The missing pieces of firefighter survival:

Investigating the psychology and physiology of surviving on the fire ground.

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions or writings of another.

Signed: _____

Abstract

West Metro Fire Rescue (WMFR) has committed to the development of fire ground survival skill sets for firefighters. That progressive approach has improved firefighter safety. The problem is that the psychological and physiological factors associated with firefighter survival had not been investigated.

Firefighters have full cognitive function in non-emergent and low stress situations. In these settings humans operate with no impairments and this is the environment firefighters train and prepare in. The survival situation within a working structure fire will be dynamic, high stress and all five senses will be suppressed in some way by equipment or environment.

The purpose of this research was to identify psychological and physiological factors associated with survival situations to ensure that firefighters are prepared beyond the provision of equipment and skills training. Using the descriptive research method, survival research from fire service, law enforcement, military and civilian fields was reviewed and the following research questions answered: a) How is survival being defined by WMFR and others? b) What are the psychological and physiological factors that affect survival? c) How are others addressing psychological and physiological preparation in survival training?

The results of research collected for this applied research paper present various physical and psychological factors of survival situations from scientific studies and documented in the stories of those who have faced life threatening situations. Recommendations for application of research to improve awareness have been developed from information presented and opportunities for additional steps provided.

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Introduction

Prior to 2007 West Metro Fire Rescue (WMFR) personnel had participated in firefighter survival training; however, the department lacked clarity between firefighter survival training and rapid intervention team (RIT) training. The sporadic approach to the topic also created inconsistent instruction and prevented overall development through lack of goals, formal plan, and evaluation.

In 2007, WMFR identified a need to address firefighter safety and survival with a formal program. All members were required to complete the program in its entirety and maintain continuing education and skills. The foundation of the program and curriculum focused on fire ground survival training and techniques that WMFR determined necessary. Since its inception the program has been modified and is continuously evaluated by a team of core instructors exploring current fire service trends and events. WMFR has demonstrated a commitment to the development of fire ground survival skill sets for firefighters. While difficult to quantify, this progressive approach has improved firefighter safety.

The problem is that the psychological and physiological factors associated with firefighter survival have not been investigated. WMFR provides equipment and the technical aspects to get firefighters out of a survival situation; however, the department has not provided firefighters with a true understanding of how they may react in a situation when survival is threatened. Anytime people are involved in situations there are human factors which are individual by nature and cannot be addressed technically.

Generally humans have full cognitive function and capacity for logic in day to day life, non-emergent and low stress situations. These static or low threat settings present with little to no physiological impairments; this is the environment firefighters have historically trained and

prepared in. The true setting of a survival situation within a working structure fire is dynamic, and all five natural senses will be suppressed in some way if not completely robbed by equipment or environment. This reduction in the ability alone decreases chances of survival in normal operations. The moment that life is threatened beyond the expected danger of the structure fire, the flood of norepinephrine and dopamine will initiate a cascade of primal escape responses that few have the capacity to decisively control without conditioning (Gonzales, 2003).

Evaluating these psychological and physiological factors on an individual basis would require psychologists, neuroscientists, survival experts and exercise physiologists. WMFR faces financial challenges of doing more with less on a daily basis, restricting this type of scientific study. Fortunately there is extensive research on the topic of the human body and behavior in survival situations. From these resources information can be drawn which can be applied to the situations faced by firefighters.

The purpose of this research is to identify psychological and physiological factors associated with survival situations to ensure firefighters are prepared beyond the provision of equipment and skills training.

Using the descriptive research method this project answers the following research questions. a) How is survival being defined by WMFR and others? b) What are the psychological and physiological factors that affect survival? c) How are others addressing psychological and physiological preparation in survival training?

The data gathered by this project will serve as a basis for improved training, education and preparation of firefighters for what may be the most intense and telling situation ever faced.

Background and Significance

West Metro Fire Rescue (WMFR) is a fire protection district governed by seven publicly elected officials. WMFR serves a population of approximately 265,000 residents across a 110 square mile jurisdiction in the Western suburbs of Denver, Colorado. At full strength the department has a uniform staff of 340 firefighters operating out of 15 stations with an annual budget of 55 million dollars. The department is an all risk organization, providing not only fire protection and prevention services but also advanced life support, technical rescue and hazardous material response and mitigation.

In August of 2012 WMFR became an internationally accredited agency. A pillar of the accreditation process is the development and commitment to a five year strategic plan. As a component of the department's strategic plan it has identified seven strategic goals**.** Goal three is to "Enhance the Safety of the Membership through Comprehensive and Pertinent Training and Education" (West Metro Fire Rescue [WMFR], 2012, p. 17). This goal establishes the direction to continually evaluate existing training programs to determine if they need further development or modification.

WMFR and most of the American fire service has taken a technical approach to the task of training fire fighters for survival situations. Firefighters are told to maintain situational awareness, trained in bailout, buddy breathing techniques and are provided equipment. Firefighter survival situations have for the most part been universally defined through a variety of texts and programs. While the efforts are commendable, there are key pieces missing; the true physical environment and mental state that a firefighter will be in when they are called upon to perform these skills to save their lives.

Continuous training, under clearly defined scenarios becomes a known world and thus creates expectations (Renaud, 2012). These situations have predetermined solutions that firefighters become subconsciously dependent on when that time comes. This is fine as long as the real world situation matches the training. In dynamic environments, under the high stress, situations and solutions engrained through training start failing to match, creating the potential for complete mental collapse (Gonzales, 2003).

Renaud (2012) demonstrates how this approach has failed responders in the development and application of the National Incident Management System (NIMS). The powerful influence of the Department of Homeland Security, national mandates, and funding through the Urban Area Security Initiative forced the emergency response community to full NIMS compliance. Renaud demonstrates that in spite of NIMS scale and resources dedicated, it only targeted the "low hanging fruit" of organizing incidents into manageable pieces in order to ensure tangible goals (Renaud, 2012). NIMS processes and procedures are well designed for the management of linear events and established work periods. Unfortunately, the belief that these assist in the early chaos of an incident sets a table for failure. "The NIMS failure point is that is offers limited help to those first arriving responders who must deal with the initial chaos inherent to every scene" (Renaud, 2012, p. 4).

Each fire presents a unique set of circumstances and every individual presents with his or her set of experiences, abilities and perceptions (vonAppen, 2010). A purely technical approach to the adaptive challenge of improving fire fighter survival fails to fully capture the human factors associated with firefighter survival.

Fire Engineering author Mark vonAppen has been interviewing firefighters who have escaped a variety of the classically defined firefighter survival situations and reporting on them

for years. From his research into fire ground survival incidents and personal reports from survivors, vonAppen concludes that fire service survival training is failing because it is not addressing the power of emotions and how they influence individual's actions (vonAppen, 2010). He has found that current practices of skills and drills must be supplemented with training on how to overcome stress and manage emotions in circumstances that pose serious injury or threaten lives. Without this education firefighters who find themselves in these situations will be confused or discouraged by their situation. An example how the high stress environment effects the execution of skills developed in low stress training is presented by vonAppen (2012) in an interview with a fire captain who survived being trapped on the floor above a flashover.

> "Helvin knew what he was supposed to do; call a mayday, turn on his personal alert safety system (PASS) device and flashlight, seek safe egress, or seek safe refuge and await rescue. He was intelligent and well trained. He had received training in mayday procedures. Why had the training not provided the correct response immediately? The problem is that our training practices cannot simulate the high energy levels that exist on the fire ground when the environment is extremely hostile and dynamic. Training scenarios are safe and predictable, not chaotic. Our experiences in training are at low energy levels, and there are no consequences for making the wrong move. The environment we must operate, and survive, is a high energy environment that is unyielding to our plight. When you add to the equation emotion, which has priority over rational thought, it is almost impossible to sort through it all." (vonAppen, 2010, p. 45)

Here is the parallel to the failure which Renaud found with NIMS. The current practices of WMFR treat the fire scene tactically and firefighters technically, deeply entrenching them in a "known world", which makes firefighters solution focused (Renaud, 2012). The International

Association of Fire Fighters (IAFF) explains that the culture of the fire service is “success training” (International Association of Fire Fighters [IAFF], 2010, p. 46). In the IAFF Fire Ground Survival program students are warned that culture of success has conditioned minds to anticipate correct performance with a positive outcome. This proves detrimental when firefighters are thrust into a situation where everything goes wrong (IAFF, 2010). Captain Helvin knew the solution to his situation with great detail. Unfortunately, his intense focus on the solution left him confused when his body’s psychological and physiological responses took control of his actions or in this case inaction. This can be the difference in life and death when seconds count.

Firefighters must be presented with the true context of situations where lives are being threatened. The belief that situational awareness can be maintained during chaotic events; that firefighters will be able to function at full capacity, recall and execute training, and communicate in a highly dynamic environment is false (Gasaway, 2012). Aside from the risks of catastrophic fire or structural events, the cognitive brain does not always have the power to overcome the deeply rooted evolutionary survival programing which controls physiological and psychological responses when lives are at risk (Gonzales, 2003). For millennia the human brain has been programed to avoid danger in order to preserve our life (Grossman & Christensen, 2008). Firefighters swear themselves to service in taking a job at the fire department, committing to dangerous work in order to preserve the lives and property of others. This cognitive decision is a choice in the low stress environment of taking an oath. It is not explained how difficult it may be to maintain this oath when natural instincts take over on the interior of a working structure fire.

Beyond the fire service, research on survival among other high risk professions of law enforcement or military focuses on responding to threats. Multiple authors in the law

enforcement and military community use the term “warrior” for those who work in dangerous situations which civilized masses are not only culturally but subconsciously programmed to avoid: confrontation, violence, combat and even fire (Asken, Grossman, & Christensen, 2011). The key to developing a warrior is training them to manage those natural human instincts of danger avoidance which would be counterproductive to survival in their chosen professional environment (Grossman & Christensen, 2008). “The fight or flight mechanism is for animals or the untrained, not the warrior prepared for danger or death.” (Asken, Grossman, & Christensen, 2011, p. 56). This approach quickly shifts the attention to the individual processing information and not the framework of the situation.

The focus of survival research in the civilian world becomes resiliency: adaptation to change, and response to adverse conditions (Siebert, 1996). In fact, the word survivor is almost completely absent of context in that a civilian approach to survival could swing from surviving in the wilderness, surviving a cancer diagnosis, or surviving tough financial times. In both these frames the act of survival becomes the individual’s response to a high stress event that threatens their life not just getting out of a life threatening situation.

Addressing survival through attention to the individual’s response over the situation is an example of approaching survival as an adaptive challenge or one that requires learning new ways, and changing attitudes values and beliefs (Heifetz & Linsky, 2002). Developing individuals as survivors through education and training on personal, physiological and psychological strengths and weaknesses under extreme stress promotes self-awareness. Self-awareness is both the greatest tool in survival training and the greatest challenge because it counters current and past practices. The consequence for ignoring this challenge unfortunately is

firefighter's lives. Ultimately a survival situation is defined by the individual in that situation, not by the ones developing curriculum (Asken et al., 2011).

Most of vonAppen's survival research focuses on events at the most common fire response; the single family dwelling fire. This aim is to reduce complacency in operations by demonstrating that there is no such thing as a routine structure fire (vonAppen, 2011). Every fire is a different fire with its own exclusive set of circumstances. At a working fire, variables are presented in every facet; the structure and its contents, the firefighter's equipment, individual capabilities and team cohesion, nothing is guaranteed. Each individual presents with his or her own set of experiences and perceptions based on the incident variables.

Renaud (2012) uses the Cynefin Framework description of the chaotic, "a space so turbulent that cause and effect are unknown; strategically, it is not clear what to do with any measure of certainty" (Renaud, 2012, p. 6). The fire scene is a chaotic situation which threatens human survival by nature, and the firefighters at work are a group of individuals not a single body of equally fit, trained and prepared responders. This presentation of the fire scene destroys the plausibility of a purely linear approach. Consider the parallels in this excerpt from a letter written by Field Marshal Lord Wavell from *On Combat.*

> "The study of war should concentrate almost entirely on the actualities of war – the effects of tiredness, hunger, fear lack of sleep and weather. The principles of strategy, tactics and logistics of war are absurdly simple: It is the actualities that make war so complicated and so difficult." (Grossman & Christensen, 2008, p. 14)

The strategy and tactics of the fire ground are the "simple" principles; offensive, defensive, attack, ventilation and search. The human factors are those actualities which he

describes as being so complicated and difficult. Addressing them appropriately presents an adaptive challenge for WMFR.

