Sippel, L. M., R. H. Pietrzak, D. S. Charney, L. C. Mayes, and S. M. Southwick. 2015. How does social support enhance resilience in the trauma-exposed individual? *Ecology and Society* **20**(4):10. http://dx.doi.org/10.5751/ES-07832-200410

Research, part of a Special Feature on Understanding human resilience in the context of inter-connected health and social systems

How does social support enhance resilience in the trauma-exposed individual?

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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.e., resilience of romantic partners, family members, neighborhoods, and larger social contexts) and individual resilience. We suggest directions for future research and interventions, with the goal of stimulating research efforts that address these questions among trauma-exposed individuals.

Key Words: *individual resilience; neurobiology; social support; systems resilience*

INTRODUCTION

Individual resilience is often thought of as the capacity of the individual to (a) bend, but not break, and to (b) bounce back from adversity. According to the American Psychological Association, resilience is defined as the "process of adapting well in the face of adversity, trauma, tragedy, threats or even significant sources of stress" (APA 2013). 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. 2014). 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 2004, Southwick et al. 2005, Southwick and Charney 2012). 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. 2010; see Torres et al. 2011 for a review). As such, sturdy role models and a history of loving caregivers predict individual resilience (Southwick and Charney 2012). 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 2000, Lerner et al. 2012, Overton 2013), which integrates principles from developmental systems theory (Lerner, 2006), ecological systems theory (Bronfenbrenner and Morris 2006), family systems theory (Goldenberg and Goldenberg 2013), biological systems theory (Lickliter 2013), and developmental psychopathology (Cicchetti 2013*a*). These models posit that systems interact to shape the course of the individual's development, that resilience at the individual level depends on the function of multiple interacting, adaptive systems, and that the "capacity for adaptation of an individual will be distributed across interacting systems" (Masten 2014:9). 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.

DEFINING SOCIAL SUPPORT

Social support is a complex construct with many definitions. In this commentary we are guided by Cohen's (2004:676) definition: "social support refers to a social network's provision of psychological and material resources intended to benefit an individual's capacity to cope with stress." Social support can take many forms, including structural support, i.e., the size and extent of the individual's social network, frequency of social interactions; functional support, i.e., the experience or perception that social interactions have been beneficial in terms of emotional or instrumental needs; emotional support, i.e., behavior that fosters feelings of comfort leading the person to believe that s/he is loved, respected, and/or cared for by others; instrumental/material support, i.e., goods and services that help solve practical problems; and informational/cognitive support, i.e., provision of

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relevant information intended to help individuals cope with current difficulties, understand the crisis, and adjust to the changes that have occurred, which typically takes the form of advance or guidance in dealing with one's problems.

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.g., Almedom 2004) further emphasize the need to consider the level of social support, i.e., macro and micro, provided as prevention or intervention. 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. These contexts can affect the provision and receipt of social support at all levels by influencing an individual's definition of support, appraisal of events as stressful, evaluation of whether social support is in fact supportive, and propensity to give, get, accept, or reject support (Shumaker and Brownell 1984).

We draw largely from research examining aspects of "social capital," which refers to the investment in, access to, and use of resources embedded in social networks (Norris et al. 2008). These resources include received and perceived social support, social embeddedness, links to and participation in organizations, sense of community, and attachment to one's neighborhood or city. 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 2010 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. 2005, Charuvastra and Cloitre 2008, Pietrzak and Southwick 2011).

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 1985, Jacobson 1986, Cutrona and Russell 1990); as such, support provided in a sequence inconsistent with the present needs will neither be effective nor recognized as helpful (Jacobson 1986). In fact, social support can be counterproductive or maladaptive, particularly if it is unsolicited, excessive, or is an inappropriate match to one's needs (see Bonanno and Diminich 2013, Song and Chen 2014). 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 2004). Finally, the types of supports that are needed change continuously with the changing nature and appraisal of the problem (Jacobson 1986). Taken together, these literatures have informed a key question about the appropriate provision of social support: "Who gives what to whom regarding which problems, when, and at what level?" (Almedom 2004:455).

