable officers to anticipate critical events: (1) situational variable assessment, (2) mental preparation including mental rehearsal and developing a "warrior" mindset, (3) training and simulation, and, (4) previous operational experience.

Situational Variable Assessment

Situational variable assessments enable SWAT members to control the environment in which they operate. Officers place a high priority on gaining rapid control of the environment in order to contain suspects and limit their options for resisting. This requires them to identify and gain control of the situational variables that have the potential to cause the officers harm. The process of gaining control of variables that can affect SWAT operations begins with determining what variables may delay or disrupt the team's processes during the assault. These include physical barriers to the assault, such as locking mechanisms on the door of the structure, as well as human and animal barriers such as the presence of attack dogs. Officers report that the most accurate method of assessment is first-hand intelligence. Firsthand intelligence is information collected by members of the SWAT team and therefore considered more reliable than secondhand intelligence. Secondhand intelligence is mission information collected from any source outside of SWAT including criminal informants or officers from divisions outside of SWAT, and it is usually viewed with a great deal of skepticism.

Officers reported that the perceived necessity for firsthand intelligence was derived from the fear of inaccuracies in secondhand intelligence. The errors associated with secondhand intelligence at times altered SWAT team policies and protocols. In one example SWAT officers trusted another officer, outside of SWAT, to provide the exact location that was authorized for assault and entry by the warrant:

> …I was told, "The narcotics agent is going to be standing in the front yard and he's going to tell you which house it is." I jump out of the van and there's three identical houses. I'm going, "Which one?" There's one of our narcotics agents standing in the front yard, guarding in front of this house. That's got to be it; nobody's given us a signal. Thank goodness the old man had passed away the week before and the house was empty, 'cause we flash-banged it and we tore the door off the hinges. The whole time the bad guys are next door, looking at us, watching us, "What are they doing?"

After this incident, the team changed their preparation policy to include a drive by, if possible with photography, by at least two supervising SWAT officers for the raid and the lead detective who obtained the warrant. This policy change provided the officers firsthand intelligence and the confidence of seeing the raid location in advance with the detective in charge to verify the location on the warrant. The presence of two SWAT officers for the drive by also aided later stages of the planning process, in particular the determination of variables presenting delays during the initial entry and throughout the assault and the methods that could be used to overcome those barriers or obstacles:

> So we'd do that, we'd get all our intelligence together on what house we're going to do, what's it look like, what are its strengths, what are its weaknesses, where can we go in easy. You always want to try to go in where everybody else is going in; the last place that's going to be booby-trapped, the last place that's going to have a lot of locks, because that's the one they're going in and out of. If you go anywhere else you're going to have to be defeating the structure, you know, as well as the people inside.

Assessing situational variables does not rely entirely on firsthand observation and assessment of a location by the supervising officers. Officers also reported that they seek to gain as much intelligence as possible about the suspect and the location that the suspect occupies from persons who are dealing with the case. This type of secondhand information gathering, particularly by those persons having a direct history of interaction with the suspect, provide information which allow officers to anticipate what the suspect may do

during the raid based on their previous interactions with the suspect and the suspect's criminal history. This secondhand information was the best weapon officers had to anticipate the moves of a suspect with which they have had limited or no previous interaction. For example, officers reported that if the detective on the case reported that a suspect was known to be armed at all times, they became much more alert to the presence and display of weaponry during the resulting assault. By having information relevant to the criminal's behavioral history, officers were able to better anticipate what moves suspects were likely to make. Still, as mentioned earlier, officers reported being skeptical of information from secondhand sources. They were particularly cautious of information that came from criminal informants with which the team had had little previous history. A pattern emerged of "trust but verify" with regard to information presented to officers by other informants outside of the team.

