Chapter 5

Violence, trauma, and resilience

By
Michael Ungar and Bruce D. Perry

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Introduction

When it comes to violence in families, one of the persistent challenges has been to better understand *exactly how* abuse and violence affect the individual child or adult. How does a physical or verbal act, or even a threat, for example, get under someone's "skin" and affect brains and bodies? How is it that particular acts or threats are traumatizing to some and appear to have little effect on others? In recent years, "resilience" has become a popular concept to explain how some people avoid the negative effects that follow exposure to violence. Is it actually "resilience" that mediates the experience? If the effects of abuse and violence change the body and brain, how do relationship-based interventions support recovery?

While we recognize that there are multiple perspectives we can use to understand and address the effects of violence and abuse, for the purposes of this chapter, we decided to bring two complementing viewpoints into a dialogue. Using two lenses, *developmental neurobiology* and *social ecology*, we will review and discuss some of the biopsychosocial factors that influence whether an individual is likely to demonstrate vulnerability or resiliency in the face of extreme adverse experiences such as those associated with domestic and family violence. We'll then show that while it might be appealing to think of resilience as simply the lack of problems and normal functioning (going to school or work, avoiding drugs or risky sexual activity, etc.) following adversity, a social ecological understanding of resilience explains *how* individuals can be supported to resist, recover from and sometimes even grow from such experiences. Three different stories (Cassandra, Steven and Deanne) will help illustrate how individuals are affected by violence and some of the factors that may minimize harm and promote recovery.

> *Cassandra, now 5, was born with a difficult-to-sooth temperament but was provided with attentive, attuned and responsive caregiving by experienced and well-regulated*

parents. She was provided many opportunities for exploration and novelty-seeking in safe, predictable and controllable ways during early childhood. She and her family are connected to community and culture with many stable and enduring relationships. However, after her grandmother died, her grandfather came to live with the family. He began to threaten and torment Cassandra whenever her parents were out of the house. She withdrew, avoided contact, and her teacher observed that in a very short time, she had changed from a bright, social child into a nervous and isolated one. Her parents' repeated questions and obvious worry that something was wrong heightened Cassandra's fears that something bad was going to happen to her, just like her grandfather predicted.

Steven, now 16, was born with the genetic gifts that, under typical circumstances, could have led to a very well-regulated, flexibly responsive and "hardy" stress-response capacity. He was born to a single mother who is a member of an isolated, marginalized indigenous group that was the target of cultural genocide in previous generations. Steven's grandmother was taken to residential school 1,500 kilometers away from family, community and culture. Physically and emotionally abused there, she returned to her community, hoping to re-connect with family. She became pregnant with Steven's mother soon after. By the age of three, due to chronic neglect, Steven's mother was taken into care and raised in a series of foster homes away from her community. At 20, she too returned to her community and attempted to re-connect with her mother and several siblings. She drank to excess, became pregnant and kept drinking. Steven developed with the epigenetic and intrauterine effects that profoundly compromised the capacity of his stress-response systems to develop normally. Maternal-child interactions were inconsistent, chaotic and episodically disrupted by domestic violence.

Deanne, now 47, and was born to a middle-class family in the suburbs of a major urban centre. During infancy and the first two years of life, she benefitted from an attentive and loving mother. After the birth of her younger sister however, her mother suffered from severe depression. Her father worked long hours to avoid being at home. When he was at home, he was verbally and physically abusive to Deanne and her three younger siblings. An older cousin sexually abused her from ages six to eight; a 'boyfriend' sexually assaulted her on multiple occasions when she was a teen. Despite all of this, she did well in school, went to university and is a successful professional. She sees herself as a 'tough cookie' that has persevered through a tough life. Recently her sister's husband groped her while they were doing the dishes in the kitchen together. This seemingly mild incident triggered a complete breakdown. Deanne went on extended sick leave and began to take medication to calm her nerves.

These individual narratives illustrate key factors involved in vulnerability and resiliency. We will use these throughout the chapter to highlight the multiple and interactive elements that appear to protect and heal individuals following extreme adversity. Moreover, we will examine those factors that increase vulnerability; and, as we will see, vulnerability can stem not just from overwhelming stressors, but as in the case of Deanne, seemingly mild ones as well.

