Key Facts on Resilience and Response to Stress for Navy and USMC Leaders

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Background

Resilience research has proven to be both promising and misunderstood. Such research holds promise for its potential to inform treatment of stress-related pathology. Likewise, a better understanding of the mechanisms that promote resilience can inform training programs aimed at preventing maladaptive responses to trauma (e.g. stress inoculation training). However, the emergence of programs offering methods to make individuals resilient suggests the term may be misunderstood, and suffering from definitional bracket-creep.

In the wake of the terrorist attacks of Sept 11th, 2001, and the subsequent increase in military op tempo abroad, there is a renewed interest in creating resilience-based interventions. Yet, resilience as a construct has traditionally lacked a consistent, complete, and measurable definition. Such definitional ambiguity has contributed, at least in part, to the term "resilience" being imprecisely applied to myriad treatment programs and outcomes. As a result, asymptomatic individuals are often deemed resilient. Moreover, what were previously known as treatment and training have been renamed "resilience building". At best, such relabeling might reduce the stigma of traditional mental health treatment – but this too is lacking direct empirical support. At worst, an expanding use of the term may confound a growing database of evidence-based factors that really do differentiate those who do bounce back from stress from those who don't.

The aim of this paper is to help put resilience in proper perspective. To do so, various definitions of resilience are briefly examined, and one possible guiding definition of resilience is proposed for future clinical research in military medicine. Factors known to be related to resilience via empirical support are highlighted. Specific mention is given to psychosocial variables and biological markers of resilience.

Resilience

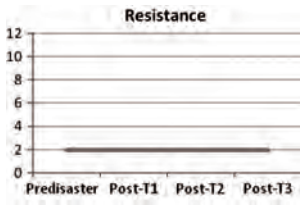
Resilience has generically has been defined as "bouncing back from a stressor." Slight variations in the definition of resilience include the absence of symptoms following trauma, an absence of risk factors for disease, and sustained performance during an intense physical or psychological challenge. Such definitions are cause to question whether resilience is a valid construct at all. To be sure, most individuals exposed to life-changing stressors do not develop stress-related psychopathology. A vast literature indicates that the overwhelming majority of military personnel exposed to combat do not develop PTSD. Given these outcomes, is the term resilience merely defining the default?

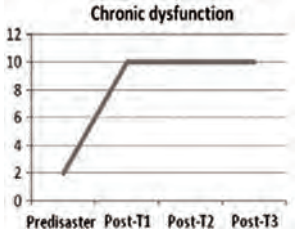
Available evidence suggests the answer to this question is "no," resilience is not the default. Some helpful context for understanding resilience is found by considering risk factors. Framed within the context of risk factors, resilience then becomes defined by a positive, adaptive outcome despite significant risk factors for stress-related pathology.

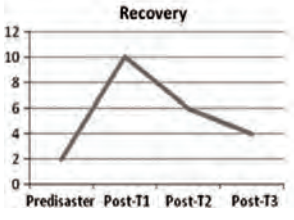
	Pathology	**Healthy**
High Risk	Predisposed	**Resilient**
Low Risk	Unique Stressor	Resistant

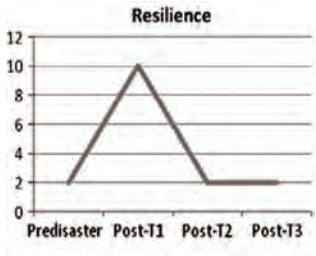
Such a framework is also helpful because we know far more about risk factors for stress-related disease than we know about resilience. Thus, resilience research, in its proper context, is focused on individuals who are identified as "high risk" for developing pathology, yet for some collection of factors (i.e. resilience factors) do not develop disease or a permanent decline in functioning.

Definitional precision of resilience can be improved by differentiating trajectories of recovery following exposure to traumatic stressors. For example, a two-year longitudinal assessment of (N = 1828) survivors of natural disaster and terrorist attacks found em-









pirical support for four distinct patterns of symptom change: resistance, chronic dysfunction, recovery, and resilience (Norris, Tracy, & Galea, 2009).

Thus, resilience can be conceptualized as having four pre-requisites:

1) Risk (biopsychosocial or environmental)
2) Exposure to a high-magnitude stressor
3) Stress response
4) Return to baseline functioning and symptom levels

Resilience Defined

A working group of experts in the field of psychiatry, psychology, behavioral health, and psychometrics constructed a scale that attempts to measure psychosocial processes associated with resilience. The Response to Stressful Experiences Scale (RSES; Johnson, Polusny, Erbes, et al., 2008) is the only scale to date that has been validated exclusively in an active-duty and reserve component military sample (N = 1078) with experience in Operations Enduring Freedom and Iraqi Freedom (OEF/OIF). Scale development and evaluation of reliability and validity were predicated on the following working definition of resilience.

Resilience comprises

a) A set of predispositions manifest as adaptive responses to stressful events.
b) Intrapersonal processes that promote stability through change.

Resilience was defined as: "*A multidimensional psychological process manifest in response to intense life-stressors that facilitate healthy functioning or psychological growth*."

Psychosocial Resilience Factors

Psychosocial factors identified by the RSES are defined below. Though this list is not comprehensive, these factors were theorized and then empirically supported with data from military personnel deployed in support of OEF/OIF.