Officers reported a three-prong approach to assault: (1) speed, (2) surprise, and (3) violence of action. The idea behind the approach is to shock the suspect and dominate the structure as quickly as possible. The preparation officers engage in prior to the mission is dedicated to maintaining that three prong approach throughout the operation. Using a combination of firsthand and secondhand intelligence officers develop a plan to anticipate and overcome situational variables that could interrupt critical team processes. This process involves the selection of methods and tactics for the team assault on the property, equipment selection, and personnel selection. Emphasis was placed on determining situational variables that might hinder the entry process and determining ways in which those variables could be overcome or avoided. The heart of enacting high reliability organizing begins here as officers attempt to identify variables that may cause delay in the entry process by reducing the speed of the team and perhaps negatively impacting the element of surprise, two of the three essential elements officers identify as essential to controlling an assault situation. In the planning stages, officers engage in this type of situational variable assessment in order to determine what could cause a delay and then determine a way around that delay in order to maintain speed and surprise. One officer while reflecting on variable assessment and how it impacted the raid planning process noted:

> …depending on the size of the structure that's going to be taken down, whether it be a house, a mobile home, an apartment, that would impact how many officers we would use. A little motel room, six guys…we have to dominate with manpower. We would try to do that to dominate it quickly with manpower so that we didn't have any type of firefight or gunfight or anything erupt.
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> So you'd figure out what size of structure you're dealing with. You'd pick your team. And then you would take surveillance from whatever agency or whatever unit you were going to be doing this warrant for…ATF, DEA, FBI, Marshal Service, our guys.
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> We'd go sit down with their case agent, go over what they knew, get as much intelligence as possible. Then we have an operational plan that we devised. It dictates who's doing what, what weapons or equipment they're carrying, what their primary responsibilities are in the deal, and we would designate those things to those individual officers.

Noteworthy in this account is that the intelligence gathered dictates the type of approach used and the number of officers necessary to preserve reliability during the assault. Another officer also noted that intelligence gathered dictated decisions about every aspect of the approach and entry to the structure all of which promoted maintaining the three-pronged assault: speed, surprise, and violence of action:

> Depending on how we were going to hit the house, we would pick what vehicle. We have a big SWAT entry van, we call it the bread truck, or Bubba some guys call it. And then we have a couple of armored vehicles; we just got a new one. And then we had a little raid van, a little white Ford van we call Skippy, Skippy the Wonder Van, 'cause we always wonder if it's going to start to get us home.
>
> We've done them out of the back of garbage trucks, we've done them out of the back of dump trucks, we've done them out of city buses. It depends on your training and environment how you

can sneak up on this house. We try to get as close as possible utilizing cover and all that of other houses, bushes, cars, whatever. Stop down the street, get out, get on foot, and work our way up to it.

Mental Rehearsal and the "Warrior Mindset"

A second process that facilitated SWAT officers anticipating critical events centered on issues related to the mental preparation of the team by mentally rehearsing and focusing by creating a "Warrior Mindset." One process that was used to mentally prepare the team was the creation of a shared mental model of the operation through rehearsal. Of particular concern to officers was making sure that the tactical decisions and intelligence information was commonly understood by officers in the raid. Officers often noted the importance of making sure that "everyone is on the same page" or that "all facets of the mission were understood by everyone." This idea of having a shared mental model was often associated with the confidence that "everyone had a common idea of the job that we were going to do", and is mentioned by several officers in conjunction with achieving "one mind". One officer noted:

> We hafta operate in one mind and when it's time to serve the warrant, when things are going like we rehearsed them in our mind, like we briefed, aside from a very overwhelming change we – we've done this so many times that we know how we're gonna operate and there usually isn't a need for us to – to give off too many directions at the time. We've worked out beforehand exactly how the breachers are gonna breach the door, where they're gonna stand, how the point – the first 2 point-and-cover teams are gonna cover the entry point and check the entry point, how they're gonna position themselves for the breachers to move up and breach the door, things of that nature.

Participation on pre-assault briefings was critical to establishing a shared mental model. One supervising officer outlined the importance of having all persons involved in the raid being present at relevant briefings so that a shared mental construct could be assured prior to execution.

> We brief the team, we brief everybody involved in the warrant all at one time. That way there's no mistaking who's there, who's gonna to be there, what they look like, what they're wearing, what they're supposed to do, everybody hears the same thing.
>
> The briefing, we pick it up, we'll plan it out, I'll explain what the plan is to everyone, make sure all the questions are asked, everybody's comfortable with their row of equipment, is prepared and we'll get it.

By achieving a common mental model of what each officer would do during the raid, the team members reduced the likelihood that officers would perform in unpredictable ways or would be shocked by the actions of other officers during operations.