Stress-response systems

Life is transition: waking from sleep, moving from place to place, engaging new and familiar people, satiating hunger, quenching thirst, learning a new concept, mastering a new motor skill--each day, each person experiences thousands of transitions. Negotiating these continuous mini-challenges requires a complex array of interconnected physiological systems and neural networks to monitor, process and act on the inner and outer environments. This array comprises our "stress-response" systems, collectively influencing every part of our bodies and brains. In any given situation, the stress- response systems can change the way we think, feel, behave, digest food, pump blood, mobilize white blood cells, release insulin, lift weights and hundreds of other body and brain-mediated functions. Thought, behaviour and emotion are all influenced by the activity of our stress-response systems. When these systems are flexible and well regulated, there can be a parallel flexibility and regulation in our thought, feelings and behaviour--a person can adapt and cope when facing novelty, transitions, stress and distress. Yet when these systems are dysregulated, an individual may be easily overwhelmed by the minor challenges of everyday life and, in response to unpredictable or prolonged stress, experience profound deterioration in both mental and physical health.

This conceptualization of stress response emphasizes that human development results from an individual's interactions with the social ecologies that mediate or accentuate risk exposure. A child who is particularly vulnerable to stress but who experiences little or none may appear to cope better than the child who has more capacity to cope but is overwhelmed by the compounding effect of multiple chronic and acute stressors. Viewed over time, the irony of the situation is that the over-protected child who experiences few challenges during development may not be properly inoculated against future stress. The child who is challenged or even overwhelmed early but is supported during recovery may develop coping strategies and a neurobiological flexibility in her or his stress-response systems that will be functional for a lifetime. Under optimal conditions, the environment provides manageable amounts of stress to maximize a child's development, but not so unpredictable, severe or prolonged that these experiences traumatize the child or hinder a child's development.

The factors that predict an individual's capacity to cope, and whether the nature of the coping is adaptive or maladaptive, range from the biological to the psychological, interpersonal, and socio-cultural. A facilitative environment, including the constellation of social services provided to mitigate risk and promote well-being (child welfare, mental health and addictions, special education, and community-based models of care, etc.) also plays an important role in whether individuals who are exposed to extreme adverse experiences follow negative patterns of development, maintain normal functioning, or exceed expectations and grow from their experience, exhibiting what is sometimes referred to as post-traumatic growth (Tedeschi & Calhoun, 1996). Resilience, in turn, is associated with maintaining normal functioning or exceeding expectations, after an adverse experience.

a) Individual level stress-response systems

The stress-response systems are widely distributed through the brain and rest of the body. Though the complex neurobiology of these inter-related systems is beyond the scope of this chapter, the general neural architecture of these systems is important to understand if we are to predict which processes help individuals adapt following extreme adverse experiences. The core components of these stress-response networks are neurotransmitter systems with receptive dendritic nets and cell bodies in the lower areas of the brain (brainstem and diencephalon) that then send direct connections to every other part of the brain (and indirectly

the body). This distribution allows these systems to influence or even control a remarkable array of brain-mediated functions mediated by every other part of the brain (e.g., cognitive, social, emotional, behavioural, neuroendocrine and autonomic functioning).

These stress-response networks are receiving input from the external and internal environments--sensing, processing, storing, perceiving and acting on this information. This monitoring is sensitive to novelty, transitions and, especially, perceived threat. The stress-response systems control a continuous process of modulation, regulation and compensation, to maintain a state of equilibrium or homeostasis. Whenever the input alters this homeostasis or is associated with a previously stored threat, these networks initiate compensatory, adaptive responses to re-establish homeostasis or to take the necessary actions to survive (Perry & Pollard, 1998).

b) Individual responses to threat

Individual responses to threat can vary tremendously. This is not surprising considering the vast distribution of neural functions that are available to the stress-response network. The specific adaptive changes taken by the brain to respond to the incoming threat-related signals will vary depending upon many factors; different elements of the widely distributed neural system will be recruited and others will be shut down to conserve energy and focus the body's response to threat. Under normal circumstances (i.e., a normal stress-response capability), the responses are graded, proportional to the level of perceived threat; when the threat is mild, a moderate activation of key systems takes place; when extreme, intense and prolonged activation will occur. The adaptive responses are specific to the nature of the threat; either preparing to flee or fight or preparing to be overwhelmed and injured. In cases of abnormal development or sensitivity of the stress-response systems (see later sections) the responses to potential threat are inappropriate and out of proportion; trauma can make these systems over-active and overly reactive (see Perry, 2008).