THE ASSOCIATION BETWEEN SOCIAL SUPPORT AND INDIVIDUAL HEALTH

A sizable literature has shown positive associations between poor social support and physical and mental health and identified potential mechanisms for these associations. Smith and Christakis (2008) and Thoits (2011) provide thorough reviews of these literatures, respectively, in adults; see Cicchetti (2013*b*) for a review of relevant literature in children. See Holt-Lunstad et al. (2010) for a meta-analysis of prospective studies showing a link between social isolation and mortality risk and Janicki-Deverts and Cohen (2011) for a review of literature linking social ties to chronic disease. In general, research indicates that the health of one person is inextricably tied to the numerous others to whom that person is connected. As such, there is evidence for "non-biological transmission of (physical) illness" (Smith and Christakis 2008:420) and well-being (Fowler and Christakis 2008).

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.e., high number of lifetime traumas, low current psychological distress) had more social support, in that they were more likely to be married or living with a partner and scored higher on measures of social connectedness (i.e., secure attachment style, social support) and community integration, than veterans identified as distressed (i.e., high number of lifetime traumas, high current psychological distress; Pietrzak and Cook 2013). In addition to postdeployment social support, military unit support has been shown to buffer against posttraumatic stress disorder (PTSD; Pietrzak et al. 2010), a psychological disorder that results from exposure to trauma. In fact, meta-analytic findings indicate that poor social support is one of the strongest predictors of development of PTSD (Brewin et al. 2000, Ozer et al. 2003). For example, in the National Vietnam Veterans Readjustment Study, King and colleagues found that low level of perceived postdeployment social support was a strong mediator of risk for PTSD (King et al. 1998). Vietnam veterans with high social support were shown to be 180% less likely to develop PTSD compared with Vietnam veterans with low social support (Boscarino 1995). Further, among treatment-seeking Vietnam veterans, homecoming stress (i.e., negative interpersonal interactions, shame, resentment, and social withdrawal) was a stronger predictor of current PTSD symptomatology than level of combat exposure, stressful life events, or childhood and civilian traumas (Johnson et al. 1997). 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.e., family support and understanding) compared to veterans classified into

the PTSD group (high combat exposure, high PTSD symptoms; Pietrzak and Southwick 2011).

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 14-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. 2003). Similarly, in a 20-year study of Israeli combat veterans, Karstoft and colleagues (2013) 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. Americans no longer seem to "confuse the war with the warrior" (Slone and Friedman 2008:50), and instead welcome, accept, and support returning service members regardless of political disagreements about the policies that initially led to the war.

Individual well-being also appears to influence the well-being of one's support system. Fowler and Christakis (2008) provide longitudinal evidence that happiness "spreads," in that one individual being happy increases the probability that a close other will become happy, rather than the tendency for people to associate with similar individuals. 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 (2008) 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 18-24 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 (2014) 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. However, data from Kaniasty and Norris's (2008) study suggest that this dynamic interplay of individual and collective experience can change as psychological distress wanes for the majority of survivors. At this point, the minority of survivors who continue to experience debilitating trauma-related psychological symptoms, such as PTSD, may be viewed as abnormal, as a burden, and as a contradiction to the community's perception of successful recovery. 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. Consistent with the frameworks provided by Jacobson (1986) and Almedom (2004), these findings suggest that social support may have a "stress buffering" effect in the early aftermath of trauma but, in later postdisaster phases of recovery, this association may reverse as a consequence of gradual distancing of social supports from chronically symptomatic survivors.

MECHANISMS FOR THE LINK BETWEEN SOCIAL SUPPORT AND INDIVIDUAL RESILIENCE

In line with attachment theories positing that attachment figures directly and indirectly regulate arousal and stress reactions, a growing body of evidence suggests that high social support may promote behaviors that improve stress-regulation. Specifically, available data suggest that high social support can increase self-confidence, decrease the likelihood of engaging in risky behaviors, e.g., excess alcohol, and foster more effective coping strategies, such as active problem solving (Holahan et al. 1995, Rozanski et al. 1999). 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.g., exercise, help an individual to redefine a difficult situation as being less threatening, and enhance regulation of emotions such as mistrust, anxiety, and fear.

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. 2008 for a review). 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. However, exceptionally stressful experiences early in life may have long-term consequences for children's cognitive, social, emotional, and physical health (Torres et al. 2011). Such situations are considered "toxic" when they are perceived as uncontrollable, when they activate the stress response system frequently and for long durations of time, and when the child does not have a dependable stable set of relationships to buffer against the impact. 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. 2007). 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.g., ventromedial prefrontal cortex) that detect safety and that inhibit fear, and release of the neuropeptide/hormone oxytocin (Eisenberger 2013*a, b*). For example, Coan and colleagues (2006) showed that women's neural responses to threat of electric shock were more greatly attenuated when they held the hand of their husbands relative to the hand of an anonymous male experimenter; this effect was stronger for women who reported greater marital quality.

