ADAPTATION TO STRESS AND PSYCHOBIOLOGICAL MECHANISMS OF RESILIENCE STEVEN M. SOUTHWICK . [ET AL.] pdf

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Adaptation to Stress and Psychobiological Mechanisms of Resilience Chapter Â· March with 32 Reads DOI: /ch5} In book: Biobehavioral Resilience to Stress, pp

Literature Cited ABSTRACT Although most resilience science has focused on individual-level psychosocial factors that promote individual resilience, theorists and researchers have begun to examine neurobiological and systems-level factors implicated in resilience. In this commentary we argue that the development of effective interventions to enhance resilience necessitates understanding that resilience in the individual is dependent on multiple layers of society. Further, we suggest that there is a bidirectional relationship between systems-level resilience i. We suggest directions for future research and interventions, with the goal of stimulating research efforts that address these questions among trauma-exposed individuals. Other definitions include the process of harnessing resources to sustain well-being; robust psychobiological capacity to modulate the stress response; and the capacity of a dynamic system to adapt successfully to disturbances that threaten the viability, function, and development of that system see Southwick et al. A general consensus is that resilience is a complex phenomenon that, for each individual, may have specific meaning that varies by phase and domain of life and may, but does not always, lead to the absence of psychopathology. Myriad psychological and biological factors have been associated with resilience in the individual for thorough reviews, see Charney , Southwick et al. Psychological correlates include, but are not limited to, optimism and positive emotions; attention to health and fitness; cognitive flexibility and the capacity to adapt to a host of different challenges; an active problem-oriented style of coping and perseverance; and strong willpower, courage, a well-developed moral code of behavior, altruism, and dedication to a meaningful purpose or cause. In terms of biological systems, the sympathetic nervous system SNS and hypothalamic-pituitary-adrenocortical HPA system are extensively involved in resilience to stress. The development of these systems is highly dependent on social systems, particularly attachment figures Loman et al. As such, sturdy role models and a history of loving caregivers predict individual resilience Southwick and Charney Human responses to adversity also take place in the context of available resources, specific cultures and religions, organizations, and communities and societies, each of which may be more or less resilient in their own right, and more or less capable of supporting and enhancing resilience in the individual. The support that individuals receive from family, friends, colleagues, organizations, and community has a profound impact on their psychological health, physical health, and on the ability to deal with adversities and challenges. In this perspective, we posit that it is critical to attend to, and intervene at the level of, social networks to fully understand and promote individual resilience to stress and trauma. We present our perspective through the lens of relationship developmental systems theory Sameroff , Lerner et al. We hope that sharing our perspective will help to stimulate future basic and applied research aimed at identifying how promoting resilience in social systems can enhance resilience in the individual and similarly how promoting resilience in the individual affects social systems. These forms of support can be provided by different systems, including the intimate couple dyad, family, community, and state, national, and international systems. Anthropological perspectives on social support provided during situations of war and displacement e. Finally, individuals and their levels of support operate in cultural contexts, which include the ideas, beliefs, and values people hold about persons and their social relationships in which they take part. Studies included in this perspective typically defined social support in terms of perceived social support, though measures varied widely. Although a thorough review of research on the assessment and utility of social support is outside the scope of this perspective see Gottlieb and Bergen for a review , three points bear noting. First, the majority of research studies on the role of social support in individual human resilience is cross-sectional in nature, precluding causal conclusions about whether social support promotes individual resilience or, similarly, that low social support serves as a risk factor for physical and mental health problems , or whether individuals who develop these problems are more

likely to develop and maintain low-functioning social support systems. Second, there are issues with the measurement of social support that pervade empirical research and limit possible conclusions. For example, social support is typically measured with self-report, which is confounded by a variety of variables such as mood state. Finally, social support is not universally or unequivocally helpful, and the effectiveness may vary by type of support provided. For example, in the context of traumatic stress, functional support is a better predictor of positive mental health and resilience than structural support Southwick et al. The effectiveness of social support depends on the match between the source, type, and timing of social support and the needs and developmental level of the individual or system Cohen and McKay , Jacobson , Cutrona and Russell ; as such, support provided in a sequence inconsistent with the present needs will neither be effective nor recognized as helpful Jacobson For example, cognitive support may be perceived as most helpful when the individual is ready and asks for it but not when it is unsolicited Almedom Finally, the types of supports that are needed change continuously with the changing nature and appraisal of the problem Jacobson Taken together, these literatures have informed a key question about the appropriate provision of social support: Smith and Christakis and Thoits provide thorough reviews of these literatures, respectively, in adults; see Cicchetti b for a review of relevant literature in children. See Holt-Lunstad et al. In general, research indicates that the health of one person is inextricably tied to the numerous others to whom that person is connected. The literature on military veterans provides some illustrative examples of the link between social support and psychological resilience and mental health. Cross-sectional data indicate that veterans characterized as resilient i. In addition to postdeployment social support, military unit support has been shown to buffer against posttraumatic stress disorder PTSD; Pietrzak et al. In fact, meta-analytic findings indicate that poor social support is one of the strongest predictors of development of PTSD Brewin et al. Further, among treatment-seeking Vietnam veterans, homecoming stress i. Finally, among veterans of Operation Iraqi or Enduring Freedom who served in Iraq or Afghanistan, those classified as resilient high combat exposure, low PTSD symptoms were more likely to be in a relationship and on active duty potentially indicating unit support , and scored higher on measures of postdeployment social support i. Longitudinal and experimental studies can speak to the direction of causality between well-being and social support, and the association appears to be bidirectional. In a year prospective study sponsored by the American Legion, veterans who reported more negative community attitudes toward their homecoming were more likely to suffer with chronic PTSD, suggesting that lack of community-level support served as a risk factor for PTSD Koenen et al. Similarly, in a year study of Israeli combat veterans, Karstoft and colleagues found that social support at the family, social network, and societal levels were differentially associated with PTSD trajectories. Specifically, social support from society at homecoming appeared to be a buffer against chronic PTSD outcomes. Fortunately, American society has appeared to learn from the experiences of Vietnam-era veterans. This finding generalized to friends, coresident spouses, siblings who live within a mile, and next-door neighbors. The causal sequence between social support and psychological distress after adversity may change over time. For example, in a large sample of survivors of a natural disaster in Mexico, Kaniasty and Norris found that although greater social support early after the disaster was associated with fewer PTSD symptoms 6 and 12 months postdisaster, greater PTSD symptoms predicted lower social support at the month follow-ups. After natural disasters, psychological distress is widespread and considered normative. This shared distress is often associated with a sense of solidarity, altruism, and mutual helping. In fact, Bastian and colleagues recently presented experimental evidence that shared pain between individuals may trigger group formation. In their study, sharing painful experiences with others, compared with a no-pain control treatment, promoted trusting interpersonal relationships by increasing perceived bonding among strangers and increased cooperation in an economic game. It is also plausible that survivors with severe PTSD may reject or discourage social support secondary to their own hypervigilance and avoidance, as well as their own feelings of detachment and estrangement. Specifically, available data suggest that high social support can increase self-confidence, decrease the likelihood of engaging in risky behaviors, e. For example, in a study of patients with cardiac illness, high social support was linked to

