

Combat/Operational Stress Adaptations and Injuries

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You dance with the devil, you don't change him—the devil changes you.

— Max California in the movie “8 mm”

Men and women who participate in combat or who deploy to military operations in support of combat have always been affected by these experiences. Persistent reactions to combat and operational stress are clearly identifiable in the literature of antiquity (Shay, 1994, 2003), and military surgeons have described characteristic stress reactions at least since the 18th century (Jones, 1995b). The specific reactions experienced by warriors have changed, somewhat, from generation to generation and war to war (Jones, 1995a), but a lot has not changed over time. Terror is still terror. Grief is still grief. Courage, honor, and self-sacrifice—the most venerable of reactions to stress—still play the role they always have in military operations. And the core features of the major adverse operational stress reactions are much the same now as they were in the American Civil War (Dean, 1997) and the many wars of the twentieth century (Shephard, 2000; Solomon, 1993).

So why, then, have so many different labels been used over the past three centuries to describe the adverse reactions of warriors to combat and operational stress? And why now, in the 21st century, are we still not sure what to call stress reactions on the battlefield? Although it is not the goal of this chapter to answer these questions, it will nevertheless be useful to do a little reconnaissance of them before developing a framework for understanding and classifying combat and operational stress reactions.

Problems with Labeling Combat/Operational Stress Reactions

Two factors have shaped every attempt in modern history to name and classify combat/operational stress reactions: (1) ethical dilemmas surrounding the labeling of wartime stress reactions because of the sometimes profound effects such labels can have on individual combatants as well as on the military units in which they serve; and (2) shifting and reductionistic theories about the nature and causes of mental and behavioral problems of all types, including operational stress reactions.

The Ethics of Labeling Combat/Operational Stress Reactions

Labels, especially psychiatric medical diagnoses, can have profound consequences, both for good and ill (Reich, 1991). Classifying a pattern of behavior or inner experience as a medical diagnosis can reassure troubled individuals that they are not alone and that their behavior and experience make sense. Diagnostic labels can also offer exculpation, or at least mitigation, to the extent they imply that individuals are afflicted with something outside of their control. Prior to the Age of Enlightenment in the 18th century, deviant behavior was often ascribed to demonic possession, sin, or fate (Porter, 2002), and the only label in wide use in the Middle Ages to describe the vice of failing to perform one's duties on a battlefield was "coward." Since both demonic possession and cowardice have historically been punishable by death, untold lives have been saved in recent centuries just by giving combat stress reactions a medical label. Medical diagnoses, to the extent they are based on standardized criteria, also allow scientific study of syndromes and disorders, including research on how they may be prevented and treated.

Diagnostic labels can also harm individual warriors and the military units in which they serve. Psychiatric labels of all kinds carry a heavy burden of stigma, particularly among warfighters whose profession requires them to remain calm, focused, and in control regardless of adversity. Psychiatric labels imply, for them, not only weakness but a failure in their core to live up to the warrior ideal. Like weapons found on close inspection to have defective firing pins, psychiatrically-labeled warfighters can lose the trust of their superiors, and their own trust in themselves. Many modern warriors would rather be diagnosed with cancer than with depression, anxiety, or—worst of all—posttraumatic stress disorder. To the extent they explain and absolve stress symptoms on a battlefield, labels of any kind can also seem to give permission to individuals to quit striving to master their own stress symptoms. The popularization by the European media of the “shell shock” diagnosis during the First World War, for example, doubtless contributed to the droves of combat stress casualties sent home from the trenches of France (Moran, 1967/1945; Shepherd, 2000). Military leaders strive to keep their troops on the front lines focused outwardly, on their mission, instead of inwardly, on their stress symptoms. Labeling combat/operational stress reactions makes the job of military leaders more difficult because it invites introspection and because it blurs the line between what is a disciplinary problem and what is a health problem.

Given the problems associated with medicalizing and pathologizing operational stress problems, both for individual combatants and military leaders, a shift occurred during the twentieth century toward normalizing stress reactions of all types—to see them as “a normal adaptive process of reaction to an abnormal situation” (Lifton, 1988, p. 9).

Since WWI, one of the abiding principles of war psychiatry has been “expectancy”—a continuous attitude toward stress casualties that they are not ill or sick, but will soon recover and return to full duty (Wessely, 2005). Stress casualties have been kept separate from the physically wounded, and if given any label at all, they have been classified as having something benign like “battle fatigue,” “exhaustion,” or “combat stress reaction.” The avoidance of labeling and a focus on normalization have also long been central to civilian crisis management efforts.

Normalization has proven effective at encouraging warriors to recover from their stress reactions and return to duty (Kormos, 1978; Wessely, 2005), but perhaps at the price of discouraging acknowledgement and treatment of stress reactions when they occur. After WWII, when as many as 10% of all combatants in heavily-engaged armies were treated at some point for adverse stress reactions, the rates of diagnosed battlefield stress casualties declined to 3.7% in the Korean War and 1.2% in Vietnam (Bourne, 1969). Although stress casualty rates have not been published for Operation Iraqi Freedom, it is likely that they are lower in that conflict than even in Vietnam. There are many positive reasons for declining rates of diagnosed battlefield stress casualties. Much shorter operational tour lengths, all-volunteer forces, and advances in training and leadership have all contributed to the resiliency of the military. However, to the extent stress reactions in combat have been redefined as merely “normal,” they have also become progressively less likely to receive any attention from anyone other than a buddy or small unit leader. Low rates of battlefield stress casualties do not necessarily predict low rates of eventually-diagnosed stress problems. The mental health problems

experienced by Vietnam veterans after their war ended attest to the gap between identified battlefield stress casualties in Vietnam and the true extent of operational stress reactions generated in that conflict. Hoge et al. (2004) found 17% of heavily-engaged infantrymen to self-report significant stress symptoms 3-6 months after returning from Afghanistan or Iraq. But stigma and fear of negative career consequences prevented many of them from seeking care.

Having been told their stress symptoms are merely “normal,” how can warriors with persistent stress symptoms ever admit to themselves or anyone else they need help? As Shalev (1996) pointed out, the “normal response” hypothesis implies that recovery from stress reactions should always be possible. How can warriors not blame themselves if they find themselves in the minority who fail to recover?

On one side of this ethical dilemma lies the danger of crippling normal warriors and depleting their ranks by pathologizing commonplace reactions to everyday military operations. On the other side is the danger of trivializing the moral, psychological, and biological damage that can result from severe and persistent stress, thereby discouraging the wounded from seeking care. Although this conundrum may be no better solved today than it was a century ago, we can at least try to keep both Scylla and Charybdis in full view as we navigate the ethical strait between them.

Shifting Theories about the Causes of Operational Stress Casualties

Since the 18th century, when the Age of Enlightenment first encouraged reason and empirical observation to replace superstition and irrationality in all human endeavors, a parade of labels and mutually exclusive theories have been used to describe and explain

operational stress reactions. The first recorded label for a combat stress reaction was “nostalgia,” which literally means homesickness, but which was often significantly more disabling than a mere longing for home. For example, the Austrian internist Josef Leopold Auenbrugger described nostalgia in 1761 (as cited in Jones, 1995a, p. 6) as follows:

When young men who are still growing are forced to enter military service and thus lose all hope of returning safe and sound to their beloved homeland, they become sad, taciturn, listless, solitary, musing, full of sighs and moans. Finally, they cease to pay attention and become indifferent to everything which the maintenance of life requires of them.

The causes of nostalgia were believed to be largely psychological and social, including prolonged separation from home and family and loss of hope of ever getting back home (Jones, 1995a). During the American Civil War, the most common label for combat stress reactions continued to be nostalgia (Dean, 1997), but many other diagnoses were used, some reflecting a growing belief that adverse stress reactions could be caused by actual physical damage to the brain and body. Other operational stress diagnoses during the Civil War included insanity, sunstroke, and “irritable heart” or “trotting heart” (Dean, 1997), the latter two diagnoses referring to the paroxysms of rapid heart rate at rest that often accompanied what we now call panic attacks. This shift in theory and labeling in the 19th century followed the medical discoveries that mental illness could be caused by physical damage to the brain, such as by an infection with syphilis or heavy alcohol use.