Most fires go as planned while the department's equipment and standards have built in safety measures. Firefighters are provided advanced technologies, and the classically defined firefighter survival situation is not a common event. In this sense perceived success and hazard reduction is growing complacency in operations. A continued, primarily technical approach to solutions for chaotic events also increases potential for catastrophic failure. In the book *Deep Survival*, Laurence Gonzales describes safety, convenience and technologies as the "opiates of the modern world" (Gonzales, 2003, p. 188) in regards to human survival skills and attentiveness. These modern luxuries conspire to remove responsibility from individuals with the belief that technology or systems will handle the risk providing a view that there is separation from the danger which lies in wait.

Statistical analysis from the National Fire Protection Association (NFPA) shows that the threat to firefighters on the interior of a working fire is steadily growing. Figure 1 demonstrates the disparity between the of decline of structure fires overall and the number of firefighter fatalities at structure fires. Figure 2 shows that there is a baseline downward trend in sudden cardiac death and traumatic deaths outside at structure fires, while traumatic firefighter deaths inside structures have an upward trend overall (Fire Analysis and Research Division, NFPA, 2007).

Today's firefighter is statistically at a greater risk then firefighters 30 years. Firefighters are also more likely to die inside a structure while working under fire conditions. This supports the need for reevaluating preparation methods.

Figure 1.

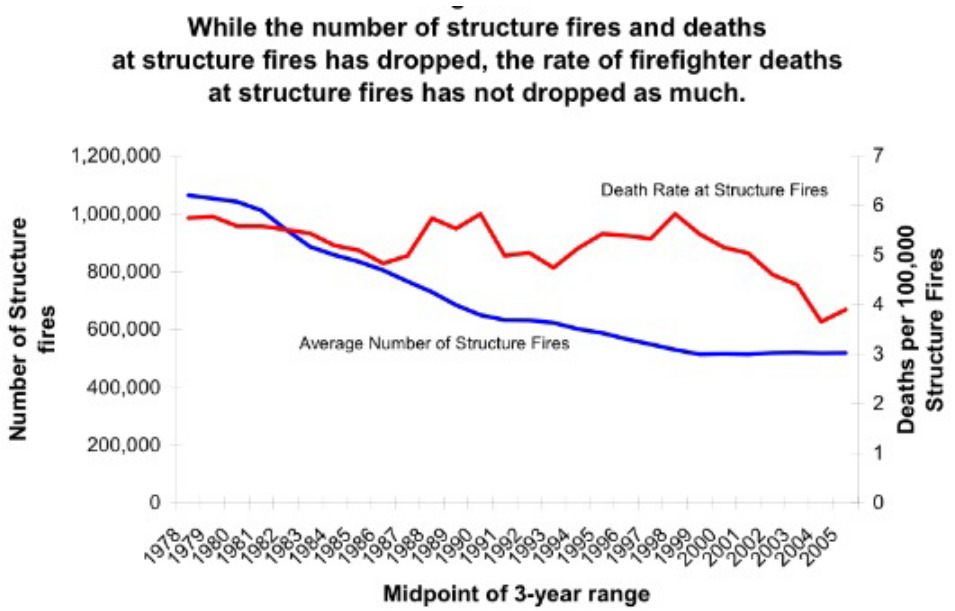
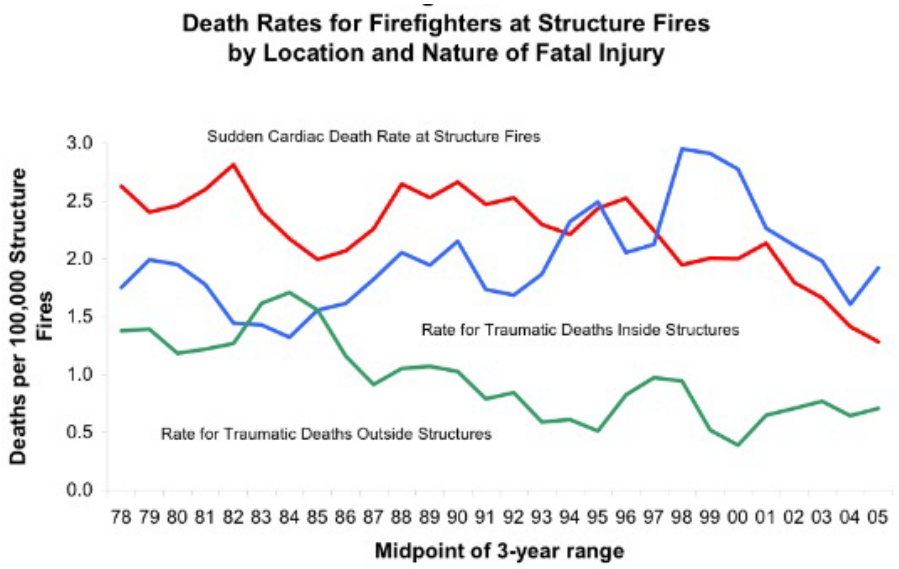


Figure 2.



(Fire Analysis and Research Division, NFPA, 2007)

Unfortunately this data and technical reports only provide a numerical representation and generic context. For years WMFR has used these types of data sets and line of duty death (LODD) reports from the National Institute for Occupational Safety and Health (NIOSH)

seeking lessons learned from other incidents in attempt at education and prevention. LODD reports from NIOSH are a technical review and do not give an equal weight to the human factors that may have contributed to the fatality, largely due to the fact the key witness is dead. The question therefore becomes; how to get a first-hand narrative account of a LODD regarding the emotions, thoughts and decisions of that situation. The answer is simple; survivors. When survivors are engaged in reporting assumptions are removed regarding the emotions and actions of those who faced their own mortality.

At this time the best fire service resource for reported first-hand information is the National Fire Fighter Near Miss Reporting System (www.firefighternearmiss.com). Modeled after the near miss reporting system used in the aviation industry, the website serves as a central point for anonymous reporting of incidents which resulted in an injury or where an injury or fatality was recognizably avoided. Each report submitted is reviewed, stripped of identifiable information, and properly tagged by site managers to provide a searchable data base of these survivor stories.

The availability of a frequently updated and researchable source of first hand narratives is a tool for improving firefighter safety and survival that few could have imagined 15 to 20 years ago. The data base allows a refined search of information from incident type down to department size and even contributing factors which includes some human factors. This would appear to be the location to find the psychology and physiology of survival situations missing and quite possibly is, just not in the current format. The near miss reporting process puts contributing factors selection in the hands of the individual making the report and beyond the submission for incidents are not evaluated and researched as thoroughly as a formal NIOSH LODD report. While the National Firefighter Near Miss Reporting System is valuable and has

great potential for continued growth and enhancement it currently faces the same challenges which limit the capabilities of WMFR in identifying the psychological and physiological factors of firefighter survival. At the end of 2012 the National Firefighter Near Miss Reporting System faced a discontinuation of funding and narrowly avoided complete shutdown (www.firefighternearmiss.com). The program will continue through 2013 however sustained future support has not been finalized. WMFR's firefighter survival program, like the National Firefighter Near Miss Reporting system provides an excellent model and foundation yet the progress and true potential are not only threatened by fiscal resources, time and also the scope of their current work.

Review of the history of WMFR shows no recorded maydays or line of duty deaths inside structure fires. With the data presented by the NFPA regarding the growing statistical likelihood of these events, our avoidance should increase our degree of concern and not be viewed as a success. The current training and treatment of firefighter survival at WMFR is missing the components which address functioning in a state of chaos under the disabling stress of a recognized threat to life. These human factors are well documented critical pieces of the survival situation outcomes.

The work of this project supports the United States Fire Administration's goal number 1; to reduce risk at the local level through the strategic initiative to focus on line of duty deaths and injuries (*Executive development*, 2012). The applied research connects to the first year executive fire officer program, executive development curriculum unit seven; organizational culture and change (*Executive development*, 2012). Application of this research internally at West Metro Fire Rescue will also support the strategic plan of the district in supporting strategic goal 3; "Enhance the Safety of the Membership through Comprehensive and Pertinent Training and

Education" (West Metro Fire Rescue [WMFR], 2012, p. 17). Within the objectives of this goal is the direction to continually evaluate existing training programs to determine if they need further development or modification.

Literature Review

Using the descriptive research method, literature review for this project began with the evaluation of how West Metro Fire Rescue and the fire service are currently defining the survival situation. Initial literature review was rooted in department lesson plans and standard operating procedures as well as fire service reports, texts and related works. From local and fire service research the author moved to survival research as it pertains to other high risk service professions of the military and law enforcement communities. Concluding with how the civilian world is defining survival and associated human factors.

Since the creation of the program in 2007, the firefighter survival program at WMFR has seen continuous revision. With each delivery to line personnel, academy recruits or change in fire service trend, event or technology an effort is made to improve. Currently WMFR firefighter safety and survival curriculum, coordination and compliance are maintained by the Safety Division.

In a review of department material from current and past trainings to written standard operating procedures and management tools numerous points of which firefighter survival was mentioned were found. Within SOP #309 Rapid Intervention Team (RIT) in the general RIT responsibilities and philosophies the setting is clearly defined. "These stressful conditions require solid leadership and ongoing training to increase the chance of survival."(WMFR, 2012, p. 72) An incredible headline to set the stage for solidifying and supporting the stressful conditions,

leadership characteristics and training requirements however this statement is not followed up or supported in any other department policy or procedure.

The balance of the firefighter survival context at WMFR is primarily focused on self-rescue or team rescue of lost, trapped or disoriented members (WMFR, 2012). The 2012 WMFR firefighter safety and survival training program curriculum explains the program objective as providing firefighters with the knowledge, skills and abilities to enhance their odds of surviving a catastrophic fire ground event (*WMFR Safety and survival*, 2012). The program curriculum is divided in two 4 hour days of skills stations. Day one focuses on emergency air operations, SCBA confidence, wall breeching, low profile maneuvers and a mayday procedure review (*WMFR Safety and survival*, 2012). Day two of the program concentrates on getting out of IDLH environments when the primary means of egress is no longer available. Day two skill stations include above and below grade bail-outs and removals (*WMFR Safety and survival*, 2012). The training program is a tool to develop skills and techniques for classically defined fire ground survival situations which are technical solutions. The program also makes it clear that there are significant limitations to this approach. “It is important that instructors at each station stress proactive concepts in order to avoid having to react with the skills being taught”(*WMFR Safety and survival*, 2012) Within WMFR the related official documentation is standard operating procedures such as Mayday (SOP #307), RIT (SOP #309) and rule of air management (ROAM) (SOP #314).

West Metro Fire Rescue (WMFR) and the American fire service as a whole continue to view the survival situation for the firefighter as a micro-climate of the larger fire ground environment. The failing point is not the efforts of WMFR but the narrow, technical definition which the district and most of the American fire service is using. Renaud (2012) uses the

metaphoric term of “galvanize” to describe the forced adherence of the emergency response community to the core solution presented by NIMS regardless of the potential that it is not the most appropriate.

WMFR has used the *Fire Officer’s Handbook* by John Norman as reference for standard operating procedures, promotional examinations for officer ranks and department trainings since the mid-1990s (WMFR, 2012). In the chapter regarding firefighter survival of Norman opens with reference to a study by FDNY Chief (Ret) Vincent Dunn which focused on 113 firefighter fatalities over a 10 year period where firefighters were “caught or trapped”. The balance of this chapter and the “survival” tools and techniques he provides focus mainly on the technical aspects of how firefighters remove themselves or others from the “caught or trapped” scenario. Norman presents 3 steps to improve firefighter survival (Norman, 2005). These three steps have essentially become the script from which WMFR and most of the fire service have based survival programs.