increased use of active coping mechanisms, such as problem solving, which in turn decreased the likelihood of developing depression. In addition, high social support might increase feelings of belonging and solidarity, encourage healthy coping behaviors, e. A number of neurocognitive systems and genetic mechanisms have been implicated in the link between social support and individual resilience, including but not limited to elements of the HPA and noradrenergic systems, oxytocin, and serotonin-transporter and brain-derived neurotrophic factor gene polymorphisms see Ozbay et al. The development of stress- and threat-management circuits is influenced by multiple experiences, starting in the first years of life. Experiences that activate these circuits are considered stressors and, under normal conditions, promote learning of adaptive responses to subsequent stressors. As such, it has been proposed that social support can actually moderate genetic and environmental vulnerabilities to confer resilience to stress, possibly by its effects on these systems Ozbay et al. For example, positive social support can inhibit behavioral and physiological stress responses. Many animal and human studies have found that these responses to a variety of stressors are reduced in the presence of a companion, and that this reduced activity is likely mediated through a variety of mechanisms including activation of the parasympathetic nervous system, activation of brain regions e. In humans, the neuropeptide oxytocin is released during social situations and promotes prosocial behavior by increasing social recognition and feelings of affiliation and trust see Ross and Young for a review. The anxiolytic and prosocial effects of oxytocin have been associated with enhanced activity of the prefrontal cortex and decreased activity of the amygdala, SNS and HPA-axis Zink and Meyer-Lindenberg This reduction of physiological reactivity to stress, particularly chronic stress, has been associated with positive mental and physical health. With respect to mechanisms for the negative effects of poor social support, Miller and colleagues have proposed that mammals process threats to social connection, e. Basic threats to survival and threats to social connection both typically activate the SNS and the HPA axis, as well as brain regions that detect and respond to a host of stressors and potential dangers, e. Studies in humans have found exaggerated cardiovascular and neuroendocrine responses to stress among individuals with low social support compared to those with high social support Southwick et al. Although the link between poor social support and poor health is complex, it is likely that chronic activation of neurobiological brain circuits and neuroendocrine systems that mediate responses to stress, threat, social isolation, and rejection have deleterious effects on cardiovascular, immune, and brain function. It is also possible that variations in social support and the social environment can trigger biochemical reactions, e. When a gene is turned on, it produces its gene products, i. For example, a number of studies have reported that people who inherit a specific variation of the serotonin transporter gene, i. However, Kaufman and colleagues found that high levels of social support protected against stress-related depression among maltreated children, even those with the SS variation of the serotonin transporter gene. Thus, it is possible that the social environment can modify gene expression or the influence that a gene has on the organism Davidson and McEwen , McEwen and Getz , Yang et al. We draw from Jaffee and colleagues , who proposed a transactional model of resilience wherein individual resilience is best understood as the interplay between characteristics of the individual, life circumstances, and context, e. According to family systems theories, resilient family systems promote individual resilience. Stressful life challenges are proposed to have an impact on the whole family and, in turn, key family processes, e. Like resilience at the level of the individual, family resilience has developmental points and transitions related to the life course of the family members, pointing again to the importance of type and timing of social support. For example, the supports needed by military families are contingent upon the stages of separation and reunification, i. Military service members are also embedded in other contexts including military units, hierarchical structures, and branches, making military families exemplars of these intersecting systems toward which interventions may be targeted. Community resilience has emerged as a key concept for disaster readiness, because disasters underscore the interdependence of individual, family, and community systems and the effects of threats to one system on the other systems. Additionally, we suggest that healthier communities take pride in their shared history and are intentional about celebrating their community. This means involving multiple generations in community

activities and action, and focusing consistently on strengths and on enhancing those strengths. In this way, individuals and families can feel closer and more involved in their communities, hence both perceiving and having more effective social networks. In general, social support at the levels of both families and communities, e. In the Environmental Risk Longitudinal Study of maltreated twin pairs and their families, investigators found that higher intelligence predicted positive functioning and resilience, except among children faced with multiple extreme family and neighborhood adversities Jaffee et al. Specifically, maltreated children who exhibited resilience had parents with fewer antisocial personality characteristics and less substance use, and lived in lower-crime neighborhoods with more social cohesion. This work suggests that poor social support from attachment figures, family, and community impeded individual resilience, and that among children exposed to multiple forms of severe adversity, personal resources were not adequate for promoting adaptive functioning, i. In a study of Israeli citizens exposed to missile attacks, individuals living in rural settings experienced fewer missile-related stress symptoms than those living in urban settings, purportedly because the rural group reported more trust in their leaders and believed that their communities were better prepared for emergencies Braun-Lewensohn and Sagy That being said, individual resourcefulness does matter for individuals lacking within-community resources. For example, Distelberg and Taylor found that residents in public housing communities who exhibited higher levels of resilience sought social support from outside of their communities to a greater degree, thereby increasing their access to and use of resources. As noted by Abramson and colleagues , the increasing scholarly and policy interest in promoting individual and community resilience presents the challenge of accommodating multidisciplinary perspectives in a single, applied model. After the Deepwater Horizon oil spill, Abramson and colleagues worked with Gulf Coast communities on collaborative and integrated research projects that examined mechanisms by which access to social resources activate and sustain resilience capabilities after disaster. This work led them to propose the Resilience Activation Framework as a basis for testing how access to social resources promotes resilience among individuals and communities exposed to the acute collective stressors associated with disasters. In fact, research is beginning to document the effect of interventions designed to promote prosocial behavior and well-being on brain structure and function Davidson and McEwan Dyadic- and family-level interventions A review of the evidence supporting couples and family interventions for promoting resilience and remediating physical and mental health difficulties is outside the scope of this perspective. Although preliminary, this work suggests that intervening at the dyadic level improves individual resilience and reciprocally promotes resilience at the dyadic level. References provided in this perspective offer suggestions for social support providers such as romantic partners and parents. Thoits provides some general guidance, while Slone and Friedman offer guidance specifically targeted at families of returning troops and veterans. Thoits argues that significant others can engage in emotionally sustaining behaviors e.