These two divergent views of causation—psychological versus biological—found champions at the end of the 19th century in two physicians who studied mental trauma in civilians, Sigmund Freud and Pierre Janet. Both Freud and Janet described the phenomenon of dissociation—currently defined as a disruption in the usually integrated functions of consciousness, memory, identity, or perception (American Psychiatric Association, 2000)—in the immediate aftermath of a traumatic event (Breuer & Freud, 1957/1895; Janet, 1920/1907). And both believed that dissociation was a key element in the development of psychopathology after a traumatic experience (Nemiah, 1998). But while Freud saw the fragmentation of consciousness in dissociation as a self-protective defense mechanism intended to keep overwhelmingly disturbing perceptions or feelings out of consciousness, Janet believed dissociation was due to an innate failure to integrate information in the brain under the impact of a “vehement emotion” (van der Kolk, Weisaeth, & van der Hart, 1996). In Freud’s view, dissociation at the moment of trauma was a “deliberate and intentional” *choice* (Breuer & Freud, 1957/1895, p. 123), albeit an unconscious one. In Janet’s view, on the other hand, dissociation was a symptom of a *breakdown* of brain function, a loss of adaptation (van der Kolk & van der Hart, 1989). This difference in theory of causation makes all the difference in treatment and prognosis. For Freud, conscious recall of repressed traumatic memories was curative; for Janet, attempts to recall traumatic memories before they were somehow detoxified would only again overwhelm the brain’s integrative capacity and cause further breakdown (Nemiah, 1998).

The succession of labels used to describe operational stress reactions in the 20th century can be understood partly as an ongoing debate between those who believed such reactions were psychological in origin, and those who believed they had primarily biological causes (Shephard, 2000). “Shell shock” in the First World War conveyed the belief, at the time, that the varied and sometimes bizarre symptoms observed in the trenches of France were caused by physical damage to the brain from proximity to the explosion of artillery shells. Every attempt to find evidence of physical damage to the brain in shell shock cases failed, however, which steered theories of causation away from the biological and toward the psychological. Although the diagnosis of “neurasthenia”—which refers literally to an exhaustion of the nervous system—was used in both world wars, the purely psychological labels “traumatic neurosis” and “war neurosis” gained prominence in WWII. “Neurosis” was a concept which grew out of the Freudian psychoanalytic movement in the early twentieth century, defined as symptoms produced by “emergency discharges” of psychic energy dammed up by unconscious conflict (Fenichel, 1945, p. 20). Shell shock and neurasthenia were considered “hardware” problems; war neurosis was thought to be a “software” problem. By the end of WWII, the most commonly used labels were “battle fatigue” and “exhaustion,” both reflecting a psychological rather than a biological etiology. Citing war psychiatry experience in both world wars, Kormos declared in 1978, “fortunately, it is a relatively settled matter. All sources appear nowadays to be in agreement that we are dealing with a functional entity” (Kormos, 1978, p. 12).

After Vietnam, an explosion in research on persistent war-related stress disorders led to the official recognition in 1980 of Posttraumatic Stress Disorder (PTSD; American Psychiatric Association, 1980). At the same time, American psychiatry embraced the “Biopsychosocial Model,” an integrative theoretical orientation based on the premise that all mental and behavioral problems have simultaneous causes in the biological, psychological, and social spheres (Engel, 1980). Since then, PTSD has become a paradigm of a true biopsychosocial disorder, with well-documented physical, mental, and interpersonal components (see chapter 4, this volume). But partly because of continued efforts to keep combat stress reactions de-medicalized and distinct from mental disorders like PTSD, etiological theories regarding battlefield stress casualties have not kept pace. In his chapter on “Traditional Warfare Combat Stress Casualties” in the U.S. Army’s current *Textbook of Military Medicine*, Franklin Jones (1995b, p. 37) wrote:

It is important to remember that most psychiatric casualties are soldiers who, because of the influence of negative psychological, social, and physiological factors, unconsciously seek a medical exit from combat.

This view of combat stress reaction as a choice rather than an affliction is still widely held. In what follows, reductionistic views of causation will be challenged, and an alternate system of description and classification will be offered. The central premise of this chapter is that although many reactions to the stress of war are adaptive choices, the worst reactions are truly injuries. And all combat/operational stress reactions have biological, psychological, and social components.

Conceptual Foundation: Defining Stress and Adaptation

Over the past century, many definitions for the word “stress” have been offered, but none has encompassed all the usages of the term even in the scientific community (Lazarus & Folkman, 1984). Perhaps one reason for this is that stress is not a unitary concept, but rather a collection of many interacting variables and processes—in the body, in the mind, and in relation to the outside world. More than that, stress may best be understood as a *transaction* between each individual’s unique biology and his or her environment, mediated by a multitude of psychological and social processes (Aldwin, 1994). In the course of adapting to stress, genes and chemical processes affect and are affected by conscious coping choices, personality styles, and interpersonal relationships.

Stress and Adaptation as Biological Processes

The modern study of stress began with the work in the 1930’s of the Hungarian endocrinologist, Hans Selye, who discovered the mammalian biological stress response almost by accident. While attempting to isolate a new sex hormone by repeatedly injecting rats with ground-up extracts of rat placentas, Selye (1956) was excited to find that these injections of ground up placenta provoked a consistent pattern of physiological response—hypertrophy of the adrenal glands, stomach ulcers, and atrophy of the thymus gland (which is involved in the immune response). To be sure that these physiological changes were really due to a new endocrine hormone contained in the extract, and not just nonspecific damage to the animals from the ground up tissue he had injected, Selye then injected rats with a weak solution of formaldehyde, a chemical fixative that destroys living tissue. To his dismay, rats injected with formaldehyde also developed the same triad of physiological changes to their adrenal glands, stomach linings, and thymus

glands. As a physician, Selye was also aware that human patients demonstrate similar physiological changes after suffering from chronic illnesses of many kinds. Perhaps, he reasoned, the triad of physiological changes he discovered represented the generic response of mammalian biology to *any* environmental demand or noxious agent.

Subsequent experiments by Selye and others confirmed this hypothesis. It has been found that the same hormonal and immunological changes occur in the bodies of laboratory mammals after being subjected to a wide variety of physical, mental, and social challenges, including cold, prolonged exposure to predators, forceful immobilization, overcrowding, and infection, among others (Selye, 1950). And humans have been found to have almost identical physiological reactions to life stressors of various kinds. Based on these findings, Selye (1956) came to the conclusion that “*stress is the nonspecific response of the body to any demand*” (p. 74). Stress, in Selye’s view, was a biological process in response to any challenge, external or internal. To differentiate the process of stress as a reaction to a challenge from the challenge, itself, Selye coined the term “stressor” for the agent that provoked the stress response. The stressor is the challenge, and stress is the process by which the organism adapts to the stressor. Selye called the predictable pattern of biological response to stressors of all kinds the General Adaptation Syndrome (GAS).

Time Course of Adaptation

Having discovered the biological stress response—the GAS—Selye went on to study how it evolved and changed over time. He found that the GAS was a process that (a) took time to develop in response to a stressor, (b) consumed energy, and (c) could not,

in most cases, be sustained indefinitely. A simple example will illustrate these three characteristics of the GAS. Imagine someone dropping a moderate weight into the palm of your outstretched hand after asking you to hold your arm as steady and horizontal as possible. Initially, your arm would dip under the impact of the weight, and it would take a few moments for your nervous system to recruit additional muscle fibers to the task of trying to keep your arm horizontal. After this initial adjustment period, your arm and shoulder would steady and settle into the work of resisting the pull of gravity on the weight. But eventually, resources would be used up by your contracted muscle fibers, lactic acid would build up, and an increasingly painful exhaustion would force you to drop your arm.