1. Improve hazard awareness
2. Provide emergency escape or self-rescue capability
3. Provide rescue capability by deploying rapid intervention teams

In 2007 WMFR began sending training officers to the Fire Department Training Network (FDTN) in Indianapolis, Indiana for “train the trainer” instruction and assistance in curriculum development for both a department wide firefighter survival program and a rapid intervention team operations program. The FDTN texts regarding Survival and Rapid Intervention have also been cited as references in department policy and training (WMFR, 2012). The *Fire Notes* text from FDTN on firefighter survival is primarily a skills based reference which divides firefighter

survival into managing your mayday, self-contained breathing apparatus (SCBA) emergencies, disorientation emergencies and emergency escape techniques. (McCormack & Pressler, 2002)

WMFR currently has a joint grant application with Denver Fire Department for funding to support the delivery of the International Association of Fire Fighters (IAFF) Fire Ground Survival Program to both departments. The IAFF Fire ground survival program was developed by the IAFF and the International Association of Fire Chiefs and is described as the most comprehensive fire ground survival program available (IAFF, 2010). According to the student manual and program description it was designed to provide solutions to the findings by the United States Fire Administration which shows “trapped and disoriented” as leading firefighter fatality situations (IAFF, 2010). To address this the survival program by design focuses on scene and situational size up, mayday procedures, self-rescue techniques concluding with management processes of the mayday for incident commanders.

Some fire service authors like vonAppen (2011), Dodson (2007) and Brennan (2011) are discussing and presenting psychological and physiological factors of fire fighter survival. Unfortunately they are not larger influencing bodies which drive national standards, industry texts and programs behind WMFR policy and procedure. Due to this lack of influence their contributions continue to be left out and the general fire service definition of a survival situation. The common fire service survival definition is framed in three areas; trapped, disoriented and lost as dictated by the aforementioned works of Norman and the IAFF. With this universal categorization and avoidance of the adaptive challenge to address human behavior and individuals set in these situations the solutions produced remain technical.

Fire service literature is technical and reactive in nature when it comes to defining firefighter survival. Lawton (2005) noted firefighter survival focus for his department and the

fire service has been on rapid intervention teams (RIT); the rescue and removal of firefighters from survival situations. He stated that “applied research papers on the topic of firefighter survival are limited to RIT application and not on the specifics of this topic.” (Lawton, 2005, p. 10). vonAppen (2010) also states that his research of fire ground survivor stories and incidents continue to demonstrate current survival training needs to be supplemented with training on how to manage stress and emotions in life and death situations.

When literature review expanded beyond the fire service to the law enforcement and military communities due to their high risk similarity a stark difference in approach to the term survival was discovered. When the core for survival becomes threat to life the information surrounding it becomes more focused on the human response and the individual involved. The necessity for further research in the fire service to expand survival training beyond the technical and address the adaptive challenge is supported by findings of similar studies. Asken (2011) reported on a comprehensive multi-year study of military and law enforcement personnel who were engaged in life and death or lethal force encounters. In his findings up to 90% of successful performance is attributed to psychological skills. He continues that while this information is so clearly recognized, the greatest deficiency among law enforcement agencies and therefore officer’s safety is the failure to train on how to succeed psychologically. Remsberg (2011) contributes to the book *Warrior Mindset* that “the orphan child of survival training is mental preparedness.”(Asken et al., 2011, p. vi).

Law enforcement and military peers are not focusing their training on avoiding threats or getting out of situations, their survival training is focused on physically and mentally preparing to appropriately respond to a threat under high stress. There is a complete shift from a definition

of survival rooted in situation to definition of survival rooted in stress, both physical and psychological.

A survival situation beyond the walls of the fire service is more classically defined as a high stress event where an individual's life is being threatened. Research among documentation by our peers in law enforcement and military the context of the high stress survival situation remains as an acute or sudden event. This provides the greatest parallel to our operations on the fire ground.

Hancock and Szalma (2005), Grossman (2008) and Asken (2010) use the research and studies of Driskell, Salas and Johnston to define the characteristics of a high stress situation. These characteristics are: 1) Sudden and unexpected demands that disrupt normal procedures 2) Consequences of poor performance are immediate and severe 3) Task environment is complex and unpredictable 4) Personnel must perform multiple tasks under adverse conditions. (Asken et al., 2011, p. 56) The definition is very similar Renaud (2012) use the Cynefin Framework description of the chaotic; "a space so turbulent that cause and effect are unknown; strategically, it is not clear what to do with any measure of certainty."(Renaud, 2012, p. 6). With the use of stress and chaos continually resurfacing as a defining terms for the survival situation within WMFR material and the works of others literature review expanded to identify those stressors which present at intense moments of uncertainty.

In a recently published article firefighting was listed as the third most stressful career behind military general and ahead of commercial airline pilot (Templeton, 2013). Information regarding physiological and psychological stressors on firefighters is easily found however it remains superficial as a general application to the fire environment and firefighter personal protective equipment. Dodson (2007) presents detailed information as to the physiology of

thermal stress, overexertion and what he describes as ergonomic stressors in *Fire Department Incident Safety Officer 2nd Edition*. This information is an important foundation for understanding that the threats to our survival on the fire ground exist well beyond an isolated situation. The information Dodson (2007) presents limits the scope to accumulative stressors over the duration of an incident or time. It does not detail the acute impact to the body that an immediate threat to life causes.

Some state that the key to improving firefighter survival in high stress, chaotic incidents is to increase situational awareness. Improving situational awareness was mentioned or presented in a detailed fashion in WMFR SOPs and training documents, IAFF (2010), Norman (2005), Dodson (2007) and McCormack & Pressler (2002). The unfortunate part is that our situational awareness under high stress may not be within our control. Gasaway (2012) uses research from various industries and organizations to demonstrate that the human brain is poorly equipped to multitask in dynamic environments. “The solution starts with avoiding the belief that you can effectively perform multiple conscious tasks simultaneously” (Gasaway, 2012, p. 94). Gasaway’s statement is supported by research in the field of “Inattentional blindness”. Inattentional blindness occurs when a person performing a task fails to observe what should have been plainly seen, due to task overloading or distraction ("Inattentional blindness: What captures your attention?" 2009). Research has shown that it is difficult to reduce the risk of inattentional blindness. It is involuntary and an unnoticed part of our adaptive ability to defend against information overload and current studies have found no education or training which can reduce the effects ("Inattentional blindness: What captures your attention?" 2009).

Gonzales (2003) explains when an individual actually recognizes they are in a survival situation the physiological response of their body and the psychological effects of the threat have

already put them in an altered state of perception, cognition and action. Gonzales' interpretation has scientific support in the field of neuroscience. Arnsten and Goldman-Rackic (2012) state that recent research in the physiology of stress conducted at Yale University is demonstrating that acute high stress situations result in neurochemical changes in the brain that inhibit or completely stop the function of the prefrontal cortex; the area of the "modern" brain. Within the prefrontal cortex lies the human's ability to mediate higher cognitive function; planning, judgment, concentration and even the ability to retrieve memories from training and education.

Grossman and Christensen, (2008) took neuroscience and matched it with their studies, research and reports from law enforcement officers and soldiers involved in life threatening or lethal force encounters to classify color coded conditions to represent how hormonal stress impairs normal human function. They found direct correlation between hormonal stress induced heart rate zones and the effects on the human body.

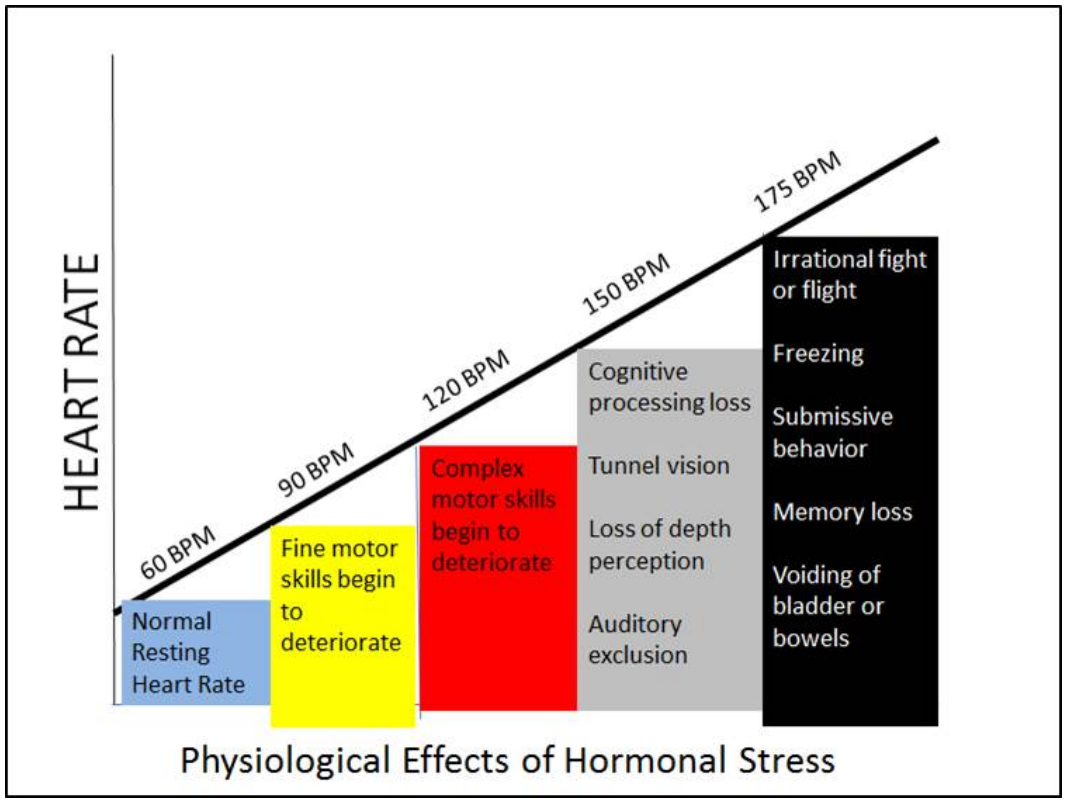
Figure 3 serves as an excellent visual representation of how physical and cognitive abilities are progressively eliminated as hormonal stress increases heart rate. The key point of disclosure is that this is only represents hormonal stress, a psychological stress initiated by the body in situations it perceives as being potentially dangerous.(Arnsten, Mazure, & Sinah, 2012).

An exhibition of psychological stress is our emotions. Emotion is often overlaid in description of the human response. "We should understand that we will respond emotionally, powerfully so when our lives are threatened. Emotions will drive us toward action, sometimes seemingly irrational action." (vonAppen, 2010, p. 46). Gonzales (2003) describes emotion as the instinctive response beyond our conscious control designed for self-preservation.

To add to the list of terms used for this influential factor of psychological stress is fear and anxiety, "Mayday situations are met with fear and anxiety" (IAFF, 2010, p. 44).

Scientifically there is no difference in how the body responds to fear and anxiety; it is only the degree of the response. Both fear and anxiety cause an increased production of norepinephrine and dopamine which rapidly erode the brain's ability to control emotions and impulses (Arnsten et al., 2012).

Figure 3



Graph adapted from (Grossman & Christensen, 2008, p. 31)

Anxiety seems best defined as "diffuse fear" by Asken (2010). Anxiety causes a progressive increase in norepinephrine and dopamine. To put it in the context of firefighting the body would naturally have a sense of anxiety be it consciously or subconsciously in response to the danger presented by working structure fire. This begins to "prime the pump" for some lower level effects on abilities as Grossman (2008) presents in the hormonal stress graph.

For a firefighter to elevate from a conscious or subconscious state of anxiety to the next level of fear would be to face one or more of the high stress characteristics presented by Driskell, Salas and Johnston during an operation (Grossman & Christensen, 2008). Those characteristics are: sudden and unexpected demands, disruption of normal procedures where consequences of poor performance are immediate, and severe in a complex and unpredictable environment (Asken et al., 2011). The acute presentation of a high stress situation may result in a complete loss of cognitive control or condition black (Grossman & Christensen, 2008).

Christensen (2008) explains that fear is the root of human survival and that experiencing fear is inevitable for anyone involved in an intense situation. Christensen, Asken and Grossman all present that the treatment of this natural and inevitable response in warrior training and preparation is being mishandled. Asken(2011), states that most modern warrior training avoids the topic of fear. He advises that many warriors are taught by society that fear is unacceptable for them as protectors of society which only compounds the problems associated with trying to control stress reactions. Robert Senn a 20 year veteran of the Fire Department of New York and survivor of the World Trade Center collapse on September 11th 2001 explains the notion that in the fire service the "tougher" you are the more respect you gain from your peers (Senn, 2010).