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factors and mechanisms associated with suc-cessful adaptation to stress, and ends by sum-marizing some of the most important psycho-logical factors that have been shown to impact on resilience.

Predicting Resilience to Stress Screening for emotional problems routinely occurs at recruitment and military enlistment stations. Nonetheless, even after preenlistment screening is conducted, large numbers of military personnel are separated from the military due to behavioral or mental health problems. For example, in the U. Air Force alone, This raises the question of how early screening might be improved to better identify individuals who are at risk or vulnerable to psychological disorder. Research-based psychological screening questionnaires have been developed, but their use in the military is still limited. These measures do not directly address resilience to stress per se, but they do pose questions related to preservice adjustment history. As will be made clear in this chapter, there is a large body of research to indicate that individuals who have a history of serious mental illness or criminal behavior are less likely to deal with stress in a resilient manner. This chapter begins with a review of the need for, and current practices associated with, early psychological screening in the military. Note that not all military psychological screening practices and specific contexts will be covered here. For instance, our review does not consider instruments specifically designed for pre- or postdeployment screening e. We also address research findings relevant to demographic, psychological, behavioral, and experiential factors that may be helpful in the assessment of risk versus resilience to stress. Finally, we consider how currently available information and knowledge might be applied to support the development of improved early screening instruments and procedures. Why Is Psychological Screening Important? Although it may seem obvious that the military should want to employ only the most stress-resilient personnel available, it can be difficult to generate consensus support on how best to implement this ideal as a practical matter. Commanders in charge of recruitment sometimes discourage the use of recruitment-level screening procedures that might significantly reduce the number of potential available recruits. Training commanders who welcome recruitment-level screening may frown upon subsequent procedures that tend to increase attrition from basic military training BMT. Finally, field commanders would be pleased to see their attrition rates reduced by more effective screening at enlistment processing and during basic training. First, there are currently in place strict limits on the number of nonâ€”high school graduates who can join the military. Given these limits, it is important to identify individuals who are most likely to perform well. Appropriate early screening could be very beneficial in this respect. This figure includes all separations, including those due to medical problems, but more often than not, attrition is related to emotional and behavioral difficulties. If first-term attrition could be reduced by even just a few percentage points, the U. Last but not the least, effective early screening for resilience to stress would promote the development of a more resilient military force in general. Workgroups and committees enlisted the help of top military and civilian psychologists. The instruments they developed gathered biodata relevant to preservice adjustment, including antisocial behavior and emotional distress Adaptability Screening Profile [ASP], Barnes et al. The intent of this effort was to assist applicant selection by screening prior to basic training. None of these tests ever became operational. The National Research Council NRC, issued a report that addressed current military enlistment standards and critiqued preenlistment psychological screening procedures that are currently employed by the U. Unfortunately, most screening instruments currently in use are not evidence-based. Early screening begins at recruitment stations when each applicant completes a medical prescreen Department of Defense [DoD] Form Although this is useful information, many individuals who have severe mental or behavioral problems have never received treatment and so would not be identified by an honest answer to this question. At military enlistment processing stations, recruits complete a medical history questionnaire. Unfortunately, attrition data were not gathered to construct and evaluate this questionnaire. Thus, it is not clear which test items, if any, might be useful as a means to identify individuals who may be at increased risk for

attrition based on a history of medical or psychiatric problems. There is one instrument currently in use to screen nonâ€"high school graduate applicants prior to their induction. The AIM gathers information that relates to personality traits, such as the tendency to strive for excellence in the completion of work-related tasks, the tendency to have a positive outlook on life, and the tendency to interact with others in a pleasant manner. Early results obtained by researchers at the U. Army Research Institute suggested that higher scores on the AIM were associated with lower rates of first-term attrition e. Based in part on these positive results, the Army began using the AIM operationally with nonâ€"high school graduates in as part of the GED Plus program. By scoring a specific subset of AIM items, Young et al. Army will be permitted to double to 14, the number of nonâ€"high school graduates it was permitted to enlist during the previous year Kennedy, Follow-up data should be gathered over a number of years to adequately address the question of attrition from military service. However, because the EPS is still in the early stages of evaluation, conclusions cannot yet be drawn concerning its validity. Air Force recruits during basic training. The Lackland BQ is designed to gather biodata relevant to preservice adjustment, including antisocial behavior and behavior related to mental disorder and treatment. Because the Lackland BQ was only recently constructed, research data on its validity are still being collected. Risk Factors for Stress and Attrition In extreme or dangerous conditions, the ability to perform under stress may be nothing less than critical to psychological and physical survival. Although BMT is helpful as a means to de-select recruits who have low tolerance for the basic demands of military performance, it is not a perfect filter by which to identify all entrants who might eventually succumb to stress. Our most current perspective on first-term attrition emerges from a review published in by the U. Results have not yet been reported for data gathered from military personnel. Despite best efforts to develop effective screening strategies, attrition rates remain high and have not decreased during the past 20 years. Another pressing concern for the military is that even the most thoroughly trained, stable, well-behaved, and apparently resilient war fighter can find himself or herself quite suddenly unable to perform very well-learned tasks under the uniquely stressful and sometimes traumatic conditions of real combat. Likewise, exposure to traumatic stress may bring about psychological difficulties such as posttraumatic stress disorder PTSD. Resilience is a complex phenomenon that involves multiple factors of psychosocial, experiential, behavioral, and physiological influence. In order to identify, measure, and screen for resilience, we need to develop a clear and useful understanding of what makes some individuals more resilient than others to particular types of stress, and why the same individual might be more or less resilient to different types of stress. To that end, we can consider specific factors that have already been linked to stress-related outcomes such as first-term attrition, PTSD, and violent or criminal behavior. Although these relationships are correlative in nature, they are of unique interest for their consistency with stress-related outcome. Symptoms of PTSD include unwanted thoughts about the original trauma, nightmares, flashbacks, loss of interest, detachment, sleep disturbance, pronounced startle response, emotional numbing, and trouble concentrating. This may be the case in part because while all trainees are exposed to roughly the same rigors of basic training and technical schooling, the severity of combat-related trauma is variable and plays a more determinant influence with respect to PTSD Brewin et al. Basic demographic variables such as gender, race, and age have demonstrated statistically significant relationships to attrition and oftentimes to PTSD as well. Although the relationships between demographic variables and PTSD are small in magnitude r ranging from 0. Other fi ndings are also important here. Some of these demographic fi ndings may have broad implications for resilience and vulnerability to stress. For example, it is also the case that when compared with the general U. Interestingly, level of education also appears to be related to both early attrition and PTSD Brewin et al. These results suggest that for whatever reason s not yet understood, there exists some relationship between education and resilience. Psychosocial and behavioral factors that may be relevant to this relationship are discussed in the next section. Psychosocial and Behavioral Factors Studies emerging from various behavioral subspecialties point to specific psychosocial factors and characteristics that may be relevant to resilience. Among these are aptitude and intelligence, criminal history, tobacco use, mental health history, childhood abuse, and specific personality