Accordingly, Selye divided the time course of the GAS into three phases, as illustrated in figure 1. In the first phase, the *alarm* phase, the organism mobilizes its resources to respond to the challenge it faces. Initially, its performance worsens under the impact of the stressor. Then, as adaptive changes take place, the organism's performance improves and it develops a phase of *resistance* to the negative effects of that particular stressor. The final phase is fatigue or *exhaustion*, during which adaptive resistance to a stressor is lost and a period of recovery may be necessary before an adaptive response can again be mounted to the same stressor. Depending on the nature of individual stressors and the biological systems that respond to them, the three phases of adaptation may be short or long, and the time dimension in the GAS may represent adaptive changes that occur over minutes, days, or months. Whether one charted the response of the body

to the stress of an all-out sprint during a firefight or the stress of a year-long operational deployment, the phases and their relationship would be much the same.

Selye noted that in most instances, adaptive responses do more than just return the functioning of organisms to their previous baseline. Physiological adaptation is more than just a homeostatic mechanism. In many cases, adaptation to a stressor results in *improved* functioning and performance in one way or another. In the example just given above, recruitment of muscle fibers would enhance strength for the moment. Over a longer time period, of course, repeated exposure to the stress of lifting the same fixed weight would build muscle mass and power. The fact that the performance of organisms or their component parts typically improves as they adapt to stressors led Selye to introduce the concept of “eustress,” which he defined as the stress which is *necessary* for optimal functioning. Stress is necessary for the development of the body and the mind (Aldwin, 1994), and the benefits to warfighters of repetitive exposure to optimal stress underlies all training in the military.

Stress and Adaptation as Psychological Processes

The concepts of stress and coping have also been important organizing constructs in psychology over the past century (Lazarus & Folkman, 1984). In one guise or another, adaptation to stress has been a central theme in psychoanalysis, health psychology, behaviorism, and cognitive psychology. In all these theoretical systems, successful adaptation to the stressors of life has been declared to be crucial to mental health and

well-being. However, compared to biological reactions to stress, adaptive responses in the cognitive, emotional, and behavioral spheres are much more diverse and variable, both between individuals and within each individual at different points in time. The responses of the body to stress are largely determined by fixed, inherited gene programs, while mental and behavioral responses to stress are the product more of learning and choice. As such, they are virtually unlimited in their variety and capacity to change over time.

Three components of psychological adaptation to stress are worthy of at least brief review: (1) reflexive and automatic responses to stress; (2) coping as conscious, volitional adaptation; and (3) appraisal as prelude to adaptation

Reflexive and automatic responses to stress. Reflexive behavioral responses to stress are those that lie at the end of the spectrum farthest from choice and free will because they are largely fixed and determined by gene programs. Examples include startle reactions to loud noises, and freezing, fleeing, or reflexly striking back in response to an external danger. Reflex behaviors operate entirely outside of conscious, voluntary control, as was noted by Charles Darwin (1915/1872) in his observations on emotional expression. In a demonstration of the independence of reflexive behaviors of willpower, Darwin attempted and failed to hold his face up against the glass of a terrarium containing a deadly viper as it repeatedly struck at him.

Less biologically-determined responses to stress that seem, in their activation, almost as automatic as instinctive reflexes are what Lazarus (1999) and Lazarus and Folkman (1984) referred to as automatized responses. These are behavioral response

patterns that have been learned through repeated practice to the point of no longer requiring conscious decision-making. All complex skills, such as playing a musical instrument and driving a car, cannot be performed efficiently until they have been automatized through repeated practice. The goal of all military training is to arm each warrior with a set of automatized response patterns that can be trusted to reliably occur in operational situations, regardless of the perceived danger or stress level. Automatized response patterns are, however, almost as fixed as biologically-determined reflexive behaviors, since they cannot easily be modified without practice and retraining.

Another class of automatic psychological stress responses that are not learned through training and practice are the *defense mechanisms* that form part of the unconscious adaptive repertoire of every individual. Defenses are habitual but unconscious mechanisms of adaptation (Vaillant, 1977) that protect the individual against conscious awareness of painful thoughts, feelings, or perceptions. They range from the most mature and effective defenses such as altruism, suppression, and humor to the least mature defenses such as splitting and projection. One particular defense mechanism that deserves special note in a discussion of adaptation to combat is *denial*. Denial can be defined as “the unconscious repudiation of some or all of the available meanings of an event to allay anxiety or other unpleasurable affects” (Dorpat, 1987, p. 24). Denial is not the avoidance of conscious awareness of the existence of an anxiety-producing stimulus; it is, rather, the avoidance of full awareness of the *meaning and significance* of that stimulus. Although once thought to be always pathological and maladaptive, denial has more recently been understood to be a necessary component of adaptation to severely

stressful situations. To remain effective, warriors must remain aware of the existence of incoming fire at the same time they deny themselves a full appreciation of the danger posed by that fire (Grossman, 1995, 2004). Likewise, they must deny to themselves a full awareness of the effects on enemy combatants and civilian bystanders of their own fires.

“Coping” as conscious, effortful adaptation. The responses to stress that are most characteristic of us as humans are those mediated by conscious decision making and effort. They are also the components of stress response that account for much of the variation in adaptive styles among individuals, including individual susceptibilities and vulnerabilities to stress. Furthermore, the conscious, volitional components of coping are the ones that are the most amenable to modification through training, leadership, and esprit de corps in military units. For all these reasons, volitional coping deserves particular attention.

Lazarus and Folkman (1984) defined coping as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). The goals of coping, in their view, are not only mastery over the environment and problem solving, but also “managing emotions and maintaining self-esteem and a positive outlook, especially in the face of irremediable situations” (p. 139). The goal of coping is not merely to survive a severe stress, but to transcend it through courage, creativity, and growth. Effective coping not only manages suffering and adversity (Lazarus, 1999), but finds meaning in it (Frankl, 1984/1946).

Warfighters in a war zone can be incredibly creative in their development and use of coping strategies. Letter writing has long been an effective tool for deployed warriors to not only retain contact with loved ones back home, but to weave their experiences into coherent narratives in order to make sense out of them. Modern information technologies such as e-mail and instant messaging have raised the coping strategy of “letters from the front” to a new level of immediacy and impact. Digital cameras have also permitted warfighters to create photo journals of their experiences, sometimes even set to music selected to give the images the greatest meaning. Giving support to fellow combatants and receiving support from them continue to reign as the monarchs of battlefield coping strategies. Relationships forged in battle may be the most profound and honest of any that warfighters will ever have in their lives. Humor and play are everywhere in the war zone, even under the most dire of circumstances. And many deployed warfighters experience an epiphany of religious faith that can do much to neutralize the toxic effects of combat and operational stress. One of the most humanizing experiences possible in a war zone is the mere conscious awareness that, however much one may be buffeted by external factors outside of one’s control, there are always still choices to be made. And these choices may not only save lives, but give meaning to otherwise chaotic experiences.