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 2009 for a review). Intranasal administration of oxytocin has been shown to improve one's ability to infer the mental state of another person, to recognize familiar faces, to correctly identify negative versus positive facial expressions, and to reduce anxiety (e.g., van IJzendoorn and Bakermans-Kranenburg 2012). 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 2012). 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 (2009) have proposed that mammals process threats to social connection, e.g., isolation, social rejection, loneliness, in much the same way that they process threats to survival since threats to social connection might signal possible exclusion from the group, thereby leaving the individual more vulnerable to danger. 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.g. amygdala, dorsal anterior cingulate, insula, dorsal medial prefrontal cortex. 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. 2005, McEwen 2006), and Eisenberger (2013*a, b*) reported that both the dorsal anterior cingulate and the dorso-medial prefrontal cortex are activated when humans are experiencing social rejection. 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.g. methylation, that turn on or turn off specific genes (Nestler 2012, Toyokawa et al. 2012). When a gene is turned on, it produces its gene products, i.e. proteins, but when it is inactivated, it no longer produces these products. For example, a number of studies have reported that people who inherit a specific variation of the serotonin transporter gene, i.e., SS variation, are more likely to become depressed after stressful events compared with people who inherit other variants of the serotonin transporter gene (Karg et al. 2011). However, Kaufman and colleagues (2004) 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 2012, McEwen and Getz 2013, Yang et al. 2013).

FAMILY AND COMMUNITY RESILIENCE AND THE TRANSACTIONAL MODEL OF RESILIENCE

As we previously noted, resilience, like social support, operates at and across multiple levels, in that social systems may be more or less resilient and more or less capable of supporting and enhancing resilience in the individual. We draw from Jaffee and colleagues (2007), 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.g., family, community, and culture.

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.g., communication or problem-solving, mediate the recovery, or maladaptation, of all members, as well as the family unit (see Walsh 2011 for a review). Acknowledgement of the interdependence of family and service members' well-being has motivated the military to strengthen its supports for families. 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.e., deployments and postdeployment periods (see Masten 2013), as well as the developmental stages of children in the family (see Paley et al. 2013, Milburn and Lightfoot 2013). 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.

With respect to communities, resilience has been defined as "the ability of community members to take deliberate, purposeful and collective action to alleviate the detrimental effects of adverse events. As with individual resilience, community resilience involves attitudes, thoughts, beliefs, behaviors and resources" (Pfefferbaum et al. 2013:251). Community-level adaptation can be understood as "population wellness," defined by Norris and colleagues as "high and non-disparate levels of mental and behavioral health, role functioning, and quality of life in constituent populations" (Norris et al. 2011:163). 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.

Numerous indicators of community resilience have been identified, including affordable housing, income equality, home internet access, educational attainment, elected leadership diversity, rates of recovery of healthy functioning following illness, rank on United Way "State of Caring Index," access to health care, public space including acreage, bike and walking paths, open space, etc., air quality, recidivism rates, and perceptions of social trust and cohesion (Hall and Zautra 2010). 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.g., church or school, has been shown to promote

resilient outcomes among children who experienced childhood sexual abuse (Marriott et al. 2014). Jaffee and colleagues' work (2007) serves as an example of the transaction between individual resilience and that of one's family and community. In the Environmental Risk Longitudinal Study of 1116 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. 2007). 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.e., the cumulative stressors model, suggesting the need to intervene at family and community levels for severely at-risk children.

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 2013). These studies suggest that community resilience serves to moderate individual resilience, in that stronger, better-prepared communities served to bolster its citizen's resilience in the face of adversity. That being said, individual resourcefulness does matter for individuals lacking within-community resources. For example, Distelberg and Taylor (2013) 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. This finding is consistent with Yehuda's definition of resilience (see Southwick et al. 2014), which includes the individual's ability to utilize available adaptive capacities.

As noted by Abramson and colleagues (2015), 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.