There are three types of fear which the warriors must be acutely aware of in order to perform when their subconscious will be telling them they are in peril; realistic fear, fear of the unknown and illogical fear (Asken et al., 2011). Realistic fear knows the reality of potential pain, injury or death from inadequate performance. Fear of the unknown is a specific fear which can be reduced through the confidence gained in situational experience. Illogical fear is the fear of failure, also called an exaggerated fear because it is tied to the individual's confidence. Illogical fear can best be explained in a personal statement such as "I never do well in search operations".

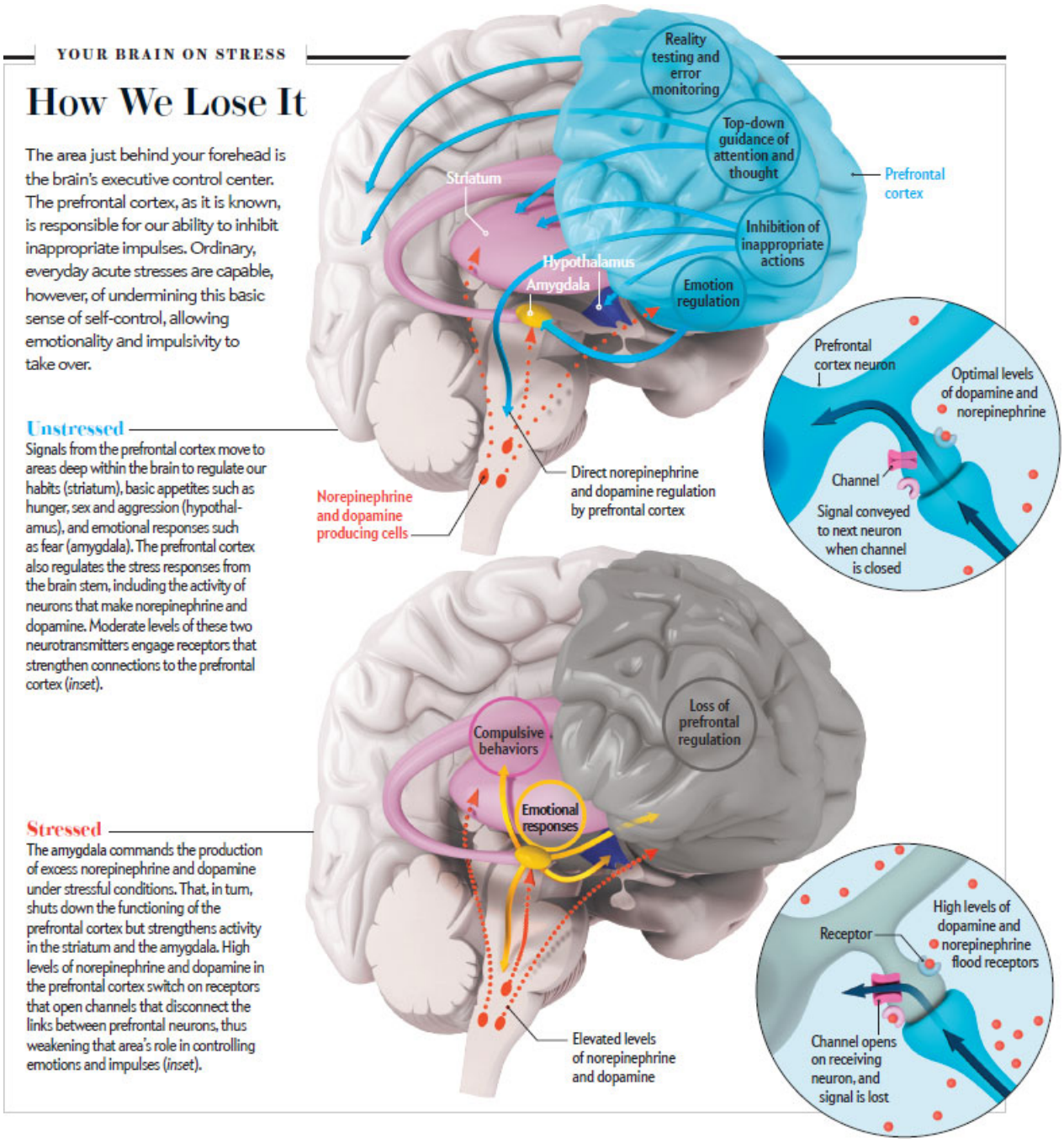
Asken (2011) uses this statement to show the example of exaggerated fear because humans do not behave or act in the same way every time, therefore “always” and “never” are mental barriers.

Gonzales (2003) describes the first act of survival as turning fear into focus. The basis of much of his research is in the civilian settings of survival where time allows a certain degree of recovery from initial floods of norepinephrine and dopamine. Gonzales recommends avoiding impulsive behavior and resisting the urge to hurry a survival situation. He states that when possible you should operate at 60% of normal capacity and rest (Gonzales, 2003). All these are attempts to regain “self-control” (cognitive control) of our body or more scientifically engagement of the prefrontal cortex regulation of body systems (Arnsten et al., 2012).

Captain Helvin of Sacramento Fire Department who was trapped above a flashover in a single family dwelling fire explains the surprise and fear of meeting his fate “This is it. I am going to die in a residential fire. This can’t be happening”. He turned this fear in to anger and action when he realized that this new reality would mean he would never see his family again (vonAppen, 2010). He then decided to throw himself down a burning stairwell towards the way he entered the structure for a chance at survival over choosing to accept death. This choice saved his life.

Figure 4 displays the physiological response of the brain to high stress situations as defined by Driskell, Salas and Johnston (Asken et al., 2011), fear as described by Gonzales (2003) or emotions as described by vonAppen (2011). With multiple names there is also various degrees of impact as anxiety was described as diffuse fear by Asken (2011). Whichever term or magnitude of manifestation, the resultant response is the same physiologically

Figure 4



From (Arnsten et al., 2012, p. 51)

The stressor increases the production of norepinephrine and dopamine which become the inhibitors of cognition (Arnsten et al., 2012) senses and abilities as shown in figure 3 (Grossman

& Christensen, 2008). “Critical to performance under stress is the ability to quickly control the stress reaction and reduce the release and effect of adrenaline on the system” (Asken et al., 2011, p. 77). Gonzales (2003) recommends slowing down and avoiding impulse or rushed decisions. In the context of being lost in the wilderness or a ship adrift at sea this is sound advice. On a limited air supply, fully encapsulated in bunker gear in a toxic and hostile environment, the difference between survivor and a fatality may be seconds. The question then becomes how we learn to quickly control the stress reaction.

Timing is what directs the research towards the context of military combat situations and law enforcement lethal force encounters where reaction time is critical. In previously cited material it has been shown that psychological anxiety or diffuse fear will initiate a physiological response of increased production of norepinephrine and dopamine. Asken (2011) presents the types of fears we must be aware of and there psychological contexts; fear of injury or death, fear of failure and lack of confidence. Anxiety in one or more of these parameters is described as mission stress (Asken et al., 2011). Mission stress sets a stage for failure because the individual’s baseline discomfort has already tipped the scales out of favor for survival. Grossman (2008) advises that the way to reduce mission stress and prepare for a quick and appropriate response to an immediate threat is replacing fear of a situation with respect for its challenges. Complacency serves as a foundation for disaster (vonAppen, 2010).

In 2007 a study was conducted using British police officers and a tactical shooting scenario with multiple evolutions. One test group was given a neutral briefing or simple description of the scenario. The second group was given a threat awareness briefing which stressed the challenges of the scenario. The results showed that the group given the threat awareness briefing had reactions times on average of .5 seconds faster than the neutral briefing

group (Asken et al., 2011). The fire service has used a similar approach in the wildfire arena for years. The 10 standard fire orders are frequently recited for personnel in pre-shift briefings on wildfire incidents. Standard fire order #6; be alert, keep calm, think clearly and act decisively ("10 & 18," 2012).

Asken (2011) also cites the research of Duran and Nasci in tactical terminology for police and military agencies to instill vigilance and reduce complacency. Simple operational language changes for example; “routine traffic stop” to “unknown risks stop” or a “raid” to “execution of a high risk warrant” help to appropriately frame the potential of the situation versus a focus on the predicted outcome (Asken et al., 2011).

It may seem counter intuitive that presenting the true risk or greater potential harm would reduce fear but it is true. Gonzales (2003), states that forcing people to confront the reality that they may die might be the first step to improving their odds of survival. In the case of Captain Helvin he faced the reality that he might die in a residential structure fire when he was trapped inside a residential structure fire (vonAppen, 2010). Fortunately for Captain Helvin the situation allowed enough time for him to face this reality, turn fear into focus and take a step towards survival. When Captain Helvin approached the fire structure he stated “we got this” and believed this was a “routine” fire in an upstairs bedroom (vonAppen, 2010). Had he a higher degree of respect for the true chaos and potential life threat that a residential structure fire presents he may have had the ability to act without that hesitation which very easily could have been the difference given different circumstances.

Asken (2011) explains that self-preparation for survival situations begins with an if-then thought process to anticipate potential challenges. If X happens, then I will do Y. Rachel Yehuda is a one of the leading experts in post-traumatic stress disorder. She contributes to the

book Survivor's club by explaining that psychological resiliency is built by facing the world with an attitude that "of course this can happen to me and this is what I will do" (Sherwood, 2009, p. 182) This mindset builds expectation and confidence in self, ultimately reducing surprise and anxiety. Gonzales (2003) advises that you must not tolerate uncertainty; you must savor it in order to truly prepare for a survival situation.

Respecting the challenges of a situation is only one piece of the puzzle; the individual who enters is the other. The personal factors which cause fear and anxiety are surprise, the unknown, and lack of confidence or understanding (Asken et al., 2011). Anyone could make a list of things which cause personal anxiety. In that list is the route to building self-awareness and in turn build psychological resilience. Siebert (1996) describes the roots of resiliency as your inner "self's": self-esteem, self-confidence, and self-concept. Sherwood (2009) explains that belief in self is the most powerful survival tool in the world.

Asken (2011) also recommends the use of three types of affirmations to prepare warriors for operation in dangerous settings; personal affirmations, professional affirmation and performance affirmations. These affirmations are confidence building exercises and rehearsals for the mind that begin with simple statements like, "I trust myself", "I am prepared" and "I am determined" (Asken et al., 2011). Attitudes determine our well-being far more than our circumstances; this is true in daily life and even more so in a situation where our life is threatened (Siebert, 1996). One's attitude is so important to outcome of a survival situation that PMA (positive mental attitude) can be found on the pre-flight checklists for military fighter pilots conducting missions (Gonzales, 2003).

Additional tools are available to improve our self-awareness specific to high stress and survival situations. Asken et al., (2011) present a Mental Toughness Psychological Skills Profile

(MTPSP) within the book Warrior Mindset. The MTPSP is a series of questions to evaluate your individual strengths and weaknesses in the context of a life threatening situation which requires immediate response. Siebert (1996) presents the heavily researched works of Sherwood and McCashland who have determined that the general population falls into 5 basic survivor types. By accessing an online questionnaire the sum of your responses will place you in one of five categories; connector, believer, thinker, fighter and realist (Siebert, 1996). Use of either of these tools improves our understanding of our "self's" as described above and can reduce surprise through understanding our type and also present areas for improvement or point of strength which can be leveraged in the context of our survival situations. Suppressing panic may be achieved by anticipating the events and things which may cause you to panic, the anticipation of an event and awareness of response prepares the mind (IAFF, 2010).

Beyond mental preparation to control the effects of stress, physical preparations are also required. Asken (2011) does an exceptional job of explaining that while the mind controls our actions; our physical abilities are directly tied to it. The brain exists in the environment of the body; the quality of that environment is an essential factor in the quality of psychological function (Asken et al., 2011). The most basic example is doubt in physical ability to perform, when there is increased anxiety about performance and there is increased psychological stress. True fitness for survival is a combination of physical and mental excellence (Asken et al., 2011). The IAFF Fire Ground Survival Student Manual includes a section dedicated to fitness for survival (IAFF, 2010). Because firefighters must perform multiple tasks under arduous conditions increased cardiovascular fitness and strength training will improve their work efficiency and awareness (IAFF, 2010).