traits. Higher AFQT scores are modestly associated with lower attrition, meaning that those endowed with good intelligence are likely to do relatively well in the military this assertion is based on the results from more than two dozen studies; see Knapik et al. When high school graduate status is controlled for, AFQT is still a modestly successful predictor of attrition, suggesting that the reason intelligence is a relatively good predictor of attrition is not simply because recruits with more education do better on the AFQT. On the other hand, high school graduation status is a more powerful predictor of attrition than is the AFQT composite. This difference is probably due to the additional relevance of other psychosocial variables. Presumably, successful high school graduation represents some degree of perseverance, generally appropriate behavior, and ability to function cooperatively with teachers and peers Knapik et al. Several studies have reported higher rates and increased severity of PTSD symptoms among individuals with lower intelligence scores Kaplan et al. Intelligence measures gathered before and after combat exposure using the AFQT and a standardized intelligence test given at a Veterans Administration Medical Center indicate that lower intelligence increases the likelihood of developing PTSD. These findings do not support the hypothesis that PTSD symptoms negatively affect performance on intelligence tests. Rather, intellectual ability may be a protective factor for several reasons. It may allow individuals to better 1 comprehend their symptoms, 2 express themselves when talking about their symptoms, and 3 engage in flexible and creative problem solving. Criminal History Preservice antisocial behavior has been identified as one possible predictor of military attrition Knapik et al. Unfortunately, many recruits enter military service with a history of antisocial or criminal behavior. For example, in one survey of male U. Among these individuals, In a larger study using two additional samples, Flyer examined the legal backgrounds of , male recruits who had enlisted in the U. This study included analysis of various records, including state California arrest and citation files, the California history database that includes juvenile records, and results from the Entrance National Agency Check ENTNAC. Even when controlling for education level, Flyer found that preservice arrest history was strongly related to separation from the military due to unsuitability. Anecdotal evidence suggests that preservice criminal behavior may also be related to subsequent criminal activity while serving in the military. Although fortunately rare, criminal incidents involving members of the U. Although anecdotal evidence of a link between preservice and in-service antisocial or criminal behavior is for now strictly anecdotal, it seems reasonable and obvious that individuals with a preservice history of criminal or violent behavior should be very closely and conservatively scrutinized prior to acceptance for service in the U. For example, in a Finnish longitudinal study Sourander et al. Among the general population, disruptive disorders are common in male teenage suicide victims. Conduct disorder, often comorbid with mood, anxiety, or substance abuse disorder, has been documented in approximately one-third of suicides among male teenagers Brent et al. Other studies have reported similar results e. For example, Klesges et al. Air Force were 1. Remarkably, a history of smoking behavior is predictive of attrition even after smokers have stopped smoking. In a study of U.

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3: Resilience : Steven M. Southwick :

Charney DS. Psychobiological mechanisms of resilience and vulnerability: implications for successful adaptation to extreme stress. Am J Psychiatry ;(2) Koenig HG, George LK, Peterson BL. Religiosity and remission of depression in medically ill older patients. Am J Psychiatry ;(4) Rachman S.