While mental rehearsal provided a template for sensemaking and action, the development of the "Warrior" or "Survival Mindset" helped develop a clear mission focus and reinforced the criteria for making decisions in the moment. As officers rode to the assault site, they used this time to prepare and attain what they called the "Warrior Mindset". This mental state was predicated on the assumption that failure was not an option or that whatever was necessary for survival or success must be done. The key component of attaining this mindset was harnessing the survival instinct of officers and making mental preparations to do whatever was necessary to maintain the highest levels of reliability and success. Officers reported that doing whatever was necessary often involved them making peace with the worst-case scenario. As one officer noted, "Okay, I'm going to walk the worst-case scenario. If I have to kill somebody what's going to happen? I'm good with it. I'm good with it. I made peace with God, I made peace with my family, I'm good with it."

Supervising officers involved in training often reported that "training the warrior mindset" was an important part of officers' training as a member of the SWAT unit:

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> I tell all the new kids at the range, all the rookies and all my new SWAT guys when I teach out there, the mindset – "You've chosen to be a police officer, you've chosen to be a warrior. Okay, you're not a meter maid, you're not a security guard somewhere; you're a police officer. And especially if you come to the SWAT world, you may be at some time in your life asked to do something that the normal police officer doesn't want to do or hasn't done or can't do, and that's kill somebody." And I said, "You need to have that mindset that," and I tell them, I said, "If I have to kill – my mindset is if I have to kill everybody on this range to go home to my family tonight, sorry about y'all's bad luck," but that's the mindset they – I said, "That's the mindset y'all need to have too."

Creating the "Warrior Mindset" also involved eliminating personal distractions prior to engaging in the mission. Officers noted that it was particularly important to suppress intra-team conflicts outside of the mission that emerged prior to the mission. Officers noted it was important to leave any and all personal issues between officers outside of the operational arena in order to assure safety and to make sure that all members of the team were focused on the mission alone and nothing else. The process of eliminating personal distractions resulting from intra-team conflicts manifested in a ritual experience that officers reportedly engaged in prior to every mission experience "Burying the Bone":

> It's a deal that we started years ago that the whole team, once we do the briefing, the whole team gets together, puts their hands in, and we yell "Bury the bone. Everybody in. Everybody out. How do you feel?" Bury the bone is if you and I are teammates and 30 minutes ago we had a dog-cussing fight that we disagreed about something, and I'm mad at you and you're mad at me. They call us up and go, "Okay, guys, we're fixing to hit this house. Gear up." You and me are teammates going in the door, okay? I'm burying the bone; I'm forgetting about that fight. We're partners now, and your life depends on me and mine depends on you, so we're burying that bone.

Training

The third category associated with the anticipation of critical events was training. This category consisted of simulation experiences outside the operational arena providing experiences for the officer to draw upon and compare with live events in the field. SWAT officers described training as a team process in which simulated experiences were used to place officers in "real world" situations to make decisions on the best way to proceed within mission parameters without error. Training sessions were subject to evaluation by supervisors and accompanied a hands-on assessment designed to point out what went well and what did not. Officers were insistent on maintaining the most realistic and intense situations possible. The realism of events during simulation made it relatively easy for officers to quickly apply the learning from training to live operations.

Officers noted that an integral part of maintaining realism in the training was the use of Simunition. Simunition is non-lethal ammunition designed for training purposes and is fired from the actual firearms used by officers in the field. The ammunition itself is a non-lethal paint ball-like round, but is propelled by gunpowder ("Simunition," 2011). Officers reported that the use of this type of round during training made that training as realistic as possible including the production of the sound of a gunfight and the sensation of pain if you were hit. One officer reported:

> With Simunitions you're required to make that split-second decision and act on it, and the Simunitions is the telling tale, whether you made the right decision, you made a decision at all, or you even remember your decision.

Another officer remarked:

> Simunition, they're regular bullets but instead of havin' a full-metal jacket or a hollow-point shell comin' outta the casing, you have plastic and soap, and they hurt like hell. It'll cut you open at times. It'll leave welts; it'll leave bruises for weeks. And we train with those on a

> regular basis, so every tactic that we use (is) trained out with the force-on-force situation. We're trainin' against other swat guys who are – are armed with guns that will shoot back at us with these Simunition rounds and that are doing things that we've seen bad guys do, doing things that we know if you don't check that corner, right off the bat, you've done wrong, so – so we've got somebody in the corner checkin', if you don't check the – check the corner, guess what, you're takin' shots, so you learn by your mistakes because you get shot because of your mistakes and so that's how you create that sense of urgency.