Even the fittest firefighters are challenged when up to 100 additional pounds, is added to the body prior to starting a work (Smith, 2012). Deeper than the gear is the physiological stress on the body due to the loss or reduction of natural senses. All five natural senses will be compromised, if not completely taken out of play, on the fire ground. This can be debilitating to some if they have never been conditioned to it.

In *Deep Survival,* Laurence Gonzales describes his research into the effects of fatigue. “Fatigue almost always comes as a surprise. It is as much a psychological condition as a physical one, and scientists have struggled without success to understand it.” (Gonzales, 2003, p. 178). There is nothing in the biochemistry of the body that would seem to predict or explain fatigue. Once fatigue sets in it is almost impossible to recover from it under survival conditions (Gonzales, 2003). Gonzales (2003) continues with the explanation of fatigue far beyond just being tired, the psychological effects can lead to a spiritual collapse. There is enough stacked against firefighters in the battles they wage. The last thing needed is a spiritual collapse to shut them down.

Beyond the psychological and physical stressors placed on the body as interior firefighters is the stress of heat which can initiate physiological changes as well. Firefighters are exposed to two types of thermal stress, metabolic heat and environmental heat (Dodson, 2007). Metabolic heat is also considered internal heat, developed through physical activity and exertion (Dodson, 2007). Environmental heat would be the heat which acts upon the body; ambient air temperature, radiant heat from fire, convective heat from fire gases (Dodson, 2007). When encapsulated in personal protective equipment, all the heat generated from activity is retained in the gear, which can compound the effects of those activities. Due to the fact that personal protective equipment prevents body heat dissipation a firefighter’s core temperature increases at

an abnormal rate (Senn, 2010). The body's normal responses of vasodilation at the skin and sweating are not effective when encapsulated causing rapid and sometimes severe dehydration and reduced cardiac preload (Senn, 2010). Add breathing dry compressed air and working inside a structure preheated by a working fire and the environment is comparable to a desert in the summer.

Extensive research has been done on firefighter rehabilitation and fluid replacement. According to most medical texts, heat stroke, or the point at which the central nervous system is being compromised, is when the body's temperature reaches 104 degrees; and severe heat exhaustion (cramps, nausea, and weakness) can be precipitated at 102 degrees (Dodson, 2007). Dodson (2007) presents treatment methods for these thermal stresses as accommodation, rotation and hydration. In a survival, these methods will not be options therefore addressing thermal stresses must be in preparation. Through proper conditioning and prescription the heart and body develop adaptations that enhance its ability to endure which allows greater work capacity under all forms of stress (Senn, 2010).

Fitness for survival (IAFF, 2010), conditioning the body for working under the compounding heat stressors (Senn, 2010) will both help to improve physical resiliency and the environment of the body in which our cognitive brain exists (Asken et al., 2011). Asken (2011) presents mission benefits of physical conditioning as: increased endurance, increased strength, increased flexibility, increased physical resistance to stressors, increased tolerance to pain, increased protection against injury, clearer mental functioning under stress, more stable/positive mood (Asken et al., 2011, p. 19). The mistake commonly made is assuming that physical stresses can be reduced simply by getting in shape. There are additional exercises performed in everyday life which can also condition bodies to respond appropriately in high stress situations.

Breathing control is a critical first step to remaining calm (IAFF, 2010). When we shift our fear into focus the transition is; breathe, organize act (Gonzales, 2003). Breathing control is a relatively easy yet profoundly effective way to improve your physical ability to control your sympathetic nervous system (Grossman & Christensen, 2008). An entire chapter of *On Combat* is dedicated to tactical breathing. Grossman (2008) explains that the effectiveness of breathing control on the sympathetic nervous system, fear, anxiety and pain have been well documented for centuries. Ancient meditation, martial arts, modern day yoga or Lamaze classes, even Green Beret snipers and cardiovascular surgeons have reported or demonstrated breathing control techniques are critical to controlling the physiological and psychological effects of stress (Grossman & Christensen, 2008). The IAFF (2010) place an even greater stress on breathing control in the Fire Ground Survival Student Manual because firefighters are operating on a limited supply. Controlling respirations keeps the mind focused, helps you remain calm and conserves air supply (IAFF, 2010).

When afforded the opportunity to breathe it is a powerful tool in controlling the psychological and physiological responses to a survival situation. Unfortunately, firefighters operate in a hostile environment and must rely on a self-contained air supply. NFPA (2007) presents that firefighters today face the increasing risk of a traumatic death inside a structure. This means that the potential for out of air emergencies is also growing. For humans few feelings induce such a severe and instantaneous fear as not being able to breathe. Understanding the feelings associated with air starvation are key to managing panic in these situations ("Performance Freediving," 2013). Developing breath hold techniques, learning the physiology and psychology behind carbon dioxide and oxygen tolerance training is the difference between near fatal and fatal outcomes ("Performance Freediving," 2013). Greg Long is a professional big

wave surfer who has extensive training in extreme breath holding. Long (2012) describes a wipe out while surfing off the coast of San Diego that nearly cost him his life. He credits his training and discipline to hold his breath up to losing consciousness with saving his life. “Having trained for extreme breath holding, at no point did I allow myself to panic or lose confidence that I was going to survive this incident.” (Long, 2012). The importance of this type of discipline and the potential for it to make the difference in life or death for firefighters is critical. Preserving our SCBA mask seal even without a supply of air may be the difference between a RIT rescue and a line of duty death.

In summary, the literature review spanned professional texts, journals and reports. Scientific data, articles and research from civilian and sworn communities was also included as were personal survival stories and non-fiction survival books. The literature review demonstrates that WMFR’s treatment of firefighter survival is superficial when compared to the depth of study outside of our organization. The literature review also shows that threats to survival go far beyond what happens inside the fire. The greatest threats to survival may actually lie within the firefighter which supports the need for improved education and training on the psychology and physiology of surviving on the fire ground.

Procedures

The purpose of this research is to identify the psychological and physiological factors associated with survival situations to ensure we are preparing West Metro Firefighters as survivors beyond the provision of equipment and skill based training. Research for this paper was conducted using the descriptive research method to collect data regarding the current definition, treatment and practices of survival.

The primary vehicle of research was literature review. Research material was taken from within the fire service, other high risk professions and the civilian world to answer the following questions: a) How is survival being defined by WMFR and others? b) What are the psychological and physiological factors that affect survival? c) How are others addressing psychological and physiological preparation in survival training?

Research was initiated while on campus at the National Fire Academy in the Learning Resource Center (LRC). Initial research at the LRC was rooted in fire service texts, journals and published Executive Fire Officer Applied Research Projects using keyword searches for firefighter survival. Research at the LRC served as the foundation for defining the current state of firefighter survival treatment and training in the American fire service.

Upon returning from the Executive Development course, training documents and programs stored on the WMFR shared S:Drive were reviewed by the author. Department policies and procedures were also searched utilizing department intranet and keyword searches in the areas of firefighter safety and survival, as well as rapid intervention. These efforts contributed to determining the answer to research question a).

From this initial research with an internal and fire service focus research to psychological and physiological factors of survival in the military and law enforcement communities. Discussion with a WMFR Firefighter Paramedic and retired United States Navy SEAL directed the author to the works of Lieutenant Colonel Dave Grossman, more specifically the book *On Combat.* In a search for similar material in law enforcement presented *Warrior Mindset* by Dr. Michael Asken, psychologist for the Pennsylvania State Police. The depth of discussion and research presented in these two texts contributed a great deal to provide material for answering all three research questions.

The scope of research and data expanded to follow a thread of survival related information from general society and academia. Initial literature review surrounded survival narratives, studies and non-fiction books at local libraries and through internet searches using Google. Through the literature review process it was clear that stress and effects of stress were key components to understanding the psychological and physiological factors of survival. Research grew to include these topics through additional books, journals and internet sources. These additional sources and related topics lead to a revisit of fire service materials regarding effects of stress and stress management.

The literature review proved comprehensive enough to answer all research questions thoroughly and from a variety of perspectives. The key limitation to this research process was available time. Psychological and physiological survival research expanded to include effects of stress presented a much larger pool of information than was initially anticipated. There is directly related material which was not discovered in the time period allowed for literature review.

Results

Using the descriptive research method and literature review process the results were produced by an evaluation of material across a broad scope of fields and persons. Research for this paper and the results yielded have also provided this author with a foundation for recommendations to further this work and directly apply current findings to WMFR operations and training. The following research questions were answered: a) How is survival being defined by WMFR and others? b) What are the psychological and physiologic factors that affect our ability to perform in a survival situation? c). How are others addressing psychological and physiological preparation in survival training?

a) How is survival being defined by WMFR and others?

Results for determining the definition of survival at WMFR was found through an evaluation of internal policy, procedures and training document. Survival was referenced within SOP #309 Rapid Intervention Team (RIT) in the general RIT responsibilities and philosophies the setting of a firefighter rescue "These stressful conditions require solid leadership and ongoing training to increase the chance of survival."(West Metro Fire Rescue [WMFR], 2012, p. 72) The ongoing training is defined within the WMFR firefighter safety and survival training program.

WMFR maintains a firefighter safety and survival training program managed under the coordination of a department Captain. The most current curriculum for the training program is maintained on the department's shared computer drive. The 2012 WMFR Firefighter safety and survival training program curriculum explains the program objective as providing firefighters with the knowledge, skills and abilities to enhance their odds of surviving a catastrophic fire ground event (*WMFR Safety and survival*, 2012). The program curriculum is divided in two, four hour days of skills stations. Day one focuses on emergency air operations, SCBA confidence, wall breeching, low profile maneuvers and a mayday procedure review (*WMFR Safety and survival*, 2012). Day two of the program concentrates on getting out of IDLH environments when the primary means of egress is no longer available. Day two skill stations include above and below grade bail-outs and removals (*WMFR Safety and survival*, 2012). With the curriculum for the training program being the most comprehensive document directly regarding firefighter survival it presents the definition of survival at WMFR as solving a life threatening equipment problem or removing oneself from a life threatening environment. The survival tools provided by WMFR is training in skills stations which replicate these situations with the

instruction that improving fundamental firefighting skills are the best prevention for creating survival situations.

The definition of survival and skills developed by WMFR are consistent with the focus of the IAFF Fire Ground Survival program which are incident management practices and survival techniques (IAFF, 2010). These approaches are also in line with the 3 steps to improving firefighter survival presented by Norman (2005): 1. Improve hazard awareness and recognition 2. Provide emergency escape or self-rescue capability 3. Provide rescue capability by deploying rapid intervention teams.

Literature review of material regarding survival in the law enforcement and military communities found the definition of survival to be deeply rooted in the appropriate response to an immediate threat to life in the context of combat. I found this immediacy to be an excellent parallel to the fire service due to the fact that interior firefighting is conducted on a very restrictive timeline; limited factors of air supply, physical exertion, fire conditions and structural stability.

Asken (2011) states that experience and research shows up to 90% of successful performance in appropriately responding to a life threatening situation or lethal force encounter for law enforcement personnel is attributed to psychological skills. The importance of this is repeated over and over in related literature and documentation. Appendix A of the Military's manual *Survival, Evasion, Recovery: Multi-Service Procedures for Survival, Evasion and Recovery – Army, Marine Corps, Navy, Air Force* states that "survival is by choice not by chance" furthering by explaining a positive mental attitude, anticipation of fears and combating psychological stressors are of greater importance to survival than equipment (Asken et al., 2011).

The Department of the Army's Field Manual 3-05.70 states "a key ingredient to survival is the mental attitude of the individual involved" (Arnsten et al., 2012, p. iv).