IMPLICATIONS FOR INTERVENTION

Although individual resilience can be enhanced through personal skill development and training in a variety of areas, such as cognitive reframing, mindfulness meditation, and physical fitness, it can also be enhanced through increasing the individual's positive interactions with family, organizations, and community (Southwick and Charney 2012). Specific interventions designed to enhance the individual's ability to attract and utilize social support have been studied in a variety of populations including subjects preparing for surgery, as well as subjects diagnosed with cancer or substance abuse disorders. In a review of over 100 published studies of interventions that taught participants social and behavioral skills needed to strengthen existing social networks and develop new relationships, Hogan and colleagues (2002) found that 83% of studies reported at least some benefits, e.g., reduced psychological distress, decreased substance abuse, from social support interventions compared with another active treatment or no treatment. 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 2012). Sometimes, however, it may be that the most effective strategy to enhance resilience at a specific level involves intervening on a different level, such as the level of the romantic partner, family unit, and/or community.

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. We highlight a novel example of the bidirectional nature of resilience, namely evidence supporting the utility of a couples-based intervention for PTSD, Cognitive-Behavioral Conjoint Therapy for PTSD (Monson and Fredman 2012). Emerging evidence for this protocol shows that treating the individual with PTSD with a dyadic-level intervention helps reduce the individual's symptomatology and improve the marital relationship, which is not directly targeted in the intervention (Monson et al. 2012). Although preliminary, this work suggests that intervening at the dyadic level improves individual resilience and reciprocally promotes resilience at the dyadic level.

With respect to children, we believe the most effective way to enhance individual resilience is to provide a safe, stable, loving environment that promotes the child's natural protective systems, i.e., brain, cognitive, emotional, and physical systems, to develop and operate effectively. Given that parental distress is a consistent predictor of child psychosocial functioning, we (and others) suggest that focusing on the well-being of parents and improving their parenting skills as early in a child's development as possible, including prenatally, may be particularly effective for promoting resilience to future stressors. For example, Minding the Baby, an intervention that aims to enhance the capacity of young parents to understand their infant's mental and emotional needs as well as their own needs as parents, has been shown to reduce maladaptive outcomes in early childhood (Torres et al. 2011).

References provided in this perspective offer suggestions for social support providers such as romantic partners and parents. Thoits (2011) provides some general guidance, while Slone and Friedman (2008) offer guidance specifically targeted at families of returning troops and veterans. Thoits (2011) argues that significant others can engage in emotionally sustaining behaviors (e.g., demonstrations of caring, valuing, and understanding), model active coping, and provide instrumental aid, empathy, and active coping assistance. As previously noted, support providers may be most effective when the type of support they offer fits the individual's needs at any particular point in the crisis or aftermath. Further, the individual's needs can in turn affect the provider's resilience and risk; providers should be aware of the possibility

of negative consequences like "burnout" and vicarious traumatization, and utilize their own support systems as needed.

Community-level interventions

Community resilience is now seen as critical to national health security, and models for building community resilience are being developed, e.g., RAND Corporation (Chandra et al. 2011). Collective traumas like natural disasters and terrorist attacks disrupt many systems concurrently. Community resilience approaches recognize that survivors are connected and dependent upon one another's coping strategies, and that the individual's resilience is inextricably linked to the community's ability to prepare for, respond to, and adapt to adverse conditions. As stated by Norris et al. (2011:162), "when problems are shared, so must be solutions." For example, individuals within pre-existing organizational networks and relationships can prepare and organize solutions, e.g., emergency and ongoing support services, to be rapidly mobilized when a disaster strikes. As such, interventions that include assessment of predisaster supports and then boost and protect naturally occurring social supports in the aftermath of disasters are likely most effective for improving mental health and resilience in a sustained fashion (Almedom 2004, Abramson et al. 2015). Recovery takes time and includes many transitions between recovery states, which again highlights the importance of considering how support provision is timed and targeted.

More generally, providing resources to ensure safe neighborhoods with public spaces that promote exercise, affordable housing, access to healthcare, and effective schools may provide a marked boost to resilience for a large number of individuals who live in impoverished and dangerous communities (Hobfoll 2001, Hall and Zautra 2010). Schools in particular can play a key role in promoting resilience. Schools provide opportunities for children to experience challenge, master failure, succeed, learn from role models, and benefit from mentors and supportive adult relationships via classroom interactions, sports, music, and community programs (Torres et al. 2011).

Consistent with transactional models of resilience, there is also emerging evidence of a bidirectional relationship between healthy communities and more resilient individuals. In some of our own work, we are working to improve families' engagement with their community through educational programs with very young children and their parents in which we increase knowledge about, and pride in, their community, with the hope that program will also bring families together. Theoretically, the community then becomes more engaged in the health of its citizens. More cohesive, engaged families can then feed back to the well-being of the community. In this way, individual intervention efforts have a synergistic effect across networks and suggest that promoting positive adaptive skills in individuals must involve a multilevel, multisystem approach including individuals, families, and communities.