Abstract Numerous studies indicate social support is essential for maintaining physical and psychological health. The harmful consequences of poor social support and the protective effects of good social support in mental illness have been well documented. Social support may moderate genetic and environmental vulnerabilities and confer resilience to stress, possibly via its effects on the hypothalamic-pituitary-adrenocortical HPA system, the noradrenergic system, and central oxytocin pathways. There is a substantial need for additional research and development of specific interventions aiming to increase social support for psychiatrically ill and at-risk populations. Overall, it appears that positive social support of high quality can enhance resilience to stress, help protect against developing trauma-related psychopathology, decrease the functional consequences of trauma-induced disorders, such as posttraumatic stress disorder PTSD , and reduce medical morbidity and mortality. We will begin with a brief overview of the neurochemistry of the stress response and resilience to stress. Within this framework, we will then review the emerging literature on the neurobiology and the behavioral mediators of social support. The psychosocial and neurobiologic characteristics of resilience to stress are extremely complex, and their discussion is beyond the scope of this article for a thorough review see Southwick, et al. However, the literature suggests the sympathetic nervous system and hypothalamic-pituitary-adrenocortical HPA system are extensively involved in stress response and resilience. Numerous lines of evidence from psychophysiology and neuroendocrine studies indicate that the noradrenergic system is often dysregulated in PTSD. Indeed, highly resilient special operations soldiers tend to have high levels of NPY[6,7] in contrast to combat veterans diagnosed with PTSD who have reduced levels. This supports the notion that resilience to stress is associated with the regulation of noradrenergic activity within an optimal window. In response to acute and chronic stress, the hypothalamus secretes corticotropin-releasing factor CRF , which in turn induces the release of adrenocorticotropin hormone ACTH. In the short run, cortisol mobilizes and replenishes energy stores and contributes to increased arousal. In summary, stress resilience seems to be associated with an ability to keep the HPA-axis and noradrenergic activity within an optimal range during stress exposure and terminate the stress response once the stressor is no longer present. Based on these findings, we may postulate that for social support to increase stress resilience, it should enhance the ability to optimize the neurochemical stress response summarized above. Theoretical models of social support specify the following two important dimensions: For example, parental support seems to be more valuable in early adolescence than it is in late adolescence. In a sample of childhood sexual abuse survivors, a combination of self-esteem support the individual perceives that he or she is valued by others and appraisal support the individual perceives that he or she is capable of getting advice when coping with difficulties was most useful in preventing the development of PTSD. It has been argued that rich social networks may reduce the rate at which individuals engage in risky behaviors,[18] prevent negative appraisals,[19] and increase treatment adherence. In general, resilient or hardy individuals are thought to use active coping mechanisms when dealing with stressful life situations. Importantly, in this cohort, social support preceded and facilitated the use of active coping mechanisms. There is an emerging literature on social support and the neurobiological pathways through which it acts to foster resilience and reduce the risk for developing mental illness. In preclinical studies, social isolation has been associated with increased heart rate and blood pressure, hypercortisolemia, and atherosclerosis. For example, among cynomolgus monkeys, resting heart rate increases during separation and isolation but returns to normal when monkeys are reunited with their social group;[21] cortisol rises in squirrel monkeys[22] and wild baboons[23] during isolation; at postmortem examination, atherosclerosis has been significantly greater in swine[24] and in female monkeys[21] living

alone vs those living in social groups. Further, evidence suggests chronic stress and lack of social support increases cardiac risk e. For example, in laboratory studies mental arithmetic28 and public speaking tasks[29,30] cause significantly smaller rises in heart rate, blood pressure, and cortisol among subjects supported by another person compared to subjects who are alone. These findings are consistent with the results of a study conducted by Steptoe, et al. However, animal studies indicate that the regulation of social attachment and promotion of positive social interactions may be heavily dependent on two neuropeptides known as oxytocin and vasopressin. For example, montane voles typically avoid social contact except while mating; they have lower levels of oxytocin receptors in the nucleus accumbens compared to prairie voles, which are highly social and typically monogamous. The Trier Social Stress Test is a laboratory stressor that involves simulation of an aversive job interview and public speaking with negative feedback, resulting in a robust increase in anxiety and salivary cortisol. Both oxytocin and social support reduced anxiety in healthy men undergoing this procedure. Taken together, these results suggest that oxytocin promotes social behavior and may inhibit the HPA axis reactivity to stress. For example, in the well-known Alameda County Studies, men and women without ties to others were 1. Johnson and colleagues found that many Vietnam veterans experienced homecoming as a highly stressful experience. The relationship between good social support and superior mental and physical health has been observed in diverse populations, including college students, unemployed workers, new mothers, widows, and parents of children with serious medical illnesses. For example, Boscarino, et al. CONCLUSION The literature reviewed above clearly demonstrates the harmful consequences of poor social support and the protective effects of having access to rich and functional social networks on maintaining physical and psychological health. The exact biopsychosocial mechanisms underlying the positive influence of social support on resilience to stress are unknown. There is undoubtedly a complex interplay of various environmental and genetic factors that mediate the effects of social support on health outcomes. Evidence for such a gene-environment interaction involving social support comes from a pioneering study by Kaufman and her colleagues who have shown that social support may confer resilience to stress by moderating genetic risks for depression in maltreated children. In fact, animal studies suggest maternal care can alter the expression of the glucocorticoid receptor gene via affecting DNA methylation and chromatin structure. In fact, findings from animal and translational studies reviewed above show that social support reduces stress-induced cortisol release. It is possible that stress-induced oxytocin release augments social affiliation, which in turn reduces negative appraisals and arousal. In summary, social support seems to moderate genetic and environmental vulnerabilities for mental illness, possibly by effects through other psychosocial factors, such as fostering effective coping strategies, and through effects on multiple neurobiological factors. It will be important for psychiatric researchers to conceptualize, test, and apply effective interventions specifically aimed at increasing social support for psychiatrically ill or at-risk populations. This represents an important challenge for our field. The psychobiology of depression and resilience to stress: Implications for prevention and treatment. Annu Rev Clin Psychol ;1: Psychobiological mechanism of resilience and vulnerability: Implications for successful adaptation to extreme stress. Am J Psychiatry ; CSF norepinephrine concentrations in posttraumatic stress disorder. Autonomic responses to stress in Vietnam combat veterans with posttraumatic stress disorder. Role of norepinephrine in the pathophysiology and treatment of posttraumatic stress disorder. Plasma neuropeptide-Y concentrations in humans exposed to military survival training. Neuropeptide-Y, cortisol, and subjective distress in humans exposed to acute stress: Replication and extension of previous report. Current status of cortisol findings in posttraumatic stress disorder. Psychiatr Clin N Am ; Allostatic load as a predictor of functional decline. MacArthur studies of successful aging. J Clin Epidemiol ; Relationships among plasma dehydroepiandrosterone sulfate and cortisol levels, symptoms of dissociation, and objective performance in humans exposed to acute stress. Arch Gen Psychiatry ; Decreased cerebrospinal fluid allopregnanolone levels in women with posttraumatic stress disorder. Social support, stressful life events, and illness: A model and an empirical test. J Health Soc Behav ; Prospective relations between social support and depression: Differential

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4: - NLM Catalog Result

Southwick SM, Vythilingham M, Charney DS. The psychobiology of depression and resilience to stress: implications for prevention and treatment. Annual Review of Clinical Psychology ; Resick PA. Clinical psychology: a modular course. Philadelphia: Taylor & Francis Group; Rhodes JE, Roffman J, Grossman JB.