To further clarify this definition of survival, it is stated that it is not the actual situation which threatens our life; the man with a gun or the flashover, it is the extreme stress that is initiated by our perception of that threat, both subconscious and conscious. There are four parts to any response stress situation; objective situation, appraisal of the situation, emotional response, behavioral/psychological/physiological consequences (Asken et al., 2011, p. 52). Asken (2011) explains that the more which can be learned to manage perceptions, stress can be managed which supports an approach that survival preparation begins with developing proper mindset before providing skill sets. Grossman (2008) explains that the extreme stress of a life threat is an emotional and physical carnivore. He further reports that years of research support the fact that the stress of combat claims far more victims then direct action (Grossman & Christensen, 2008).

Beyond the combat setting, the definition of survival in the civilian setting was researched. Sherwood (2009) explains that the definition of survivor he used for his nonfiction book *The Survivors Club* is one who faces and overcomes adversity, hardship, illness, physical or emotional trauma. These parameters broaden the scope of survival beyond the intense setting of the fire scene or combat encounter the underlying connection is clearly made by Sherwood. "While some challenges appear to be more daunting or excruciating than others, it doesn't make any difference where it ranks on some imaginary Richter scale of survival. Survival is based on the perception of the individual, not the situation" (Sherwood, 2009, p. 22).

The civilian definition of survival varies in context from cancer diagnosis, to financial hard times or being lost in the wilderness. While the settings are diverse, the focus of most

literature regarding tools for surviving these situations returns to mental and emotional preparation. This point is echoed in the works of Gonzales when he clarifies that that the keys to survival is not what is in our packs or our mind but most importantly what is in our hearts (Gonzales, 2003, p. 15). Gonzales (2003) continues that our "survival kit" therefore lies inside of us, our desire to survive, our ability to respond appropriately to the situation and our ability to adapt to the new reality which threatens us. Seibert (1996) states that our attitudes determine our well-being more than our circumstances which explain why some people thrive in the same situation which will claim the lives of others. Through his research for *The Survivor Personality* he reports that improving your odds of survival lies in developing resiliency. Because the survival situation could be anything but the one who must survive will always be you, the roots of resiliency are your inner-selfs; self-esteem, self-confidence and self-concept (Siebert, 1996).

Survival in the civilian world is primarily focused on overcoming adversity and challenge, while this is not as concentrated as the immediate threat to life that is presented in the law enforcement and military peers the common denominator is dealing with stress. This is why there is such an incredible span of information and interest in survival from the most acute to longest term situation. "I believe that everyone should learn about basic survival skills and the survivor's frame of mind" (Gonzales, 2003, p. 279).

b.) What are the psychological and physiological factors that affect survival?

Gonzales (2003) explains that adaptation is another word for survival which is not used enough. Only 10 to 20 percent of the general population can stay calm and think clearly in a survival situation (Gonzales, 2003). The survivors are those few who can perceive their situation clearly, readily adapt to the current state and take correct action (Gonzales, 2003). To focus on the psychological and physiological factors that affect our ability to perform, we need to analyze

those factors which inhibit our abilities to stay calm, think clearly and perceive our situation; stressors. In response to a stressor the brain floods with arousal chemicals of norepinephrine and dopamine (Arnsten et al., 2012). Elevated levels of these chemicals in the prefrontal cortex (cognitive brain) prevent neuron firing in the same way that the body shunts blood from the extremities to the core organs during shock (Arnsten et al., 2012). This is what precedes cognitive and physical activities downstream of adapting to the situation and taking correct action.

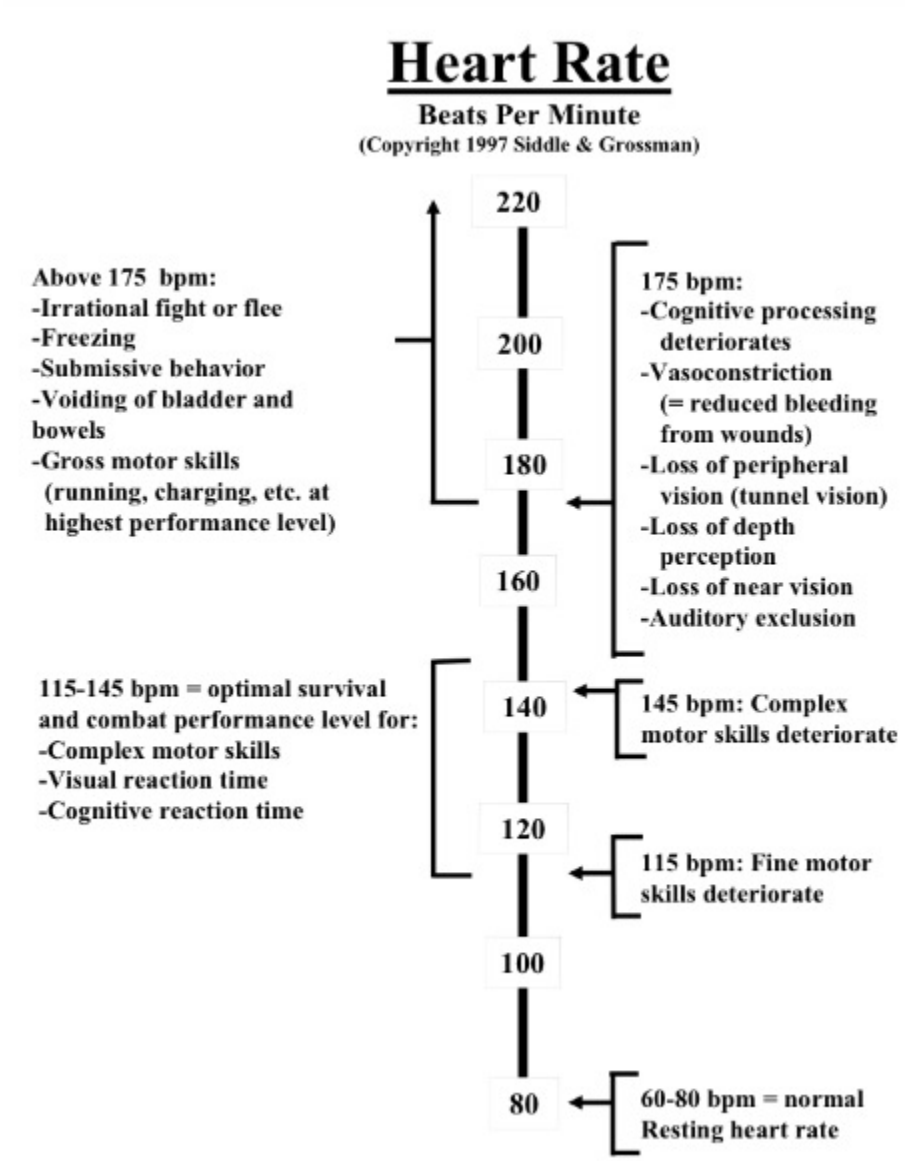
Stress initiates responses in our brain subconsciously (emotional) and consciously (cognitively) (Gonzales, 2003). The emotional response is a deeply rooted, animalistic, instinctive response engrained through evolution aimed at self-preservation which occurs outside of conscious control. Cognitive thought and reason is tentative, slow and fallible (Gonzales, 2003, p. 31). As shown in figure 4, when the brain is stressed it commands production of norepinephrine and dopamine which suppress the cognitive (prefrontal cortex) and stimulate the emotional and compulsive areas of the brain (Arnsten et al., 2012). The cascading and compounding psychological and physiological effects of emotional response is the greatest separator between those who live and die. vonAppen (2010) presents a nearly verbatim description of the process through his interview with Sacramento Fire Captain Jeff Helvin, “The fear and painful stimulus began to eat into Helvin’s ability to think clearly” (vonAppen, 2010, p. 45). Grossman (2008) described extreme stress as an emotional and physical carnivore it consumes most individuals, the unfit, the 80 to 90% of our population which cannot think clearly in a survival situation (Gonzales, 2003, p. 15), or the 75% which simply freeze or operate in a daze (Gonzales, 2003, p. 196). An unchecked emotional and compulsive response also known as “fight or flight” will have the greatest psychological and physiological effect on our ability as

firefighters to perform in a survival situation. Asken (2011) cites James Williams in saying that the fight or flight mechanism is for animals or the untrained not those of us who must operate and respond in environments of danger (Asken et al., 2011, p. 56)

Because firefighters are trained and prepared to operate in dangerous environments there is an expectation that overall performance when faced with a life threatening situation would be better than that of the general population, however comparable data presents concern. Grossman (2008) shows that over one third of law enforcement officers killed in combat did not defend themselves. Data has been gathered from officers who were involved in lethal force encounters that did survive which can help us understand in greater detail the psychological and physiological factors which affect chances of survival. Doctor Alexis Artwohl and Loren Christensen conducted research on a pool of 141 police officers who were engaged in a lethal threat situation (Grossman & Christensen, 2008). Some of the research was targeted at the effects of stress and perception. 85% of officers interviewed reported what is called auditory exclusion; diminished sounds, not hearing radio traffic or missing commands or statements from others. 80% reported tunnel vision, blocking out all activity in their periphery or a focused visual clarity, meaning they were able to see very clearly just the threat, for example details of the weapon drawn on them. 65% reported a slow motion effect where they felt that their actions were happening too slowly to be effective. 51% reported complete memory loss for some parts of the event and 40% reported feeling dissociated from the event as if they were watching it unfold without a position of control within it (Grossman & Christensen, 2008). These psychological and physiological effects reported by these officers is presented in figure 5, which represents the physiological effects of hormonal (emotionally) induced heart rates, and sympathetic nervous system arousal. These are not exercise induced heart rates and the effects are not the same.

Asken (2011) also presents that some additional physical disruptions of high levels of psychological stress are muscle tension, fatigue, poor coordination and blurred vision (Asken et al., 2011). These also can be connected to the chart presented in figure 5.

Figure 5



Effects of hormonal stress induced heart (Grossman & Christensen, 2008, p. 31)

The various ways and degrees to which stress affects our mental and physical function is a component to acknowledge before skills or technique training is presented. In reference to

figure 5, fine motor skills begin to deteriorate at a relatively low threshold of 115 beats per minute (BPM). Complex motor skills start to deteriorate at 145 BPM. If components of your survival skills require knot tying or small equipment operation and your firefighters have not been advised that their abilities to execute these skills will be severely compromised by the emotional stressors of attempting to save their lives the panic of inability will only compound the problem. As it has been said to be forewarned is to be forearmed. In regards to the physiological effects of stress and more specifically the topic of intentional blindness Gassaway (2012) offers this, "Denial of these scientifically proven facts will not make you an effective multi-tasker; it will only make you more vulnerable." (Gasaway, 2012, p. 94)

c). How are others addressing psychological and physiological preparation in survival training?

The research shows that the common denominator of the psychological and physiological factors of survival is stress. From this same body of work, preparation methods can be divided in two areas. The first is reducing diffuse stresses of anxiety and surprise through education, self-awareness, perception control and creating expectation. The second is and reducing the acute effects of high stress situations through conditioning, and breathing control. In both cases active preparation is the key "Denial and inactivity prepare people well for the roles of victim and corpse" Dr. John Leach (Sherwood, 2009, p. 37)

Asken (2011) refers to culture surrounding preparation for performance stress of high level completion athletes as changing from one of "get over it" or "deal with it" to one of educating athletes on how to deal with it. Senn (2010) a Fire Department of New York (FDNY) firefighter and survivor of the World Trade Center collapse explains that the culture of the FDNY up to 9/11 was one of "suck it up, do whatever it takes to get it done and ignore the

emotional" (Senn, 2010, p. 60) Multiple authors in the law enforcement and military community use the term warrior for those who work in dangerous situations which civilized masses are not only culturally but subconsciously programmed to avoid; confrontation, violence, combat and even fire (Asken, Grossman, & Christensen, 2011). The key to developing a warrior is the education of those natural human instincts of danger avoidance which would be counterproductive to survival in their chosen professional environment (Grossman & Christensen, 2008). We must understand how we respond emotionally because in times of survival our emotions drive our actions powerfully and sometimes irrationally (Siebert, 1996). The IAFF (2010) explains that inadequate situational awareness is the consistent theme among firefighter line of duty deaths and near misses. They continue by explaining that the lack of situational awareness causes firefighters to lose track of location, air supply and potential fire events (IAFF, 2010). This context is focused on environmental situational awareness. WMFR firefighter safety and survival training also mentions situational awareness and the importance of fundamental skill proficiency however, it remains environmental and tactical in context (*WMFR Safety and survival*, 2012). WMFR firefighters are lacking in the education of physiological response or emotional situational awareness.