Regional/National/International interventions

Review of regional, national, and international policies and interventions to promote individual resilience is beyond the scope of this perspective. That being said, we do believe that policy reform aimed at increasing individuals and families' access to individual and community services is needed. Public health models indicate that interventions can be universal, i.e., for all children, targeted toward those at higher risk, e.g., National Guard or Reserve families that live far away from military installations, or intensive, e.g., identifying and treating individuals experiencing mental or physical illness. There are many active programs within military communities, but they are often lacking in civilian communities where National Guard, Reserve, and veteran families live (see Slone and Friedman 2008 for a review). Policy change toward enhancing resilience in military families is underway, and programs targeting military families have been developed and implemented, though typically lack the infrastructure for rigorous monitoring and testing (see Boberiene and Hornback 2014 for a review). Evaluation of these programs and more large-scale studies with representative samples are needed.

On one hand, with advances in our understanding of how social network factors impact the individual, it may be possible to develop societal interventions that promote physical and emotional resilience in a large population of individuals. Political and societal policies that address issues such as poverty, housing and food instability, poor education, and income inequality could have substantial impact on the resilience of individuals affected by these policies (Shim et al. 2014). On the other hand, given evidence that large-scale prophylactic interventions are often ineffective, and sometimes harmful (as noted by Bonanno and Diminich 2013), novel intervention efforts should not be undertaken lightly. Further, the determinants of resilience in one community and culture may differ from those in another community or culture. For example, instilling hope and a sense of dignity may be critical in a war-torn community but not in a stable, resource-rich community.

CONCLUSIONS

Individuals have great potential to adapt in the face of adversity. However, this adaptation requires the functioning of many interacting systems within and around the individual. Thus, although numerous demographic, psychosocial, and biological factors have been associated with resilience, any one factor typically accounts for a relatively small portion of the variance (Southwick et al. 2014). Effective interventions will need to focus on a wide range of factors, including promotion of social support and social networks through supportive caregivers, family units, organizations, and communities. Such interventions will be more or less effective depending on the match between the source, type, and timing of social support and needs of individual or system.

The science of human resilience has influenced many social responses to and policies targeting trauma-exposed individuals. Studies like those of Johnson and colleagues (1997) and Koenen and colleagues (2003) have shown how critically important it is that families and communities support military veterans, for whom poor homecoming support is a robust risk factor for PTSD. Fortunately, U.S. communities have provided far greater support for military personnel serving in the Iraq and Afghanistan wars than they did for returning Vietnam Veterans, even if they were critical of the war efforts themselves (Friedman 2005). The U.S. federal government has increased focus on military families' needs; for example, the *Strengthening Our Military Families: Meeting America's Commitment* (Department of Defense 2011) report outlines priority areas to address the concerns and challenges of active duty, reserves, and veterans' families,

recognizing that families are the first line of support and care. The U.S. Department of Defense and Veterans Administration engage in public awareness and outreach efforts to connect veterans with mental health resources and to engage families in veterans' care.

We also want to note that knowledge that individuals benefit from community resilience and coordinated responses to disaster is not new. The development of the U.S. Federal Emergency Management Agency (FEMA), which was created in 1979 and supports citizens in coordinating responses to disasters, can be traced back to the early 1800s: the Congressional Act of 1803, generally considered to be the first disaster legislation, provided assistance to a New Hampshire town after a severe fire. Present-day FEMA's mission is based on the understanding that individuals under stress need community support to prepare for, protect against, respond to, and recover and grow from trauma. FEMA operates on a community level to provide aspects of social support, thus inherently recognizing that individuals cannot "do it alone." The same can be said for maltreated children, whose potential to thrive is heavily contingent on support from attachment figures and communities (Jaffee et al. 2007). Research with at-risk children has influenced a broad range of federal policies and practices aimed at strengthening families and preventing child maltreatment (National Alliance of Children's Trust and Prevention Funds 2009).

In this perspective, we have argued that resilience in the individual is highly dependent on social systems that provide positive support, and that these systems enhance resilience through a variety of psychosocial and neurobiological mechanisms. Further research on the complex relationships between social support, social networks, and resilience is needed to develop effective strategies to enhance resilience in individuals, families, and communities.

Responses to this article can be read online at:
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