The training emphasis is on placing officers in realistic simulations as bad, or worse, than anything that they might come across in the field. Officers described high-risk situations as somewhat non-standard, yet they spent their training time in this environment to train for the worst. By exposing officers to extremely chaotic and unusual situations, officers develop their capacity for reacting to chaos:

> We're gonna put together scenarios that require us to operate in those conditions, taking fire upon approach, taking fire inside the house, compromise, shoot/no-shoot decisions, officer-down situations and these are – the high-risk/low-frequency situations for us – it isn't standard for us to have an officer down on the warrant. But if it happens, we have to know what to do.

Officers reported that simulations not only increased the behavioral and cognitive repertoire that can be brought to operations, it also affected the way their minds worked. Officers reported that due to the frequency of training their "minds worked faster than the environments that they were in," allowing them to make anticipatory decisions during operations and think faster than their opponents:

> Well, we've already thought about it in our mind, you know? We train – it's you know, this is a high-risk/high-frequency act for us. We train and train and train and train so that our standard, the chaos that we're operating in is normal for us? There's a normalcy to us running warrant that you do 100 times a year, ya know, and then we train on...probably 200 entries in training a year. There's – there's normalcy in us operating under that condition, so, automatically, our mind's operating much faster than the environment that we're in. That the environment is slowed down for us, so we're – we're using that skill and also the prior planning that we've had, the thought process.

The quotation highlights the role that simulation and training play in preparing officers for the chaotic situation that they will face in the field. This training process allows the officers to experience operations in a way that they can maintain sensemaking even in the most chaotic circumstances.

Previous Operational Experience

Previous operational experience also provided resources to facilitate officers anticipating suspect moves. Officers remarked that their ability to assess the environment increased with experience. Officers reported, "You can't plan for all events. You can't plan for – we try to, but, you know, especially with some of the older guys, like myself and all – you look at something and you go, 'Okay, I remember last time we were here this happened or that happened.'" Drawing on their previous experiences and making connections to those experiences in light of the unfamiliar situation that they currently faced allowed the officer to make sense of the current environment and, in some cases, to anticipate that environment.

Officers reported that part of using previous experience to anticipate how an operation would unfold was related to the concept of contingency thinking. Contingency thinking is the process officers use to apply what they have learned in past operations to the situation that they currently face in an effort to anticipate how the situation will unfold. Officers looked at existing gathered intelligence and used their past experience to visualize what could happen and plan their counter move. Applying contingency thinking was often used when officers considered potential interactions with suspects or subjects which could produce hostile resistance. One officer remarked:

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> I'm gonna already have a plan on what it is that I'm gonna do if I encounter the threat. If the threat does – if the threat is standin' up and won't go down, I already have it, mentally, what it is that I'm gonna do in order to put him down, based upon what it is that he's doing. If his hands are empty and he doesn't have a weapon, how am I gonna put him down whenever I have my M4? Am I gonna do a superman stunt on him and knock him out? Am I gonna kick him? Am I gonna just grab him and put him down? Uhh and the reason I already have all that planned out is because…doin' (this) for all those years.

The process of considering contingencies appears to increase the officer's ability to rapidly assess situations and anticipate what will happen with a suspect or situation based on what they have planned out previously in their visualization process. Interestingly, some officers reported that the process of contingency thinking based on experience even impacted their daily lives outside of operations:

> Today at lunch, I'm sitting there and I'm looking around the restaurant and my partner's going, "What are you doing?" and I'm going, "Don't want to be a victim." I'm constantly looking around thinking, "What do I need to do next? If somebody comes in this front door, which way do I need to break, what am I going to do next?" I don't know if it's a curse or a gift, but I go, "You were worried about your enchiladas and I'm worried about you and me." I'm eating lunch, I'm enjoying my lunch, but I'm also keeping, you know, I don't want to be a victim. In today's society a nut job could spring out of the woodwork. You know, we have seen this happen too many times.

Finally, officers related that previous experiences gave them a "sixth sense" or "gut feeling" about a situation or suspect they encountered. Officers sometimes reported situations in which they would enter a structure and something would not "feel" right to them. They knew that something was wrong, or that that suspect was going to do something abnormal, but they were unable to articulate why. In the end, officers attributed the development of this sixth sense as something that experiential learning helped to build. In these cases, the minds of the officers were making connections based on the context of the encountered situation that were preconscious. The officer's senses have had such a great number of experiences through training and prior experience on operations that their senses have become acutely sensitive to the contextual variability. This sensitivity, however, is at an instinctual and intuitive level, as it has become part of their practice and identity. One officer reported:

> So the threat, it becomes instinctive. It just doesn't feel right. It's hard to explain, but you know what I mean? You know when you go in your house and maybe something is out of place, or you go somewhere and you think, "This just don't feel right?" It is something that training and experience builds.