Appraisal as prelude to coping. The first step in the process of adaptation in humans is *appraisal* (Lazarus & Folkman, 1984). Sights, sounds, smells, and physical sensations do not have meaning for an individual until they are analyzed in their full context, including dangers posed and resources available to meet those dangers. On a forward operating base in Iraq, for example, the sound of nearby small arms fire would

produce one response in individuals who appraised those sounds as coming from peers on a practice range, and another response in those who appraised them as coming from enemy forces attempting to breach the defenses of the base. It has long been a tenet of cognitive psychology that conscious appraisal is a crucial determinant not only of behavioral responses to stressors, but also of emotional responses to them (Lazarus, 1999). In their study of combat and operational stress among aircrews in World War II, Grinker and Spiegel (1945a) described the process of appraising and responding emotionally to threatened losses—whether the loss threatened was personal injury or death, harm to someone else who was loved, or failure to meet one’s own expectations at a crucial moment:

The emotional reaction aroused by a threat of such a loss is at first an undifferentiated combination of fear and anger, subjectively felt as increased tension, alertness, or awareness of danger. The whole organism is keyed up for trouble, a process whose physiological components have been well studied. Fear and anger are still undifferentiated, or at least mixed, as long as it is not known what action can be taken in the face of the threatened loss. If the loss can be averted, or the threat dealt with in active ways by being driven off or destroyed, aggressive activity accompanied by anger is called forth. This appraisal of the situation requires mental activity involving judgment, discrimination and choice of activity, based largely on past experience. If on the basis of such mental activity it is seen that the loss cannot be averted, the situation is hopeless and nothing can be done, then anxiety develops. (p. 122)

Individual differences in appraisal of stressful situations account for much of the difference in how individuals adapt to them (Lazarus & Folkman, 1984). This fact is important for understanding how to build resiliency in warfighters by modifying their appraisal of operational stressors through training, leadership, and unit cohesion. But it is also crucial for assessing individual risk for adverse stress reactions, since those most vulnerable will be those who appraise given situations as entailing the greatest personal loss.

Stress and Adaptation as Social Processes

The importance of social support in adaptation to extreme stress cannot be underestimated. Just as families, under ideal conditions, provide shelter, nurturance, and guidance for family members, relationships in cohesive military units are vital to the survival of each individual in them. Shared danger intensifies attachments, partly because each person's survival lies literally in the hands of his peers (Elder & Clipp, 1988). The resulting close social network buffers intense, negative emotions, and makes each dangerous encounter seem less threatening (Cohen, Gottlieb, & Underwood, 2000). As Boston psychiatrist Jonathan Shay (2002) so beautifully stated, the "*human brain codes social recognition, support, and attachment as physical safety.*" (p. 210)

Effective military leaders can also promote adaptation in their subordinates to extreme stress, under ideal conditions. Grossman (1995) likened an effective military

leader to a “well of fortitude” into which subordinates could repeatedly dip to restore their own flagging courage.

Of course, relationships can also have a negative impact on adaptation (Lazarus, 1999). Warfighters who are new to their units, such as replacements for combat losses, may have a particularly difficult time since they are initially excluded from the sustaining network of attachments in the unit. And to the extent warfighters depend on attachments in their units for their emotional survival, they are vulnerable to a catastrophic failure of adaptation if those attachments are abruptly lost (Elder & Clipp, 1988).

Stress Adaptation Summed Up

Three additional aspects of stress adaptation may help integrate the above theory on the biological, psychological and interpersonal components of adaptation, and make it easier to apply to real-life adaptive processes in a war zone. The first is a grouping of all adaptive processes into one of three tactical categories—accommodate, neutralize, or disengage. The second is another look at the time course of adaptation, this time with combat action and operational deployment in mind. The third is the reversibility of adaptive responses to stress.

Three Tactics of Adaptation: Accommodate, Neutralize, or Disengage

The point of all biological, psychological, and interpersonal adaptive processes—whether conscious or unconscious, voluntary or involuntary—is to restore lost homeostasis, to reduce alarm and anxiety, and to grow and develop through mastering challenges. However, moment to moment, it may be hard to see how specific adaptive tactics may lead to these strategic goals. Or working backwards, it is hard to identify

which thoughts, feelings, and behaviors are adaptive if one uses the strategic goals of adaptation as a yardstick. For this reason, it may be useful to conceive of all adaptive responses as falling into one of three tactical groups, the goals of which are much simpler. The three *tactics* of adaptation, moment to moment, are: (1) to change oneself to *accommodate* to the challenge faced, (2) to *neutralize* or eliminate the challenge, or (3) if neither of the first two tactics are possible, to *disengage* cognitively or emotionally from the source of the stress, in order to become numb to it (Nash, 1998). An example from civilian life may help illustrate these three tactics of adaptation.

Imagine a group of recreational runners deciding to enter their first ever marathon race. Having never run 26.2 miles before, the runners would have to begin a program of tough training, running longer and longer miles at a faster and faster pace. The physical challenges of training would build power and endurance—force the runners’ bodies to change to accommodate to the stress of distance running. But the training program would also promote adaptation in the runners’ minds by building their self-confidence, focus, and will to endure. In addition to allowing themselves to develop and change in response to training, the runners would also seek ways to reduce the challenge of a marathon run—to neutralize the stress as much as possible. Of course, there is no way to shorten the course or make it flatter or downhill the whole way. The course is fixed. But runners can reduce the challenge of a marathon run in many smaller ways, such as by wearing optimal clothing, staying hydrated and nourished, and running in a pack to reduce wind resistance and the mental strain of running alone. No matter how hard runners may train, and regardless how clever they may be about reducing the impact of the challenges they

face, however, it is impossible for them to make a 26.2 mile race easy. They will still suffer, both physically and mentally. To adapt to the challenge that is left after the runners have changed themselves as much as possible through training, and neutralized aspects of the challenge as much as possible through other actions, they simply have no choice but to make themselves numb to their own suffering—to disengage mentally from it.

In an operational theater, stressors come fast and furious, and they pile high and deep. Through training and experience, warfighters can accommodate to some of them—they can change themselves physically and mentally to be as suited as they can be to meet the challenges they face. And through the proper equipment, teamwork, and leadership, they can neutralize, or at least mitigate, a portion of the stress of war. But most of the danger, hardship, and ugliness of war cannot be removed by any amount of training or leadership. For the worst stressors of war, the only tactic available is controlled mental and emotional disengagement—to become as numb and unaware as necessary to endure and survive. Disengagement is partly a cognitive tactic involving denying the magnitude and significance of stressors. It is partly an emotional tactic involving dampening emotional reactions to stressors. And it is partly a physiological tactic, involving reducing the responsiveness of the nervous system through high levels of stress chemicals in the brain and body. Disengaging mentally from a severe challenge sufficiently to make it bearable while still maintaining focus and control is a skill that must be learned through repeated exposure to tough challenges. Toughness, a sine qua non for a warrior, is built on controlled and reversible mental disengagement from unavoidable stress.

The Stages of Adaptation: Dread, “In the Groove,” and Rebound or Fatigue

Hans Selye’s General Adaptation Syndrome, describing the time course of biological adaptation to stress, was discussed earlier and diagrammed in figure 1. Selye knew his GAS applied to the non-biological aspects of adaptation as well as the biological. Regardless of whether an adaptive response is mediated by the body, the mind, or social relationships, adaptation takes time and effort, and it cannot be sustained, in most cases, forever. Selye’s GAS may be more easily applied to the adaptation of warfighters to the challenges of war, however, by flipping it upside down, as shown in figure 2. Diagrammed in this way, the curve traces the time course of *perceived stress*, from the initial peak of stress caused by alarm or dread, through a period of reduced perceived stress while “in the groove,” to a final re-emergence of perceived stress either due to fatigue or rebound once a danger has passed. The timeline of figure 2 can be minutes, hours, days, or months. The time course of adaptation is the same regardless of the duration of a stressor. Two examples will help illustrate.

Before a planned combat action, most warfighters experience a period of uneasiness and agitation because of the unknowns they face and because, before the action begins, there is little they can do to actively master their stress. With the commencement of combat, however, the pre-action dread dissipates quickly, especially for veterans of combat. Most warriors then quickly get into a groove—a period of exceptionally low perceived stress, during which their thinking is clear, perceptions are sharp, and emotions are calm. The “in the groove” period may last the duration of a combat action, if it isn’t too long or too overwhelmingly stressful. Once the action ends,

however, perceived stress shoots back up as warfighters emerge from their emotional and physical numbness and review in their minds and perceive in their bodies all the dangers and horrors they may have experienced. The veteran warfighter quickly masters this rebound stress, however, and perceived stress returns to baseline.