Beyond educating on the powers of emotion and stress others are utilizing psychological profiles to improve self-awareness. Seibert (1996) explains self-awareness as the roots of resiliency to describe it as the very beginning and foundation of the survival personality. He describes the three roots of self-awareness as, self-esteem (the emotional opinion of self) self-confidence (how well you expect yourself to perform) and self-concept (how well you know who and what you are) (Siebert, 1996, Chapter 10). A personal inventory of these items is possible however a variety of survival focused profiles are available.

Based on research conducted with Mc Cashland, Sherwood (2009) presents the five survivor types as the fighter, believer, connector, thinker and realist. The typing is done when an individual completes a personality profile questionnaire. While the context of survivor for this profile is not as acute and compressed as the situations firefighters may find themselves in, the typing still improves self-awareness and provides an excellent foundation for addressing more individualized strengths and weaknesses for each personality type. The best example is the "fighter", a determined and individualized person, this serves well for the never give up attitude necessary for survival however they may be one of the last to call for help (Sherwood, 2009). This can prove lethal on the fire ground where seconds count.

Asken (2011) presents the Mental Toughness Psychological Skills Profile (MTPSP) as a tool for determining personal toughness and psychological abilities in eight areas. The eight aspects of psychological performance include: confidence, physical arousal, attention control, arousal control, imagery use, commitment, self-talk, physical condition (Asken et al., 2011). The full MTPSP can be found in appendix A and is comprised of 56 total questions which correlate 7 questions for scoring to each of the eight aspects. The scores can also be transferred to a graph on which the level of psychological ability in each area is divided into four levels of performance; in command, passed muster, no medals yet and basic training time (Asken et al., 2011). Survival style results from interactions in everyday life and an individual's habitual ways of dealing with stress or reacting to the unexpected however without awareness this experience is lost or missed (Siebert, 1996).

Asken (2011) explains stressors and their impact on the mind and body are a result of perception. Children make incredible survivors because their perception of the world is open and knowledge of threats is limited. Children experience less of the classic fears an adult would

which have been set through life experiences (Gonzales, 2003). When we can learn to manage our perceptions we can learn to manage our stress (Asken et al., 2011). It may seem counter intuitive that presenting the true risk or greater potential harm would reduce fear but it is true. Gonzales (2003), states that forcing people to confront the reality that they may die might be the first step to improving their odds of survival. In the case of Captain Helvin he faced the reality that he might die in a residential structure fire when he was trapped inside a residential structure fire (vonAppen, 2010). Fortunately for Captain Helvin the situation allowed enough time for him to face this reality, turn fear into focus and take a step towards survival. When Captain Helvin approached the fire structure he stated "we got this" and believed this was a "routine" fire in an upstairs bedroom (vonAppen, 2010). Had he a higher degree of respect for the true chaos and potential life threat that a residential structure fire presents he may have had the ability to act without that hesitation which very easily could have been the difference given different circumstances. Asken (2011) explains that self-preparation for survival situations begin with an if-then thought process to anticipate potential challenges. If X happens, then I will do Y. Rachel Yehuda is a one of the leading experts in post-traumatic stress disorder. She contributes to the book *Survivor's Club* by explaining that psychological resiliency is built by facing the world with an attitude that "of course this can happen to me and this is what I will do" (Sherwood, 2009, p. 182) This mindset builds expectation and confidence in self, ultimately reducing surprise and anxiety. Gonzales (2003) advises that you must not tolerate uncertainty; you must savor it in order to truly prepare for a survival situation. Controlling perceptions of hazards by having greater respect for the risk and creating expectation reduces the potential for surprise. Surprise is the short fuse to the emotional cascade of norepinephrine and dopamine release, as

vonAppen (2011) states, complacency sets a foundation for disaster and that foundation is surprise.

The afore mentioned preparation tools may have a greater effect on the outcome of a survival situation due to the fact that they set a basis for a sound mental performance by developing psychological resiliency. With that said there is still a physical component of the body that must be conditioned to handle the impacts which are also precipitated by these situations. Gonzales (2003) explains that survival preparation is both a spiritual and physical act that spans a lifetime. Asken (2011) states that because the mind exists in the environment of the body the quality of that environment is an inherent piece of survival. The true goal of fitness for duty is mental and physical excellence (Asken et al., 2011).

Armed forces, law enforcement and the aviation industry have been using stress inoculation training as a means of conditioning the body and mind for the reality of high stress situations through scenario based evolutions. Also described as stress acclimation the fundamental concept is that success under simulated high stress situations prepares the body and mind and also builds confidence in the individual for performance (Grossman & Christensen, 2008). The Navy takes men and women just out of high school and conditions them to be survivors in dangerous missions and hostile environments. Through a well-designed stress conditioning program they mold warriors (Sherwood, 2009).

The IAFF (2010) also recommends that firefighters be placed in positions that closely simulate actual fire conditions in order for them to realistically exercise their mayday skills. Mayday situations are met with fear and anxiety and the desire to remove oneself from the situation overrides the ability to reason and perform necessary survival skills without conditioning and comfort under similar circumstances (IAFF, 2010).

Conditioning under high stress situations is also a necessary step in self-discovery and self-awareness. When you face a true crisis you'll discover strengths and abilities that you never knew existed or find weaknesses which will humble you beyond words (Sherwood, 2009). Hormonal stress induced heart rates are also the only way to replicate and therefore prepare for the perceptual distortions described in figure 5. Exercised induced tachycardia will not result in the same temporary disabilities that the chart presents because hormonal heart rates are influenced by the norepinephrine and dopamine release (Grossman & Christensen, 2008).

Conditioning also extends beyond psychological stress as our interior operations are conducted fully encapsulated in personal protective equipment (PPE). The first point of concern for working in full PPE is sensory reduction and breathing restriction. These restrictions can lead to precipitation of anxiety or Closter phobia. The PPE also adds weight to our body and restricts movement, consuming a portion of our normal work capacity (Senn, 2010). Perhaps the most detrimental stressor of our PPE is heat. A firefighter's work is physical labor in a superheated environment exposing firefighters to the combination of metabolic and environmental heat stress (Boyle, 2007). The side effects of heat stressors are compounded by the thermal protective design of firefighter PPE which impairs heat dissipation (Senn, 2010). The inability for the body to cool itself through natural physiological processes of evaporation of sweat and peripheral vasodilation severely impacts thermal regulation and causes rapid core temperature increase (Boyle, 2007).

Negative effects of this heat stress escalate as the physical operations continue; working muscle and organs begin to demand the blood pressure which the body is subsequently reducing in attempts to cool the core (Senn, 2010). Boyle (2007) presents data from two firefighter line of duty deaths where rectal temperatures were recorded upon arrival at the hospital for

resuscitation: Firefighter 1 was 108.6 degrees Fahrenheit and firefighter 2, 107.4 degrees Fahrenheit (Boyle, 2007). The fact that our body's core temperature can rise nearly 10 degrees above normal in one work period is difficult to compare the work demands or environment of any other profession.

Boyle (2007) also presents data from a study which recorded heart rate and core temperature of firefighters through a simulated work period of fire ground tasks. These tasks, performed in a fire training structure found average core temperatures of firefighters upon conclusion of the work period was 104.1 degrees Fahrenheit with an average heart rate of 182.3 beats per minute (Boyle, 2007). Regarding the potential risk of this type of operating level, heat stroke is medically defined as core body temperature greater than 104 degrees Fahrenheit (American Academy of Orthopedic Surgeons, 2012). At this high core temperature, cardiac dysrhythmias, organ system failure, seizures, confusion, disorientation and coma can result and it should be treated immediately as a medical emergency (American Academy of Orthopedic Surgeons, 2012).

The context of a firefighter survival situation has an added layer; medical emergency. At the time of calling a mayday the research shows that our bodies may be approaching if not operating in the range of heat stroke. The keys to preparation for psychological and physiological factors associated with working in full PPE include proper hydration and conditioning. Regarding working in full PPE Senn (2010) reports that research shows that through a proper conditioning program the heart develops adaptations that enhance its ability to endure stress and allow for greater work capacity.

One of the most critical components of firefighter survival is breathing. The superheated and toxic environment of the interior of a working structure fire is non-supportive of human life

and without supplied air fate is sealed in minutes if not seconds. Much of firefighter training regarding breathing is centered on conserving supply, "by controlling your respirations you conserve air" (IAFF, 2010, p. 45). Research and history present that breathing patterns and control may also serve a greater purpose in improving our chances of survival especially regarding our psychological and physiological responses.

Breathing control is a relatively easy yet profoundly effective way to improve physical ability to control the sympathetic nervous system (Grossman & Christensen, 2008). An entire chapter of *On Combat* is dedicated to tactical breathing. Grossman (2008) explains that the effectiveness of breathing control on the sympathetic nervous system, fear, anxiety and pain have been well documented for centuries. Ancient mediation, martial arts, modern day yoga or Lamaze classes, even Green Beret snipers and cardiovascular surgeons have demonstrated breathing control techniques are critical to controlling the physiological and psychological effects of stress (Grossman & Christensen, 2008). Grossman teaches a simple yet effective tactical breathing technique to assist in gaining control of psychological and physiological responses at times when our emotions begin to take control.

> "Begin by breathing in through your nose to a slow count of four, which expands your belly like a balloon. Hold for a count of four, and then slowly exhale through your lips for a count of four, as your belly collapses like a balloon with its air released. Hold empty for a count of four and repeat the process." (Grossman & Christensen, 2008, p. 332)

Gonzales (2003) reports the three steps to suppressing panic are to breathe, organize and act. Grossman (2008) presents numerous reports from law enforcement and military personnel who have credited breathing technique training with the difference between performance and

panic. Breathing and blinking are the only two actions of the autonomic nervous system that you can bring under conscious control. Gaining conscious control of your unconscious nervous system is critical to regaining composure through relaxation and concentration (Grossman & Christensen, 2008).

The common denominator of the psychological and physiological factors of survival is stress and preparation methods should address it. Reducing diffuse stresses of anxiety and surprise through education, self-awareness and perception control and by reducing the acute effects of high stress situations through conditioning, and breathing control are means.

Discussion

The title of the paper uses the word investigating to describe the action taken in the research and it is an accurate term. The amount of information on the psychology and physiology in regards to survival is staggering. When the underlying cause of stress and effects of stress is exposed the scope broadens even further. Through five months of research this remains an initial investigation of the related material. Topics such as inattentional blindness, auditory exclusion and tunnel vision have complete communities of research and discussion. Each of these areas and many more deserve the time and efforts put forth in this general investigation towards understanding these individual aspects. While follow up and follow through is necessary, from this current body of work there is a variety of methods in which this research that the foundation of awareness can be built and directly applied to WMFR.

In the introduction and the background and significance states that properly addressing firefighter survival preparation is an adaptive challenge for WMFR that requires a cultural shift for the organization. Solutions require a change in the behaviors and attitudes of WMFR firefighters and officers, this statement holds true. The material reviewed for this paper shows

that the survival situation is very individualized in perception and response. By taking a universal approach for all members and focusing on technical preparation for specific survival situations we are not properly presenting the true context of a survival situation and its demands to our members or developing them as survivors.

WMFR has identified and taken great steps to prepare firefighters with survival skill training however the increased focus and attention to mental response of the law enforcement and military communities presents and important point; skill execution is impossible without first the mental response. Defining survival technically is assuming that all firefighters are already mentally prepared, unfortunately when faced with an immediate life threat about 75% of people will initially freeze or simply operate in a daze (Gonzales, 2003). Grossman (2008) presents data that shows over a third of all police officers killed in combat did not defend themselves. This type of information is utilized to reinforce the fact that while properly equipped with body armor and weapons, properly prepared with skills of shooting qualification and active shooter evolutions there is still a barrier between recognizing the threat and skill execution which sits between the ears. Charles Remsberg contributes to *Warrior Mindset* by explaining that mental preparedness is the orphan child of survival training (Asken et al., 2011, p. vi). Seibert (1996) also concludes that our attitudes determine our well-being far more than our circumstances.