Interest in resilience has increased in recent years. Coping skills are also relevant, yet the relationships between coping and resilience are unclear. This brief review examines personal resilience and individual coping strategies, exploring definitions of each, along with their potential relationships to one another. Their potential contributions within a work setting are described. A literature review was conducted using search terms of resilience, resiliency, personal resilience, coping and resilient coping. Coping techniques can be functional or dysfunctional and the situations one copes with may be acute or long term, severe or minor. While coping and resilience are related to one another, they are distinct concepts. Positive coping techniques may contribute to resilience. However, which coping techniques improve resilience, and in what circumstances, are questions for future research. Articles abound regarding individuals, businesses, schools, communities, and countries seeking to increase their resilience. Individuals and groups want to improve their ability to withstand, recover, return, and thrive. That is, they want to withstand adversity, recover from calamity, return to normalcy, and continue to grow and prosper, while simultaneously acknowledging the severity of the situation they have experienced. Depending on which articles one reads, coping may be considered a subcomponent of resilience or vice versa; positive coping may refer to the actions taken by a resilient person; or the concepts within each may differ from one another. Soldier resilience is of utmost importance [3] and U. Understanding coping and resilience will benefit both the civilian and military sectors and impact training provided in each. This brief review examines personal resilience and individual coping strategies, exploring each and their potential relationship to one another, and probing their potential contributions within a work setting. While the definition of resilience refers to moving through and recovering from adversity, this does not imply that resilience is short-lived â€” occurring only in the face of a singular hardship. Some research has shown that individuals who are resilient tend to show healthy, long-term psychological functioning [7]. Other findings show that resilience is not predictably stable over time, as resilience is influenced by internal and external factors and life experiences [8]. Resilience is also differentially defined and influenced by culture [9]. Thus, resilience is an on-going process [10, 11] and individuals may be more resilient during one period of their lives than another. Rather than being a singular quality that one is born with, resilience develops over time and is influenced by perceptions, culture, family, experiences, and training [12â€”16]. As an example, Antonovsky [32, 33] wrote of Sense of Coherence SOC as a conceptual explanation of overcoming adversity. SOC contains three components: Comprehensibility refers to recognizing both the world and the hardship one is facing as explicable. Manageability suggests a conviction regarding the capability to handle the situation s oneself or with the help of others. Meaningfulness denotes identifying sense and value in overcoming hardship. The characteristics associated with resilience may exist prior to facing adversity, and as such may be considered to enhance or promote resilience, or perhaps be preventative in nature. However, according to some researchers, these same characteristics may develop after exposure to trauma, as part of a post-traumatic growth PTG process [22, 34]. However, post-traumatic growth does not occur for everyone [22, 34]. It is not known for certain whether those who were considered to be resilient before exposure to trauma or tragedy are more likely to benefit from PTG than those who were not resilient [34], and research is ongoing in this area [35]. Of particular relevance to businesses, companies, and the military are findings that resilience is related to workplace performance [13, 15, 17, 36â€”38]. Individuals who are more resilient are considered to be more adaptive within the perpetually changing workplace [40, 41] and may contribute to a more resilient organization. Resilience is positively related to job satisfaction, work happiness andorganizational commitment [37].

Moreover, individual resilience is only one part of developing team, organization, or community resilience [45]. Studies have discussed the factors that promote resilience beyond the individual level, such as within families, organizations, or communities [21, 46]. In a workplace, support from peers, team members, managers, and company culture are all factors that contribute to employee resilience [47]. Examples of workplace or company resilience, both of individuals and of a company as a whole, are exemplified by the recovery of Reuters America [48] and Southwest Airlines [49] following the terrorist attacks in the U. Kimhi and Shamai [50] describe community resilience as containing three elements: Amit and Fleischer [52] have published on the concept of national resilience in terms of sustainability and strength. National resilience is thought to be influenced by patriotism, optimism, social integration and trust [53]. While everyone uses coping skills, not everyone who uses coping skills is resilient, as explained in the following paragraphs. Not all coping approaches are helpful. Unlike resilience, which is defined as positive adaptation to change, coping techniques may be helpful or harmful in regard to both the immediate situation, as well as to the psychological health of the individual. Two positive coping styles are problem-focused coping and emotion-focused coping [59â€”62]. These categories are further divided into 14 subcategories. Meanwhile, another coping style - avoidant coping â€” is a technique in which one attempts to avoid the stressor and its consequences and it is negatively related to work ability [63]. Successful coping is considered to be adaptive and can include self-reflection, planning, dynamism and multidimensional thinking [64, 65]. The development of appropriate coping mechanisms is thought to be part of a healthy growth process and fundamental to social-emotional functioning [68] and overall well-being [68â€”70]. Again, coping refers to encounters in everyday life, as well as with great distress, while resilience refers to dealing with adversity and trauma rather than with commonplace circumstances. Coping strategies can be learned and therefore can be trained. In an investigation of cognitive-behavioral training of Australian Army recruits, the intervention group received specific instruction on coping strategies [73]. At the end of basic training, recruits receiving the instruction reported less use of negative coping strategies, more positive states of mind, and less psychological distress than the control group [73]. Ineffective coping can also be learned, potentially developing through repetition [73]. That is, if a person experiences an untoward event and responds in a protective, yet ineffective manner a few times, then a conditioned response can begin to develop. In the future, a situational trigger is likely to yield similar results. This conditioned response may need to be deconditioned. Organizations may need to train employees on how not to use dysfunctional coping during challenging situations,instead engaging in positive coping strategies [66]. Van den Heuvel and colleagues suggest that promoting positive coping styles and health can sustain employability [63]. However, individuals high in active coping, but without an option for having control over their work, can become frustrated and emotionally exhausted [75]. Coping skills have been found to be important influences on work engagement in a wide range of fields such as police recruits [76] and among nurses and midwives [77]. More specifically, problem-focused coping, low use of avoidance coping, and low use of venting of emotions as a coping strategy predicted work engagement among nurses [78]. Coping skills can be positive, negative, or dysfunctional, thus not necessarily leading to improved functioning, while resilience denotes beneficial adaptation only. A number of questions arise from this brief review, some of which will be addressed in the recommendations. Publications on resilience and coping should refrain from using the terms interchangeably, as this confuses the issues for readers. For example, some articles refer to their outcome measurements as assessing both resilience and coping; however in reading the articles, testing includes coping scales, interpersonal skills, social impact measures, or interviews, but no specific measures of resilience [79, 80]. Thus, leaving readers to the idea that coping and resilience are the same. The reverse can also occur where authors refer to their measures as including both resilience and coping, yet their measurement section contains characteristics associated with resilience such as the SOC , symptoms of stress, and exposure to war, but no measures of coping [81]. While such articles provide valuable information regarding their research, using the terms interchangeably is misleading. Understanding both is important to assisting individuals deal with