As a second example, consider the time course of the stress of an entire deployment to a combat theater. The dread of deployment, for some warfighters, begins long before they pack their duffle bags. Anticipation of dangers and losses, and of separation from family and friends, can progressively heighten pre-deployment anxiety. When warfighters finally set their boots down in the war zone, their initial dread may dissipate to some extent, but only to be replaced by the physiological and psychological alarm caused by the operational stressors encountered. It is no accident that the first three months of an operational deployment are when the majority of stress casualties may occur (Tischler, 1969). It is easier for those who have been there before, perhaps, but it takes time for warfighters to adapt to the hardships and dangers they face day in and day out—to get into the groove of deployment. The subsequent period of sustained adaptation during a deployment may last for many months, but since adaptation takes work and consumes resources, it cannot be sustained forever. If operational stressors are intense enough and last long enough, eventually warfighters become fatigued and their perceived stress level gradually rises. But even if the length and rigor of a deployment does not exceed the capacity of individual warfighters to adapt and cope while deployed, eventual redeployment out of the operational theater will cause a rebound increase in their perceived stress level much like that which follows short combat actions, only of longer

duration. The new stressors associated with being home again—of returning to an environment that is familiar but to which the warfighter is no longer adapted—add to the perceived stress of homecoming.

The Reversibility of Adaptation

All adaptive responses, if they are truly mechanisms *chosen* by individuals or their biological machinery to master challenges, must be reversible. However bent over a tree may grow to adapt to the wind blowing across a precipice, the tree retains the ability, at least theoretically, to grow back the other way if the wind direction changes. But just as adapting to a stress takes time and effort, re-adapting to the absence of that stress also takes work and cannot be accomplished instantaneously. After warfighters return home from fighting urban, counterinsurgency warfare, for example, they may continue for some time to scan strangers on the street for weapons or change lanes on the highway to avoid passing too close to a pile of rubbish that, in the war, might have hidden an improvised explosive device (IED). But unless warfighters' biological and psychological adaptive machinery has been damaged by the war, the adaptive changes that occurred during deployment should be reversible afterward.

Stress Injuries: Beyond the Limits of Adaptation

There are compelling reasons to believe that the human mind, like the body, has a limited capacity to withstand external forces without suffering damage. Among them are the following:

- U.S. Army researchers during WWII found that the rates of stress casualties were proportional both to the intensity of combat (measured by the rate of physical

wounding and death in battle) and to duration of combat. In the Italian campaign, for example, Appel and Beebe (1946) found that the breaking point for most individuals occurred after 88 days of combat in which at least one friendly casualty was sustained (210 calendar days, on average, in that theater). These and other observations on the epidemiology of combat/operational stress led to the military psychiatry principle of “ultimate vulnerability”—in other words, “everyone has a breaking point” (Jones, 1995a).

- Screening programs to weed out in advance those vulnerable to operational stress disorders have always failed to actually prevent such disorders (Copp & McAndrew, 1990; Shephard, 2004; Wessely, 2005). Ultimately, everyone is vulnerable.
- While adaptive strategies for coping with stress are almost infinitely variable, constrained only by opportunity and individual imagination, persistent adverse reactions to overwhelming stress tend to fall in one or more of a small number of remarkably predictable syndromic patterns. Combat stress casualties are fundamentally different in their nature from adaptive coping strategies; they are not choices, but afflictions.
- Research on the neurobiology and psychology of overwhelming stress has found a number of consistent patterns of persistent dysfunction in the brain and mind (see chapter 4, this volume).
- Individuals exposed to overwhelming stress have consistently described subjective experiences of feeling helpless to control or modulate their reactions to

- the stress. Rather, trauma is often experienced as a discontinuity or fracture of the self (Laufer, 1988; Lifton, 1988), and the subjective experience of helplessness during a traumatic experience typically provokes significant and persistent shame.
- Individuals exposed to overwhelming stress may be permanently changed by their experience, though not always negatively. Stress symptoms that develop during an operational deployment sometimes continue long after return from the war. Adverse stress reactions are often not reversible, although they can certainly heal.

The word “trauma” comes from the Greek word for wound. Although this term may have originally been intended metaphorically when first used in connection with stress, there is increasing reason to believe that overwhelming stress can inflict literal injuries in the brains and minds of warfighters and civilians. The term “injury” has significant advantages when communicating with warfighters about the nature of their reactions to severe stress and how best to care for them. Warriors understand that stress injuries, like sports injuries, may be unavoidable, at times—they are just part of the cost of doing what they do. And like sports injuries, most stress injuries heal up quickly, even without professional attention. But also like sports injuries, stress injuries are most likely to heal quickly and completely if warfighters monitor themselves for symptoms of injury, and take proper care of those injuries that are sustained. The Canadian military has found that applying the term “stress injury” to persisting operational stress problems has helped destigmatize them (chapter 16, this volume). “Injury” also just happens to be the most accurate description of how overwhelming stress affects the mind and brain.

Several approaches have been used to categorize combat/operational stress injuries according to their phenomena (Kardiner & Spiegel, 1941; Grinker & Spiegel, 1945b; Solomon, 1993). But the shifting and polymorphic nature of stress injuries makes classification by symptoms difficult. The approach that will be used here, rather, will be to divide combat/operational stress injuries into three categories based on precipitating stressors—*traumatic stress*, caused by the impact of terror, horror, or helplessness; *operational fatigue*, caused by the wear-and-tear of accumulated stress; and *grief*, caused by the loss of someone or something that is highly valued.

Traumatic Stress: An Impact Injury

The core feature of psychological trauma is exposure to an event that is so toxic that a full and immediate adaptive response to it is impossible. Traumatic stress causes an impact injury to the mind and brain just as falling from too great a height will inflict an impact injury to the body. What makes a particular stressor toxic for a particular individual at a particular point in time is a bit more complex, though, than what causes a fall to break a bone. And the symptoms of traumatic stress injuries are more subjective than the swelling, bruising, and X-ray findings that signal a fracture. Nevertheless, a predictable symptom pattern has emerged in traumatic stress injuries of many types, including those common to combat. Although it is not without controversy (Bryant & Harvey, 2000; Marsall, Spitzer, & Liebowitz, 1999), the DSM-IV-TR diagnosis of Acute Stress Disorder (ASD) best describes the features of traumatic stress injury (American Psychiatric Association, 2000, p. 471):

- A. The person has been exposed to a traumatic event in which both of the following were present:
- (1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
 - (2) the person's response involved intense fear, helplessness, or horror
- B. Either while experiencing or after experiencing the distressing event, the individual has three (or more) of the following dissociative symptoms:
- (1) a subjective sense of numbing, detachment, or absence of emotional responsiveness
 - (2) a reduction in awareness of his or her surroundings (e.g., “being in a daze”)
 - (3) derealization
 - (4) depersonalization
 - (5) dissociative amnesia (i.e., inability to recall an important aspect of the trauma)
- C. The traumatic event is persistently reexperienced in at least one of the following ways: recurrent images, thoughts, dreams, illusions, flashback episodes, or a sense of reliving the experience; or distress on exposure to reminders of the traumatic event.
- D. Marked avoidance of stimuli that arouse recollections of the trauma (e.g., thoughts, feelings, conversations, activities, places, people).

- E. Marked symptoms of anxiety or increased arousal (e.g., difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated startle response, motor restlessness).
- F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or impairs the individual's ability to pursue some necessary task, such as obtaining necessary assistance or mobilizing personal resources by telling family members about the traumatic experience.
- G. The disturbance lasts for a minimum of 2 days and a maximum of 4 weeks and occurs within 4 weeks of the traumatic event.
- H. The disturbance is not due to the direct physiological effects of substance (e.g., a drug of abuse, a medication) or a general medical condition, is not better accounted for by Brief Psychotic Disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder.