DISCUSSION

In this section, I will clarify and expand on the concepts associated with learning from, and anticipation of, critical events during team operations. Taking each research question in turn, I will discuss the findings and applicable connections to previous literature and identify areas of theoretical connection and extension.

RQ1: How do high reliability teams learn from experiencing critical events that disrupt their ability to make sense of and coordinate their activity?

Experience, reflection, and training were noted as key processes that enhanced learning. Officers noted that experiencing critical events, either in training or operation, became the impetus for the design of additional training. After reflection, the officers designed training scenarios that simulated the critical event that they experienced and allowed for creation of new procedures. By experiencing critical events, reflecting on them, and using those events to design new training, officers used these critical incidents to inform their learning.

A critical element of the experience, reflection, must be considered a bit further. In order to identify critical incidents that influence future simulation designs officers, particularly leaders, must be capable of

recognizing when such an incident took place and linking it to the need for additional training. This process involved communication among team members concerning critical events, how they reacted to those events, a determination of whether additional training was needed, and how that training might be designed. To facilitate this exchange, officers across the cases reported engaging in after action reviews, reporting that debrief and reflection were critical to identifying deficiencies in team function and opportunities for future training.

The debriefing process was characterized by officers' strong connection to the concepts of appreciation for mistakes and personal accountability. First, all teams noted that while the teams attempted to avoid mistakes, errors were considered a part of the learning process. Second, officers were encouraged admit if they had made or contributed to an error. The process of debriefing finds close connection with Schon's (1983) concept of reflection on action in which members reflect upon their previous endeavors communally in order to facilitate improvement. Still, an extension of this theorization is evident due to the strong focus by SWAT teams on being accountable for ones actions as a part of the unit. Further, if they failed to acknowledge their mistake, they risked having another senior officer point it out publically. This norm produced an environment in which officers accepted that they had made errors and brought those errors to the attention of others.

An additional connection can be drawn to both the notions of High Reliability Theory and Normal Accident Theory, as SWAT teams acknowledge that mistakes are a normal part of team processes but also acknowledge the desire to limit those mistakes as much as possible through reflection and subsequent innovation. Here the theoretical perspectives do not stand in opposition to one another in practice, rather they work together, with critical incidents providing the impetus for learning and innovations which enhance reliability and thus prevent the critical incident from being disruptive when encountered again. While the data seems to suggest that NAT is correct as accidents are accepted as normal, the data also suggests that attempting to prevent those accidents is possible and through evolution accidents may remain normal but less frequent.

It is also interesting that the concept of learning is viewed as a continuous process, unfolding over time and involving all team members. Officers never stop debriefing after operations and never stop assessing their performance, suggesting that officers never feel as if they "know it all" or have attained perfection in their processes as the environments and suspects are dynamic, requiring continued study to maintain reliability. This finds some connection with Weick's (1993) notion of preoccupation with failure, as officers constantly pay mindful attention to practice in order to learn and adapt processes to foster continuous improvement. Furthermore, learning is a communal process with teams interacting at all levels in the process. Particularly applicable to the younger officers, the learning process connects to Vygotsky's (1978) zone of proximal development as officers created scaffolding to make sense of situation through sharing stories and wisdom about their experience during planning and debriefing sessions allowing emergence of communal knowledge.

RQ2: What facilitates high reliability teams' anticipating the onset of critical events?

Officers noted that anticipation of critical events began prior to mission execution with the collection of intelligence. Teams professed a belief that the best way to anticipate critical events was to avoid them by eliminating or avoiding variables identified prior to the operation which might impede progress.

Officers noted a preference for firsthand intelligence collected by members of the SWAT unit rather than relying on third parties. Officers noted that third party intelligence was always considered suspect due to a long history of inaccuracy when information came secondhand. The desire for accurate intelligence gathered by the team led to a variety of tactics for gaining and verifying information including drive by assessment, fly over assessment, use of photography and video, and the use of the Internet resources such as Google Earth. All information was used to create the most accurate picture possible of the suspect, their resistance capabilities, and the context in which the team would be functioning. This allowed for the team to consider and plan around any factors that might slow or derail their progress. By identifying these variables and then avoiding or eliminating them the team can avoid critical incidents before they develop and disrupt team coordination.