adversity, teaching resiliency, and conducting research on resilience. Research opportunities abound for exploring each and for examining the associations between the two concepts. Disclaimer The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U. Conflict of interest The authors have no conflict of interest to report. Acknowledgments This research was supported by the U. Army Research Program Office. References [1] Gerardi SM. Work hardening for warrior: Occupational therapy for combat stress casualties. A Journal of Prevention, Assessment, and Rehabilitation ;13 3: Work hardening for warriors: Training military Occupational Therapy professionals in the management of combat stress casualties. Oxford handbook of positive psychology. Oxford University Press; Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. American Journal of Community Psychology ;41 Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? American Psychologist ;59 1: Risk, resilience, and recovery: Perspectives from the Kauai Longitudinal Study. Development and psychopathology ;5 The ability of older people to overcome adversity: A review of the resilience concept. Geriatric Nursing ;34 2: Using visual methods to capture embedded processes of resilience for youth across cultures and contexts. Developing a highly resilient, change proficient work force. A methodological review of resilience measurement scales. Health and Quality of Life Outcomes ;9 8: Determinants, measurement, and treatment responsiveness.

ADAPTATION TO STRESS AND PSYCHOBIOLOGICAL MECHANISMS OF RESILIENCE STEVEN M. SOUTHWICK . [ET AL.] pdf

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[et al.] --Resilience through leadership / Donald Campbell, Kathleen Campbell, and James W. Ness --Adaptation to stress and psychobiological: mechanisms of resilience / Steven M. Southwick.

This article has been cited by other articles in PMC. Abstract Understanding of psychopathology of mental disorder is evolving, particularly with availability of newer insight from the field of genetics, epigenetics, social, and environmental pathology. It is now becoming clear how biological factors are contributing to development of an illness in the face of a number of psychosocial factors. Of late, there has been a paradigm shift in the understanding of resilience in context of stress risk vulnerability dimension. It is a neurobiological construct with significant neurobehavioral and emotional features which plays important role in deconstructing mechanism of biopsychosocial model of mental disorders. Resilience is a protective factor against development of mental disorder and a risk factor for a number of clinical conditions, e. Available information from scientific studies points out that resilience is modifiable factor which opens up avenues for a number of newer psychosocial as well as biological therapies. Early identification of vulnerable candidates and effectiveness of resilience-based intervention may offer more clarity in possibility of prevention. Future research may be crucial for preventive psychiatry. In this study, we aim to examine whether resilience is a psychopathological construct for mental disorder. Resilience is described as an evolving process influenced by a variety of biological, social, and environmental factors. It is in this respect that resilience emerges as a factor which contributes as a defense mechanism and a protective factor. A number of factors have been used to explain the resilient response to adverse life situation, and recent development in psychosociology and neurobiology provides more insight into this problem. Of late, there has been a paradigm shift in the understanding resilience which determines stress-risk vulnerability dimension. In this paer, we examine whether resilience is a psychopathological construct for mental disorder. We first examine its correlates i. In addition, we seek to explain why resilience has a greater effect on some individuals when compared to others. Finally, we will investigate the implications and ramifications of resilience in a clinical setting. The level for resilience protection and modification also depends on other complex factors that shape the influence resilience on individuals experiencing trauma. The capacity to which resilience is able to act as a preventative measure seems to have a strong correlation to ingrained psychosocial factors. The factors that act to maintain and uphold resilience are active coping, cognitive flexibility, and social support. In addition to active coping, cognitive flexibility also helps to develop and maintain the effectiveness of resilience in withstanding trauma. Therefore, when trauma based stimuli occurs, an individual with a better-established reservoir of knowledge would potentially be more suited to be cognitively flexible to the arising problem and mitigate the harm caused by the trauma. Finally, the last factor that contributes to the makeup and function of resilience is social support. Furthermore, if the three factors are developed properly, then there is a greater likelihood for the individual to be defended against harm caused by trauma. The neuroscience of resilience is beginning to uncover the circuits and molecules that protect against stress-related neuropsychiatric diseases. Literature on trauma has focused predominately on limbic and cortical structures that innervate the hypothalamic-pituitary-adrenal HPA axis and influence GC-mediated negative feedback. Central neurochemical response to trauma is HPA axes which governs, coordinates, and modulates various changes arising from its interaction with hypothalamic-pituitary-thyroid axis, corticotropin-releasing hormone, and corticotropin-releasing factor, to finally regulate neurotransmission mechanism. Changes in neuroplasticity, HPA axis response to stress, neurotransmissions of dopamine, serotonin, and norepinephrine play an important role in maintaining homeostasis of resilience plasticity. Neurochemical changes suggest that cortisol related sustained, enhancement of amygdala, and hippocampus may lead to loss of functional connectivity. A number of other abnormalities in the brain have also been observed, for example, changes in neurocircuitry mediating reward, and activation and regulation of mesolimbic dopaminergic projections from the ventral tegmental area