There are two parts to the DSM-IV-TR definition of a traumatic event. The first is a significant threat to the life or physical integrity of oneself or someone else in close proximity. The second is the person's response to the threat, which must involve terror, horror, or helplessness in order for the threat to qualify as traumatic. Threats vary in their ability to provoke terror, horror, or helplessness in the average person. In the author's experience with warfighters who had served in Afghanistan and Iraq, among the most potentially traumatic combat events were witnessing the violent death of a buddy or

valued leader, being responsible for the death of unarmed children, failing to save a buddy from death or serious injury, friendly fire, witnessed atrocities, or surviving an unexpected assault in which many friendly casualties were suffered, such as a vehicle-born IED attack or a large ambush. But combat of any kind is potentially toxic. In their study of soldiers and Marines 3-6 months after OEF and OIF-I, Hoge et al. (2004) found a strong positive correlation between number of firefights and severity of traumatic stress symptoms.

One of the controversial features of the DSM-IV-TR diagnosis of ASD is the time course criterion. ASD cannot be given as a diagnosis to stress injured warfighters until their symptoms have persisted for more than two days after a traumatic event. DSM-IV-TR does not allow for any specific diagnosis to be made for traumatic stress symptoms occurring in the first 48 hours after an event, even though the symptoms and disability from them may be the same (or worse) on day one as on day three post-trauma. The rationale for this is the belief, expressed in the ICD-10 diagnostic criteria for Acute Stress Reaction (WHO, 1992), that traumatic stress symptoms that appear within minutes of the impact of a traumatic event *usually* resolve within a few hours or a couple of days, at most. The committee that wrote the criteria for ASD wanted to avoid pathologizing traumatized individuals before their symptoms persisted beyond day two (Marshall, Spitzer, & Liebowitz, 1999). However, as clearly articulated in the VA/DoD Clinical Practice Guideline for the Management of Traumatic Stress (Department of Veterans Affairs & Department of Defense, 2004), traumatic stress symptoms deserve to be acknowledged and actively managed as soon as possible after they appear. Ignoring

traumatic stress symptoms for the first two days would make as much sense as ignoring the signs and symptoms of an ankle fracture for the first two days just in case the injury might turn out to be only a sprain. These ethical entanglements may be side-stepped by using the term “traumatic stress injury” for all warfighters who experience significant posttraumatic stress symptoms, whether in the first 5 minutes or the first 5 days.

The symptoms of ASD listed above are merely that—observable symptoms. They offer little insight into the processes by which a traumatic event can injure a warfighter. Although existing research cannot explain everything that happens to the mind and brain at the moment of a traumatic impact, several consistent peritraumatic processes have been studied and reported. Four of these that may be especially useful in understanding traumatic stress injuries in combat are (1) physiological hyperarousal, (2) damage to core beliefs, (3) shame or guilt, and (4) dissociation.

Physiological hyperarousal. All mammals normally react to imminent threats to their safety with an adaptive physiological “fight or flight” arousal, largely mediated by the neurotransmitters epinephrine and norepinephrine in the brain and body. Increases in the activity of norepinephrine circuits in the brain promote alertness and attention, while increases in the activity of norepinephrine neurons in the peripheral nervous system increase heart rate and blood flow to muscles and other vital organs. Arousal in response to a perceived threat is a universal adaptive mechanism. But there is evidence that *excessive* physiological arousal in response to a threat may be characteristic of traumatic stress injuries. Certainly, persistent hyperarousal in the form of difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated startle responses, or motor

restlessness long after the threat has passed is a cardinal symptom of both ASD and PTSD (American Psychiatric Association, 2000). As markers of physiological hyperarousal, resting heart rates, and heart rate elevations in response to loud sounds or trauma reminders, have been found retrospectively to be greater in individuals with PTSD (Orr et al., 2003; Prins, Kaloupek, & Keane, 1995). Elevated heart rate soon after a traumatic event has also been found prospectively to be a predictor of who will go on to develop ASD or PTSD (Bryant et al., 2000; Bryant et al., 2003; Kassam-Adams et al., 2005; Shalev et al., 1998).

Arousal is necessary to adapt to threats, but arousal beyond a certain optimal point is toxic. Hyperarousal reduces the efficiency of cognition and memory (van der Kolk, 1995; Yerkes & Dodson, 1908), and may make it more difficult to make sense out of and master a given situation. Excessive arousal can also promote physical damage to certain neurons in the brain, a process known as “excitotoxicity” (Stahl, 1996). Excitotoxicity from excessive arousal has been implicated in the degeneration of the brain in several mental disorders. It may also be a mechanism by which traumatic stress damages neurons in the brain essential for overcoming fear and integrating traumatic experiences and memories (see chapter 4, this volume).

An important implication of the connection between arousal and traumatic stress injury is that anything that reduces arousal level at the moment of stress impact may mitigate or even prevent the resulting injury.

Damage to core beliefs. One of the recurring themes in the literature on traumatic stress is the ability of traumatic events to shatter necessary and deeply held beliefs (Davis,

2001; Janoff-Bulman, 1992; Kauffman, 2002). Everyone interprets life events and makes life decisions based on a set of core assumptions about the world and one's place in it. Janoff-Bulman (1992) proposed three fundamental assumptions common to all people at all times: (1) the world is benevolent, (2) the world is meaningful, and (3) the self is worthy. All people also need to believe that they are safe—that their lives will not be snuffed out in the next few seconds—and that a moral order exists in the universe that discriminates right from wrong. The importance of these core beliefs is easy to take for granted because they all operate beneath our radar screens, until something violates one of these beliefs. A feature common to all traumatic stressors, but particularly evident in combat operations, is their ability to betray one or more of these core assumptions.

Young warriors experience death, chaos, and evil in an intimate way—and often not just once but over and over again. Lifton (1988) called the radical intrusion of the reality of death into the minds of young warfighters “the death imprint.” Because of “its suddenness, its extreme or protracted nature, or its association with terror of premature, unacceptable dying,” Lifton (1988, p. 18) wrote, the death imprint may be very difficult for young warriors to assimilate and detoxify. Under almost no circumstance other than war would men and women in their teens and early twenties—barely adults—face the reality of their own mortality so brutally. Combat trauma also “destroys the capacity for social trust” (Shay, 1994, p. 33) because it shatters the illusion that people are basically benevolent and good. Shay also wrote eloquently, from his experience treating Vietnam veterans with traumatic stress injuries, how the betrayal in war of the moral order—of basic beliefs about right and wrong—can ruin the character of young warfighters.

Grossman (1995) argued that for many young warfighters, the very act of killing another human being can shatter core beliefs, especially beliefs about one's own basic goodness.

Shattered beliefs are not beyond repair. Nor is the loss of the beliefs of youth necessarily a bad thing. Traumatic injuries of all kinds can promote positive growth that might otherwise not be possible (Calhoun & Tedeschi, 2001). Many warriors experience positive transformations in their self-esteem, life focus, and faith after a tour in a war zone. As Viktor Frankl (1984/1946) learned in the death camps of WWII, surviving unavoidable suffering can infuse life with a powerful new meaning. To prosper mentally, however, warfighters who have suffered damage to their core beliefs must construct new belief systems that transcend the old and incorporate, somehow, the brutal realities of war without sacrificing everything that is positive about human existence.

Shame or guilt. Intense self-reproach in the form of shame or guilt may be a frequent consequence of traumatic stress injuries in combat (Figley, 1978; Grinker & Spiegel, 1945a; Grossman, 2004; Hendin & Haas, 1984; Shay, 1994; Solomon, 1993). Of course, shame and guilt can also accompany civilian traumatic stress injuries of many kinds (Herman, 1992; Horowitz, 1986). But combat may be uniquely toxic to self-esteem and self-image. To the extent warfighters go to war believing in their own strength and competence, they experience intense shame after becoming utterly helpless during a traumatic event. To the extent they believe they can protect their brother warriors from harm, they experience racking guilt after surviving their buddies' deaths. Civilians traumatized by natural disasters or crimes of violence may also feel intensely ashamed of their helplessness or guilty for surviving when others did not. But the shame of

traumatized warriors is compounded by the fact that they all volunteered for military service knowing they would face the challenges of war. Since warfighters train and prepare themselves to withstand the traumas of combat, it is much harder for them to forgive themselves for failing in any way to triumph over it.