Cognitive Flexibility

Adjusting beliefs about the self, the world, and the future in a manner that leads to a positive response to stress. Confronting fears and reframing stressful events as opportunities for positive change; overcoming cognitive and behavioral avoidance.

Spirituality

Belief that life has dimension beyond the physical, and that there is a higher power, greater than the "self," that can help guide, shape, influence, and inform experiences.

Active Coping

Thoughts, behaviors, or emotions aimed at altering external or internal sources of stress.

Self-efficacy

Expectation of ability to direct fate and manage reactions effectively should bad things happen unexpectedly. Confidence in the ability to do something positive in response to serious life challenges or to mitigate their impact.

Meaning-making

Appreciating the informational value of stressors and challenges. Recognizing stress-related thoughts, behaviors, and emotions as potentially useful; willingness to allow these to instruct a response to future events. Living with intentionality and extracting purpose from suffering and challenge.

Restoration

Self-care intended to maintain stability in response to stress and rejuvenate following stress. Restoration involves both repair of stress-related damage and preparation for anticipated stressors.

Biological & Genetic Factors

The precise roles of biological and genetic factors that contribute to a resilient response to stress are dynamic and complex. What we do know about biological and genetic resilience factors is largely correlative, therefore claims about a particular candidate gene, allele, or neuropeptide *causing* resilience is premature. A challenge is to determine whether biological factors associated with resilience are the consequence, or the cause, of being resilient.

A complete description of the genetic and biological variables that have been implicated in resilient response to stress is well beyond the scope of this paper. Biological and genetic factors that have been implicated in resilience include,

Human serotonin transporter gene (5-HTTLPR):

Also known as SLC6A4, the long allele is associated with increased serotonin availability, decreased risk of depression, and stronger emotion regulation skills.

***Neuropeptide Y (NPY)**:*

Research conducted in high-intensity military settings (e.g. SERE) indicate that higher baseline levels of NPY are associated with better performance during prolonged stress. NPY is also associated with more efficient return of cortisol levels to baseline following activation of the HPA axis.

***Brain-derived neurotrophic factor (BDNF)**:*

BDNF has been implicated with adaptive responses to stress and enhanced learning under stress, primarily in rodent research. However, the role of BDNF in resilience is not completely understood, as some findings suggest this nerve-growth factor has differential effects on various brain regions. Thus, an increased level of BDNF in one area is associated with increased risk for stress-related pathology, whereas in other areas is confers resilience promoting properties.

***Catechol-O-methyltransferase (COMT)**:*

COMT is an enzyme that affects synthesis of two primary neurotransmitters: dopamine and noradrenaline (norepinephrine). COMT is negatively correlated with levels of dopamine and noradrenaline. Evidence suggests that decreased amounts of COMT are associated with emotion lability and poor tolerance of negative affect.

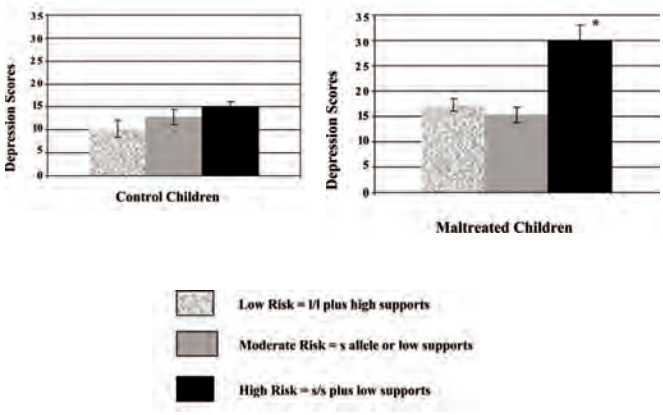
***Dehydroepiandrosterone (DHEA)**:*

DHEA is known to counteract the deleterious effect of elevated glucocorticoid levels found in the brain resulting from prolonged stress reactivity of the HPA axis. A study of U.S. Army Special Forces personnel undergoing combat diver qualification training found that higher levels of DHEA were correlated with better scores on an underwater navigation task.

Note: For a more complete review of bio-genetic resilience factors see Feder, Nestler, and Charney (2009).

Interaction of Resilience Factors

What is known about psychosocial and biological resilience factors is that they are dynamic and multidimensional. An example of the complex interaction of biological and environmental resilience factors has been demonstrated in children at-risk for depression. Kaufman et al., (2004) found that children who inherited both short alleles (s/s) of the 5-HT serotonin transporter gene had higher depressive symptoms, thus demonstrating a genetic vulnerability to psychopathology. Results also showed that children with a genetic vulnerability who were also abused had the highest level of depressive symptoms. Most noteworthy, however, was that high levels of social support was associated with decreased levels of depression, and served as a stress buffer even in those children who were abused and genetically at risk. These findings highlight the import of psychosocial factors like social support that can interact with genetic and other environmental risk factors.



Associated Resilience Factors

- Resilience in OEF/OIF veterans is associated with higher levels of unit support, unit cohesion, and post-deployment social support.
- Resilience is negatively correlated with dimensions of personality in active-duty and reserve component personnel: Namely neuroticism and introversion
- Resilience is associated with hardiness
- Resilience is negatively correlated with baseline levels of dissociation

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