to the nucleus accumbens. Studies report that resilience is affected by pharmacological interventions, e. It has been established above that there is a strong interplay between resilience and mental illness. The number of traumatic events significantly decreases the level of resilience, and people are more likely to develop psychiatric disorders such as depression and suicide. This is important because people with an experience of trauma significantly differ, from those who have not had such experiences, in terms of structural as well as functional changes in the brain. Investigating mechanisms by which trauma is associated with increased risk of mental illness would provide insight into the processes involved in the emergence of mental disorders, as well as help with the identification and development of treatment for predisposed individuals. Researchers have investigated the association of resilience in euthymic patients with bipolar disorder. Their study illustrated that high levels of resilience were shown to be related to low levels of impulsivity and depressive episodes. A similar relationship was found in patients that had posttraumatic stress disorder PTSD , where high levels of resilience correlated to low levels of PTSD. Studies regarding ultra-high-risk UHR show that psychosocial functioning in UHR participants is often compromised, and this dysfunction is often associated with negative symptoms, adaptive coping, and resilience. Treatment strategies for individuals at UHR for psychosis should be comprehensive, promoting resilience while targeting the reduction of positive and negative symptoms in order to foster social reintegration and recovery. The notion of enhancing resilience through intervention has been studied with patients that had lived through a high trauma situation. The results indicated that significant intraparticipant mean increase in resilience at follow-up assessment, and greater self-reported improvement in resilience processes for participants who experienced more traumatic events. Therefore, resilience can be modified and enhanced by metallization and cognitive training. Other researchers have examined the effect of mindfulness training on resilience mechanisms in active-duty marines preparing for deployment. MMFT emphasizes interceptive awareness, attention control, and tolerance of present-moment experiences. The main outcome measures were heart rate, breathing rate, plasma neuropeptide Y concentration, score on the response to stressful experiences scale, and brain activation as measured by functional magnetic resonance imaging. The results showed that mechanisms related to stress recovery could be modified in healthy individuals prior to stress exposure. These results carry important implications for evidence-based mental health research and treatment. As models of resilience inevitably reflect interpersonal variability, this approach is likely to provide valuable information for personalized medicine, where treatment is customized to individual patients. Furthermore, this could mean a new mouse model of resilience in schizophrenia research may emerge resulting from efforts to further explore pathophysiology. The resilience models offer a novel and more direct approach to drug discovery for schizophrenia and neuropsychiatric disorders. Psychiatrists and other mental health professionals should collaborate with policy-makers in developing policies and interventions to bolster resilience. Clinical and public health interventions each have a role in improving the chances of resilience in children and adults affected by severe adversity. Clinical implications induce renewed emphasis on the value of a clinician taking a good history, a strong therapeutic alliance, and the reinforcement of attitudes and behaviors known to facilitate resilient outcomes. However, it remains far too complex to simply determine the nature and degree of the resilience response in the face of an adverse situation. Without a uniform understanding of resilience, it becomes hard to study the effectiveness of resilience as a treatment. They have examined the current conceptualizations of resilience as well as their own subdivisions and approaches to resilience in relation to mental health. Confliction between these two definitions has led in the inability to utilize resilience as a theoretical concept in research. Some authors have looked at three resilience approaches that can be effective at preventing and counteracting mental illness. The first is the harm-reduction approach, which describes resilience in terms of a quick recovery after a time of stress, and this may include biological reasons and genetic predispositions. The next is the protection approach, in which an individual uses certain mechanisms or measures to maintain mental health i. Finally, the promotion approach which describes the individual as one who promptly uses resources to aid in mental health. The notion of enhancing resilience through intervention has been studied with patients that lived through a high trauma situation. In this, respect

and intervention can increase resilience and as such, high resilience can enhance effectiveness of a treatment. This has a strong clinical implication for physical disorder as well as mental disorders, especially in how the treatment is developed and delivered. Patients with chronic pain suffer less distress and face it with optimism when they are resilient. Therefore, one can make the argument that if resilience is encouraged throughout the treatment process, the treatment itself will become more streamline and manageable and in all probability lead to more favorable outcomes. Similarly, resilience plays an important role in the overall well-being of individuals. If introduced into nursing curricula, emotional intelligence interventions may increase coping resources and enhance social skills for nurses, which may be of benefit for their long-term occupational health. Studies have concluded that moderate resilience and emotional intelligence can help, nursing students, in this case, in coping with adversity in their future clinical work. In a study of Palestinian school children, it has been reported that the intervention was not statistically significant, and it did not increase the level of resilience. A clear role of resilience in psychopathology is not yet known; however, some isolated characteristics can be amalgamated to clarify how it plays a role in functioning as a protective factor. Some examples of this include maintaining a psychological state which provides protection against adversities in both acute and chronic conditions, minimizing the extent of pathogenesis in developmental process of transition from health to disease, facilitating return to original stage once the adverse situation has changed, and resiliency is modifiable. Resilience programs have the potential have great benefit, and not only to people suffering from mental disorders but also to the general public by enhancing their ability to cope with unforeseen challenges. It can delineate specifically to the group of people who have significantly more resilience, and further epidemiological finding is expected to provide information about validity of the concept of resilience and its correlation with mental disorders. Resilience is not a dichotomous concept but a parametric one. Further, it is clear that it is involved in prevention of progression of a psychopathology, like conversion to frank psychotic state from UHR state. Though it is not clear, whether resilience is a modifiable or nonmodifiable factor, studies report that resilience is affected by pharmacological interventions, e. Understanding the psychology and neurobiology, underlying resilience will help develop strategies aimed at preventing psychopathology after exposure to severe adversity. However, individual differences exist, which determine the nature of psychopathology, response to treatment and outcome. Reason for such differences is complex which has been hampering the efforts to obtain best possible quality of life despite similar treatments and treatment settings. We believe that it has been neglected factor while discussing psychopathology. With increasing evidence for its involvement, a newer way of understanding psychopathology, protection of risk, and prevention of mental disorder is likely to emerge. Financial support and sponsorship.

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Resilience is a construct that may be involved in psychopathological process for mental disorder; it also mediates stress response of trauma; therefore, high level of resilience works a protective factor and lower level of resilience increases vulnerability for developing pathological consequences of adverse environmental events.

8: Biobehavioral resilience to stress - ECU Libraries Catalog

[et al.] -- Resilience through leadership / Donald Campbell, Kathleen Campbell, and James W. Ness -- Adaptation to stress and psychobiological mechanisms of resilience / Steven M. Southwick.

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