Recovering from traumatic shame and guilt requires the construction of a new set of beliefs about oneself and one's place in the world—beliefs that allow for very human weaknesses at sometimes crucial moments. Overcoming guilt and shame depends on forgiveness.

Dissociation. In recent years, there has been a resurgence of interest in the relationship between trauma and dissociation (Marmar, Weiss, & Metzler, 1998). Dissociation has been increasingly implicated in both the short-term and long-term disability that can follow a traumatic stress injury. On the battlefield, a sudden and profound disruption in the capacity of the brain and mind to process and integrate information can certainly make a warfighter a hazard to himself and his peers. An almost archetypal movie portrayal of battlefield dissociation was that by Tom Hanks' character in "Saving Private Ryan," in which he went mentally blank while kneeling on the beach in Normandy, briefly becoming unable to respond to his surroundings or even to hear the explosions and screams around him. Since dissociation disrupts the processing of information, it is also implicated in the long term failure of trauma-injured veterans to integrate their perceptions, feelings, and thoughts at the moment of traumatic injuries with the rest of their identities and memories. Many of the cardinal symptoms of ASD and PTSD involve a loss of authority over memory. Vivid images of traumatic experiences intrude,

unwanted, into dreams and conscious awareness, and the individual struggles to avoid recall of these perpetually distressing memories. Yet, there is often a simultaneous amnesia for many of the details that might help put the puzzle pieces into some kind of order. Flashbacks in both ASD and PTSD are memories of trauma that provoke dissociation, again and again, in their recall. As long as traumatic memories are always accompanied by a breakdown in capacity to integrate and process information, such memories may forever remain independent of conscious control. Dissociation seems to be both a cause and effect of traumatic stress injury.

There are several unresolved controversies over the significance of dissociation during and after a traumatic stress, however. The first is whether dissociation truly is, as suggested by the DSM-IV-TR criteria for ASD, always a symptom of a traumatic stress injury. Peritraumatic dissociation is a strong predictor of future PTSD, but not everyone with PTSD reports having had symptoms of dissociation at the time of the trauma (Marshall, Spitzer, & Liebowitz, 1999).

Another controversy is whether dissociation is a normal and reversible adaptive process, or a symptom of irreversible (though capable of healing) injury. Seen as a normal adaptive process, dissociation has been cast as a defense mechanism, a form of self-hypnosis, or a genetically-programmed reflex similar to the freezing or sham death behaviors of prey animals (Cardena, 1994). Supporting the idea that dissociation is normal and adaptive is the finding that dissociation occurs with great frequency in potentially traumatic situations. For example, a prospective study by Morgan et al. (2001) found that 96% of soldiers undergoing intense survival training experienced dissociation

at some point in that training. But the frequency of dissociation in combat-like situations does not necessarily make it normal, any more than it should be considered non-pathological to have a black eye after being punched in the face. Janet's view of dissociation as a breakdown of adaptation, rather than as an adaptive choice, has gained renewed support in recent years (van der Kolk & van der Hart, 1989). Advances in the neurobiology of traumatic stress injury have prompted one researcher to suggest that the subjective experience of dissociation may be just what it feels like to suffer an injury to integrative centers of brain during a traumatic stress (Bremner, 2002).

A third controversy involves which symptoms should be included in a list of trauma-induced disruptions "in the usually integrated functions of consciousness, memory, identity, or perception," as dissociation is defined by DSM-IV-TR (American Psychiatric Association, 2000, p. 519). The criteria for ASD, listed above, include only cognitive forms of dissociation, such as perceptions of unreality, numbing, being in a "daze" or on autopilot, or a loss of memory. However, as first described by Janet and others, traumatic dissociation could also include a host of physical forms of disrupted integration, including paralysis, blindness, deafness, shaking, stuttering, inability to speak, sleepwalking, and psychogenic pain (Nijenhuis, 2004). Physical (somatic) types of dissociation have been observed on the battlefield since the 18th century, made famous in the stress casualties of WWI and WWII. A survey of dissociation symptoms in policemen involved in combat includes similar somatoform dissociative symptoms (Grossman, 2004). Besides cognitive and somatic forms of dissociation, a third type has been described both in warfighters and in civilians exposed to repeated or ritual abuse. This

type has been termed “tertiary dissociation” by van der Kolk, van der Hart, and Marmar (1995, p. 316). Its characteristic feature is a shattering of the core self of the traumatized person into two or more partial selves, each with its own style and value system. In its most malignant form, tertiary dissociation underlies Dissociative Identity Disorder (multiple personality disorder). But in a milder form, the fracture of self into partial personality fragments has been described in traumatized warfighters. Kind and gentle individuals can become abruptly cruel and vicious. Timid people can become fearless, even “berserk.” Or strong and brave warriors can become childlike and regressed. Laufer (1988) termed the fractured component of the self that can develop in a traumatized warrior a “war self,” which develops such different perceptions, values, and memories from the rest of the warfighter’s identity that post-war integration into one whole person may be very difficult.

Prospective studies of warfighters engaged in combat will be necessary to resolve these controversies regarding dissociation. Prospective research will also clarify the role of physiological hyperarousal, damage to core beliefs, and shame and guilt in traumatic stress injuries on the battlefield. Meanwhile, to the extent these four components of traumatic injury may truly define combat trauma, they are exactly the places where we can intervene to prevent and mitigate traumatic stress injuries. Any tactic that reduces arousal level, protects or restores belief systems, relieves shame or guilt, or prevents or relieves dissociation should help keep warfighters healthy and ready.

Operational Fatigue: A Wear-and-Tear Injury

Not all stress injuries in operational settings are caused by trauma, just as not all post-deployment stress problems are PTSD. The National Vietnam Veterans Readjustment Study, funded by Congress in 1983, found that Vietnam veterans had high rates of persistent mental disorders other than PTSD, including depression, anxiety, substance use, and personality disorders (Kulka et al., 1990). The rates of these other mental disorders were higher in Vietnam veterans than in their civilian peers who had not served in Vietnam, and their rates were found to correlate directly with nearness to combat in theater. Similarly, Hoge et al. (2004) found significantly high rates of depression, anxiety, and substance use problems among warfighters 3-6 months after their return from Afghanistan or Iraq. But what do future depressive, anxiety, or substance use disorders look like on the battlefield? Are they identifiable among deployed warfighters? Or do these problems always spring from the ground in full bloom after return from a deployment?

These questions have not been well answered by prospective research to date. But observations over the past three centuries of the nature and causes of operational stress injuries suggests that there are characteristic patterns of symptoms that can arise in warfighters due merely to the wear-and-tear of accumulated stress, independent of specific traumatic events. Nostalgia cases in the 18th and 19th centuries were non-traumatic stress injuries. Jones (1995c) rediscovered the nostalgia concept in his explication of what he called “disorders of frustration and loneliness,” which he believed could occur as easily in garrison as in a low-intensity operational deployment in a war zone. But others have noted the connection between accumulated stress in a war zone,

even among support personnel not directly engaged in combat, and psychiatric breakdown.