The adaptive problem will not be switching from one approach to another. The skills and equipment associated with these situations will still require extensive and continuous training. The adaptive challenge for WMFR will be in properly incorporating the newly identified components of survival preparation into the existing program. Training with attention to the individual and aspects of mindset, confidence and stress management are non-traditional.

Some of the organizational implications of instituting the information gathered from these results are within our control. If WMFR were to attempt to institute a complete program in one attempt the challenges presented would fail it before it had the opportunity. Challenges such as, creating curriculum and educational tools, determining proper avenues or levels of conditioning and finding the additional resources of time, equipment, people and support at a point where these are difficult for the organization to come by would leave the program short. These obstacles are not insurmountable if changes are instituted progressively. Some very important pieces may be implemented immediately and at little to no cost to the district. Program modifications beyond initial implementation that require greater commitment and development may be instituted over time. Beyond the initiation of awareness and development of future programs the topic needs to have continued and expanded research to ensure currency and accuracy.

Recommendations

Applied research project infers that the project is not complete until research is applied. As stated above, the scope of the topic is intimidating but important information has been collected and direct parallels have been presented. A traditional path of education and training levels for programs in the fire service is awareness, operations and technician. It would be unreasonable to expect someone to fill the role of hazardous materials technician without base knowledge, experience and skill sets, there is a natural progression in education and training to follow. This model of progression is a good format for the application of research results and recommendations presented in this project. The following recommendations are means for WMFR to begin to directly apply this research in the development of a foundation of

understanding and awareness level for the district's firefighters with a plan to build on the research for future application.

1. Partner with St. Anthony Hospital to provide an EMS continuing education video conference on the psychology and physiology of stress in the context of firefighter survival. Content for the program may be developed from the research and references presented in this document and reviewed by WMFR physician advisor. These monthly sessions are already scheduled through WMFR EMS and Training Divisions, a process exists to ensure that content meets paramedic continuing education requirements for anatomy and physiology. The connections to the fire ground and firefighter are thoroughly documented in this research paper and also parallel to responses we will see in civilian victims and patients.
2. Provide tactical breathing training for all members. The breathing technique instruction is clearly presented in *On Combat* and supporting documentation can be found in that text as well as several others I researched as part of this paper. Breathing technique is a no cost tool to reduce stress in WMFR firefighters. If the department is not comfortable teaching this technique we can seek out instructors from the local law enforcement community.
3. Improve firefighter self-awareness by providing access to both the survivor personality and the mental toughness psychological skills profiles or developing a firefighter specific tool based on the model presented in Appendix A.
4. Evaluate department policy, procedure, training and operational language to identify where tactical terminology can be used to encourage a state of vigilance and deter complacency.

5. Consider incorporating the principles of threat awareness briefings described by Asken (2011) to WMFR station line up procedures to enhance an approach of vigilance and deter complacency.
6. Include an educational component on the psychological and physiological factors of a survival situation into the WMFR firefighter safety and survival training program.
7. Reevaluate survival training with attention given to the psychological and physiological factors of survival to develop concepts for stress conditioning in future firefighter safety and survival training.
8. Continue research and education into the psychology and physiology of survival stress, for the benefit of firefighters beyond WMFR.

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Appendix A

Asken (2011) Mental Toughness Psychological Skills Profile

Police officers are well aware that a fundamental requirement for success on a call is acquiring accurate and useful "intel" about the situation or subject. Knowing "what you got," background on the situation and subject, gives direction in knowing where to start and where to go. In the 4th Century B.C., Seneca observed:

If a man does not know to what port he is steering, no wind is favorable.

The same is true for successfully learning psychological skills for maximizing your actions during a call. Knowing "what YOU got" in terms of personal mental toughness and psychological skills will allow you to efficiently use your time and energy to enhance your police skills.

You already have considerable psychological skills, given the work you do. However, completing the Mental Toughness Psychological Skills Profile (MTPSP) will help you to be better aware and to better understand skills you are already using, as well as, how to enhance these even further. It will also introduce you to new skills and highlight areas that need to be strengthened.

Below are a series of statements that comprise the Mental Toughness Psychological Skills Profile (MTPSP). For each statement on the profile, you should indicate how often it is true for you or how often it applies to you. There are no trick questions and the MTPSP will be most helpful if you are open and honest in responding to the statements. There is no benefit in trying to make yourself "look good." It will not be helpful to try to make yourself seem more skillful than you are. You probably wouldn't attempt a "snow job" with physical skills training and you shouldn't do it here, either.

Here's how to complete the MTPSP. For each statement, circle or place an X on the number and descriptor that corresponds best with how often the statement is true for you. The choices are **Almost Always** (True); **Often** (True); **Sometimes** (True); **Seldom** (True); or **Almost Never** (True).

For example, responses from an Officer who feels that question 1 is "often" true and feels that question 2 is "sometimes" true would look like this:

1 I can handle a crisis situation.

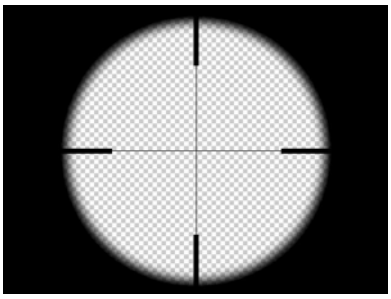
5	X4	3	2	1
almost always	often	sometimes	seldom	almost never

2 I get nervous or afraid when responding.

1	2	X3	4	5
almost always	often	sometimes	seldom	almost never

Now do the same with the full Mental Toughness Psychological Skills Profile.

MENTAL TOUGHNESS PSYCHOLOGICAL SKILLS PROFILE (MTPSP)



1. I can handle a crisis situation.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

2. I get nervous or afraid when responding.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

3. I can become distracted and lose my focus when responding.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

4. Even if nervous before I start, I can calm down when responding.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

5. Before a response, I can picture myself doing well.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

6. Goals I've set for myself keep me working hard.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

7. I am a positive thinker when responding.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

8. I eat at least two good balanced meals per day.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

9. I can lose my confidence very quickly.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

10. My body feels good, "pumped," and ready to go when responding.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

11. My thinking can get "cloudy" during a response.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

12. Even if I am not "up" to responding, I can "psych" myself up.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

13. I mentally practice my police skills.

5	4	3	2	1
almost				almost

always often sometimes seldom never

14. I am motivated to train and practice as much as possible.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

15. I can become negative on myself when responding.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

16. I get at least seven hours of sleep every night.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

17. I'm a mentally tough police officer.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

18. I easily get angry or frustrated when responding.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

19. I find myself dwelling on past mistakes when responding.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

20. I can keep my emotions positive and in control when responding.

5	4	3	2	1

almost always | often | sometimes | seldom | almost never

21. Thinking in pictures/images about performing my police skills is easy for me.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

22. More drills and training really are not necessary for me.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

23. I can change negative moods into positive ones by controlling my thinking.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

24. I smoke no cigarettes and avoid other forms of tobacco.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

25. I have faith in my ability.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

26. I wish my body wouldn't get so "revved" up during a response.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

27. My concentration is solid/hard to shake.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

28. I can clear any interfering emotions quickly and refocus on my police skills.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

29. I mentally rehearse responding in difficult situations as a way to practice my police skills.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

30. I easily get bored and burned out.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

31. My superiors and fellow officers would say I have a solid attitude.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

32. I use fewer than seven alcoholic drinks per week.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

33. I expect to succeed in my responses.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

34. I'm afraid I might lose it under pressure.

1	2	3	4	5

almost always	often	sometimes	seldom	almost never

35. The main thing on my mind during a response is applying my skills in that response.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

36. If I am too "up" or "wired," I can calm myself down.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

37. It is hard to get clear images in my mind of myself responding.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

38. Doing my job gives me a strong sense of pride and honor.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

39. I worry a lot while responding.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

40. I limit my intake of "junk food" (doughnuts, chips, etc.).

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

41. I think about screwing up even before starting to respond.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

42. I am bothered by things like my heart pounding, hand shaking or "butterflies" in my stomach during responding.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

43. I find myself "hoping" to do well rather than being confident about doing well during a response.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

44. "Choking" or "Freezing" at a critical time is a worry for me.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

45. When I mentally rehearse my responding, I can really feel all my senses rather than just "seeing myself" respond. (I can see, hear, feel, taste & smell the situation).

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

46. The greater and more difficult the challenge, the better I like it.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

47. It is hard to clear negative thoughts if they enter my mind.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

48. I engage in a regular and designed exercise at least 30 minutes at a time at least three days per week.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

49. I worry I will face a situation I can not handle.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

50. If there were something safe and legal I could "take" to keep myself calm during a response, it would really help me.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

51. During a response, my attention and skills can get overwhelmed by my body's feelings.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

52. Just thinking about engaging in a response makes me nervous.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

53. If I mentally rehearse my response skills, I see it like the actual scene and what I experience rather than like a video of myself and watching myself respond.

5	4	3	2	1
almost always	often	sometimes	seldom	almost never

54. I often question myself if I really want to do this job.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

55. Making a mistake distracts me from going on to complete the response confidently or effectively.

1	2	3	4	5
almost always	often	sometimes	seldom	almost never

56. I drink more than three cans, cups or glasses of caffeinated beverages (coffee, energy drinks) per day.

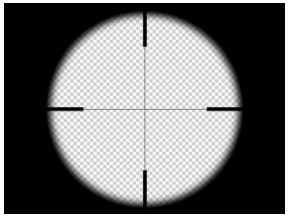
1	2	3	4	5
almost always	often	sometimes	seldom	almost never

Now that you have completed the MTPSP, you can score your results. If you look at the Mental Toughness Psychological Skills Profile Scoring Sheet, you will see that there are eight categories with numbers below them. These numbers refer to the numbers of the statements you just completed. Go back and transfer the number that indicated your level of agreement with a specific statement and enter it in the space next to the same number as the question on the scoring sheet.

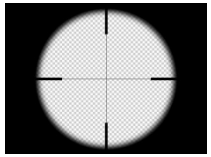
For example, if for question one, you circled or placed an X on "often," you should write the number 4 in the space for question "1" under the category of *Confidence*. If you circled or placed an X at "sometimes" for question two, you should write the number "3" in the space for question two under the category of *Physical Arousal*. Continue to do this for the rest of the statements, transferring the number representing your level of agreement with the statement to the corresponding space on the scoring sheet.

After you have done this, you should add up the numbers for each category and you will have your total score for each category. You can now graph these scores on the Mental Toughness Psychological Skills Profile to get a visual representation of your skill profile.

MENTAL TOUGHNESS PSYCHOLOGICAL SKILLS PROFILE SCORING SHEET



Confidence	Physical Arousal	Attention Control	Arousal Control	Imagery Use	Commitment	Self-Talk Use	Physical Condition
1. _____	2. _____	3. _____	4. _____	5. ____	6. _____	7. ____	8. ____
9. _____	10. _____	11. _____	12. _____	13 ____	14. _____	15. ____	16. ___
17. _____	18. _____	19. _____	20. _____	21. ____	22. ____	23. ____	24. ___
25. _____	26. _____	27. _____	28. _____	29. ____	30. ____	31. ____	32. ____
33. _____	34. _____	35. _____	36. _____	37. ____	38. _____	39. ____	40. ____
41. _____	42. _____	43. _____	44. _____	45. ____	46. ____	47. ____	48. ____
49. _____	50. _____	51. _____	52. _____	53. ____	54. _____	55. ____	56. ____
TOTALS							
_____	_____	_____	_____	_____	_____	_____	_____



MENTAL TOUGHNESS PSYCHOLOGICAL SKILLS PROFILE

	Confidence	Physical Arousal	Attention Control	Arousal Control	Imagery Use	Commitment	Self-Talk Use	Physical Condition
35 - 31 -	BULLS EYE							
30 - 25 -	ON TARGET							
20 - 15 -	NO MEDALS YET							
10 - 5 - 0 -	BASIC DRILL TIME							
	Confidence	Physical Arousal	Attention Control	Arousal Control	Imagery Use	Commitment	Self-Talk Use	Physical Condition

From Asken, M. (2005). MindSighting: Mental Toughness Skills for Police Officers in High Stress Situations. www.mindsighting.com