Control of variability also extends to considerations suspect resistance capability, with officers involved in the raid identifying variables which could be used against them by suspects and eliminate them if possible. For example, automobiles in the area, which could potentially be used by the suspect to flee the scene, were disabled or sectioned off. By identifying methods of transportation that the suspect might use to attempt escape, the suspects options for evading capture were reduced. This process reduces variability in the operation and by

limiting the number of choices available to the suspect, the officers force the suspect to act in more predictable ways. Thus, officers were able to reduce the potential for the suspect to shock them with unanticipated moves.

Officers also noted anticipation and avoidance of critical events was closely linked to knowing what other officers would do. Officers reported that having a shared mental model of how the operation would play out enhanced their ability to make sense of the situation and recognize any deviation in the plan. For example, it was considered essential to have individuals taking part in the raid present during the briefing sessions prior to the mission. This allowed every officer the opportunity to contribute to the planning process and assured that all of the officers were on the same page concerning how the mission would be carried out. This shared mental model allowed officers to reduce variability in the team's execution and limit the number of surprises arising from within the team by enhancing the confidence that all team members had in their fellow officers. This shared mental model reinforces communal confidence and the individual officer's role and identity in the raid, preventing disruptions to sensemaking (Weick, 1988, 1993, 2001, 2002; Weick & Sutcliffe, 2006, 2007).

Additionally, the theme of personal mental preparation prior to mission execution, sometimes referred to as a warrior mindset, also emerged. Attaining the operation focus is a process of preparing mentally for battle and in doing so preparing for the worst that could happen. Whether making peace with the possibility of using deadly force or with the possibility of be killed, attaining this mindset is a process in which officers make personal cognitive adjustments to prepare for entry into the chaos of an operational theater. The process itself is individualized for the officer, but the focus is always on the mental preparations necessary to attain high levels of concentration during the operation and minimize distraction in order to avoid hesitations.

The final aspect identified by officers across cases as central to anticipating critical events was contingency thinking. Contingency thinking involves officers, either individually or communally, working through "what if" scenarios concerning what a suspect might do. This process of visualization allows the officers to live the moment and their response prior to it actually taking place. By doing this, officers reduce the shock associated with the unexpected by visualizing the scenario and their response prior to it occurring. This allows the officer to act more fluidly should the event actually take place during the operation and reduces the mental shock and resulting necessity to figure out what to do in the face of the unexpected.

Limitations

Perhaps the largest limitation of this work is its primary reliance on an interview methodology. While the retrospective generation of stories of critical events gives some interesting ideas about what is learned through experiencing critical events and how we might come to anticipate them, these narratives represent recollections of participants in the events themselves. Thus, the study is limited by my capacity to only look at data that is retrospective. In future research, it may prove beneficial to perform extensive shadowing and participant observation techniques which will allow for real time analysis of critical events as they unfold (Becker, 1958; Czarniawska, 2007; DeWalt & DeWalt, 2002; Jorgensen, 1989).

Furthermore, the study is somewhat limited by the inability to go back and perform follow-up interviews with subjects in an attempt to flesh out additional details. This would be useful in further examining some of the principles informing decision making processes. Finally, and perhaps as a matter of future research, I feel that the study is limited by the fact each case represented all male teams. While female SWAT officers are somewhat rare, as more and more women join the elite unit it would be interesting to determine if their perceptions on decision making differ from their male counterparts.

Summary

This research highlights how critical incident experiences impact learning in high performance team environments and how those teams attempt to anticipate critical events to avoid disruptions to team performance. Modern organizational teams can benefit from consideration of the value of mistakes made in both simulation and live environments on innovation and improvement of overall team performance. This research highlights that through the experience of critical incidents, including those resulting in team level error, innovation and adaptation is fostered. This innovation provides for smoother team processes in the future and further enhances the team's ability to anticipate and avoid critical incidents, both identical and dissimilar, in

future team processes. Additionally, by engaging in system level thinking, team members foster ever-greater levels of team identification, mindfulness, and facilitate higher overall performance.

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