Lord Moran, a battalion surgeon in France in WWI and later, personal physician to Winston Churchill, observed that all warfighters had a limited supply of courage. And courage, like capital, was constantly paid out by warfighters in response to the accumulated stressors of war (Moran, 1967/1945). Grinker and Spiegel (1945a) were among the first to describe the syndrome of “operational fatigue” in U. S. Army Air Forces personnel in WWII. Typical symptoms of operational fatigue included (p. 210):

- persistent restlessness
- irritability and anger
- difficulty falling asleep
- tension and subjective anxiety
- depression
- decreased appetite
- decreased ability to concentrate
- easy fatigue and low energy levels.
- tremor or other sympathetic hyperactivity

Appel and Beebe (1946) studied psychiatric breakdown in Italy near Cassino and Anzio, and found that exposure to danger took a relentless toll, even in the absence of specific, overwhelming events. They wrote that “men will break down in direct relation to the intensity and duration of their exposure. Thus, psychiatric casualties are as inevitable as gunshot and shrapnel wounds in warfare” (p. 1470). Older warriors have

traditionally been found to be more susceptible than the young to operational fatigue injuries. Hence, the name that was given to these injuries in WWII—“Old Sergeant’s Syndrome” (Dean, 1997, p. 37).

The symptoms of operational fatigue—or nostalgia, for that matter—are indistinguishable from the symptoms of DSM-IV-TR depression and anxiety disorders. But further prospective research is needed to determine the relationship between operational stressors and the development of these symptoms, as well as under what circumstances such symptoms can become persistent and chronic.

Grief: A Loss Injury

Grief has been defined as a “reaction to the loss of a loved one through death” (Stroebe et al., 2001, p. 6). Grief is certainly a normal part of life since the loss of loved ones through death is inevitable for everyone who lives long enough. If the definition of grief is expanded to include reactions to the losses of non-human love objects, including valued states of mind and beliefs, then grief is an almost continuous process beginning in early childhood. Even though inevitable and necessary, however, grief may not quite qualify as an adaptive response to a manageable “eustress.” Grief is not reversible. Nor is it a choice. The losses that provoke grief are afflictions. The symptoms of grief can be long lasting and, at times, disabling. Like trauma and operational fatigue, grief may best be conceived of as an injury. Like trauma, it is an impact injury, even if the death occurs over a long period of time. Of course, it is not being proposed here that grief is necessarily pathological. Rather, as with other combat/operational stress injuries, the

point is to avoid minimizing or trivializing grief just because it is so common and “normal.”

Many warfighters who participate in combat suffer the loss of someone who is loved, sometimes loved dearly. The attachments young warriors have for each other are infused with an intensity that has few parallels in civilian life, coming closer to the attachment a parent has for a child than the bonds of siblings or mere friends. Certainly, the responsibility warriors feel for each other is similar to that felt by a parent for a child. Hence, grief in war can be one of the most traumatic forms of grief.

The features of grief can vary greatly, but certain manifestations are typical, including symptoms in the following dimensions (Stroebe et al., 2001):

- Emotional: anger, hostility, depression, despair, anxiety, guilt
- Behavioral: agitation, fatigue, crying, social withdrawal
- Cognitive: preoccupation with thoughts of the deceased, self-reproach, memory loss, difficulties concentrating
- Physical: sleeplessness, energy loss, loss of appetite

In addition to the above manifestations, grief in reaction to losses that are particularly wounding can include some of the cardinal symptoms of traumatic stress injury, including the following (Jacobs, 1999):

- Dissociative symptoms, such as feeling stunned, dazed, shocked, or numb
- Intrusive, painful recollections about the deceased person
- Frequent efforts to avoid reminders of the deceased

- Damage to belief systems, including loss of security and trust

All the above grief symptoms are common among warfighters who have lost buddies and valued leaders. However, warriors deployed to an operational theater often don't experience the full impact of their grief until after they have returned to garrison, and their adaptive numbness and denial have worn off. Sometimes the reality of combat losses first begins to sink in for warfighters when they are on the airplane flying home, surrounded by too many empty seats.

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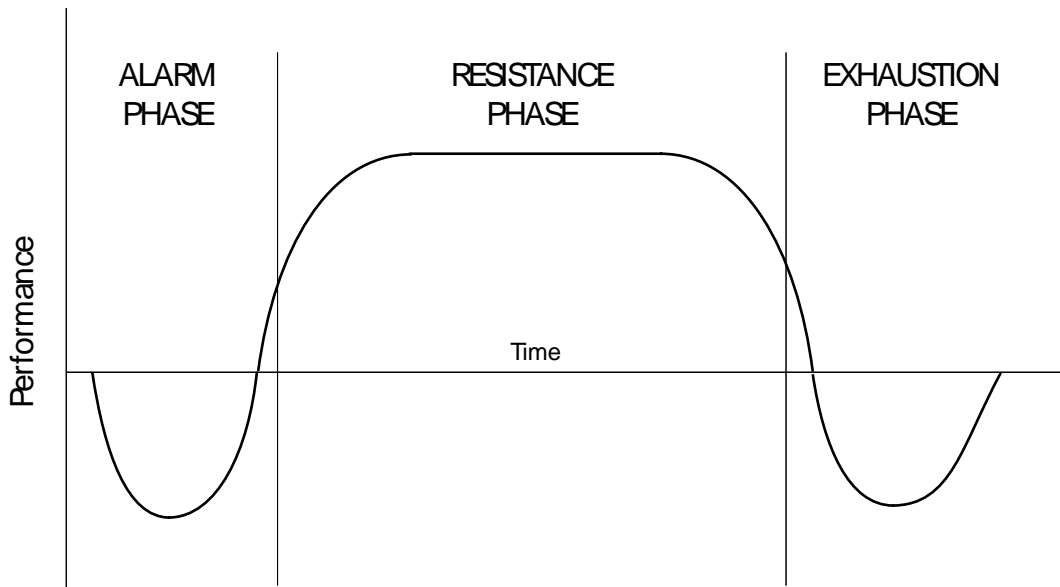


Figure 1. Three phases of adaptation to any stressor—the General Adaptation Syndrome (GAS, adapted from Selye, 1956, p. 111).

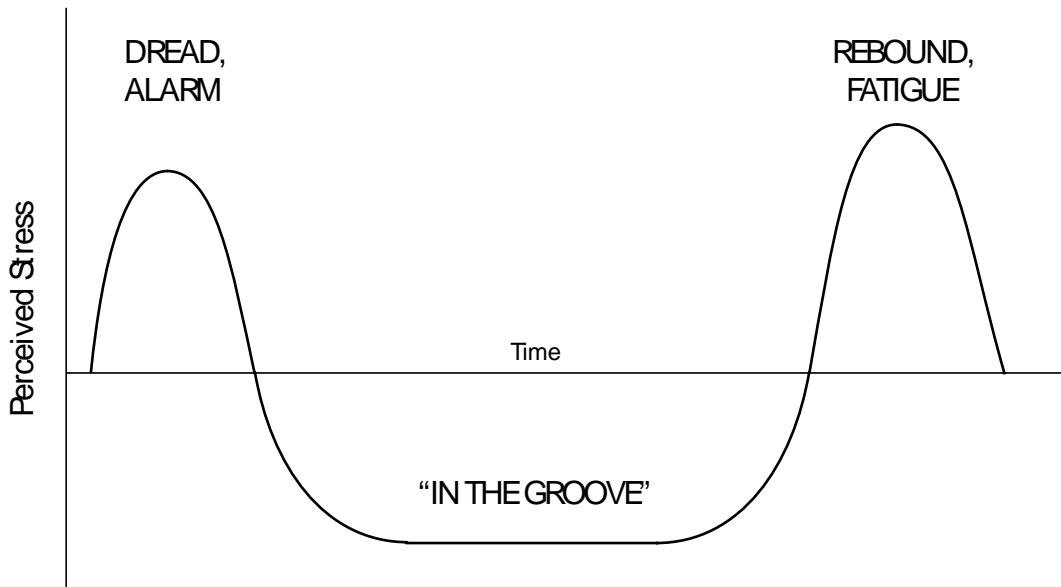


Figure 2. The time course of perceived stress in combat and other military operations, whether over minutes (e.g., a single firefight), days (e.g., a single mission), or months (e.g., an entire deployment).