Whatever the adaptive response during an extreme experience, the key issue for the development of subsequent pathology is how long these systems are activated. The brain changes in a "use-dependent" fashion. The longer and more intense the activation during the actual event and subsequent exposure, the more likely there will be molecular changes in the stress-response systems that lead to long-term functional changes. These extreme adverse experiences can cause alterations that lead to sensitized, dysfunctional neural networks; essentially the state of fear can become the persisting trait of anxiety, for example. What were once adaptive neurobiological states can become, over time, maladaptive traits (Perry et al., 1995). In turn, anything that can prevent or modulate the prolonged activation of these systems can minimize long-term negative functional consequences of an extreme experience.

c) Determinants of stress-response system capability

Genetic: All complex neurophysiological systems are comprised of thousands of proteins. This means that there will necessarily be a range of genetic variations that can be seen in the full expression of individual stress-response neurobiology observed in the population. Further, it is not unreasonable to assume that this variation in composition will be paralleled by variation in flexibility and functional capability. Certainly in animal models, this is the case (e.g., Perry et al., 1983). In preliminary human studies, genetic variations in key neural proteins that are associated with the stress-response networks appear to increase risk for the development of neuropsychiatric symptoms following maltreatment (Caspi, et al., 2002; Caspi et al., 2003).

Epigenetic: Recent studies are showing that genetic expression, or whether or not a gene within a person's DNA gets turned "on" or "off," can be directly affected by environmental influences present in the life of the biological parents (and grandparents). This pre-conception impact on development has yet to be fully characterized--particularly in humans--but there is clear evidence that epigenetics can affect stress-response neural networks development and alter reactivity and flexibility of these systems (e.g., Harshaw, 2008).

Intrauterine: There is an abundance of research on the impact of intrauterine stress, alcohol exposure and drug use on the development of the fetal brain. The neural networks that will ultimately be responsible for mediating the stress response are profoundly influenced by prenatal factors (see Perry, 1988; Perry, 2002). Alcohol, nicotine, extreme maternal distress, drug exposure, infection and hypoxia are a few of the intrauterine insults that can alter the development of stress-response networks in the fetus.

Early childhood experiences: Early in life the brain is organizing at a remarkable rate, with more than 80% of the major structural changes taking place during the first four years. The key neural networks involved in the stress response develop early in life (see Perry 2001a; 2008). Experiences that take place during early childhood have a greater potential to influence functional organization of these systems in either positive or negative ways; therefore, early developmental trauma and neglect have a "disproportionate influence on brain organization and later brain functioning" (see Perry, 2002; 2008). Children exposed to threat and who have minimal "buffering" from caregivers, develop overactive and overly reactive stress-response systems.

Primary caregivers are the external stress-regulators for the infant. With attentive, attuned and responsive caregiving, the pattern of stressors (hunger, thirst, cold, fear) will be moderate, predictable and, to some degree, controllable. It is these patterns of post-natal stressors that can lead to the development of a more flexible and "resilient" stress- response capacity (Tronick, 2006). In contrast, a depressed, distressed, inconsistent or absent caregiver will contribute to abnormal organization and functional development of two crucial and inter-related neural systems (the stress-response and relational). The result is a child more vulnerable to future stressors and less capable of benefiting from nurturing interactions that might help buffer stress, distress and trauma later in life. The "protective" and regulating presence of a predictable, nurturing caregiver can attenuate the increased risk.

Adverse Experiences: The impact of traumatic stress on the developing child has been well documented. Many studies have documented trauma-related psychopathology such as post-traumatic stress disorder (PTSD) (for review see; Bremner, 2003; DeBellis & Thomas, 2003; Glaser, 2000; Perry, 1994; 2001b; Teicher et al., 2002). Table 1 summarizes the key factors that appear to be related to subsequent development of trauma-related psychopathology. The development of this psychopathology appears to be due to alterations in key stress-response neural networks (Danese et al., 2009; Perry, 1995).

Table 1 - Risk factors that increase and decrease the impact of trauma on biopsychosocial development

	Event-Related Factors	***Individual Characteristics***	***Family and Social Factors***
Increase Risk *(Prolong the intensity or duration of the acute stress response)*	♦ Multiple or repeated event (in this case, ongoing threat) ♦ Physical injury to child ♦ Involves physical injury or death to loved one, particularly mother ♦ Perpetrator is family member ♦ Dismembered or disfigured bodies seen ♦ Destroys home, school or community ♦ Disrupts community infrastructure (e.g. Hurricane Katrina) ♦ Long duration, difficult recovery (2004 Tsunami)	♦ Female ♦ Age (younger more vulnerable) ♦ Subjective perception of physical harm ♦ History of previous exposure to trauma ♦ No cultural or religious anchors ♦ No shared experience with peers (experiential isolation) ♦ Low IQ ♦ Pre-existing neuropsychiatric disorder (especially anxiety related)	♦ Trauma has direct impact on caregivers ♦ Anxiety in primary caregivers ♦ Continuing threat and disruption to family ♦ Chaotic, overwhelmed family ♦ Physical isolation ♦ Distant caregiving ♦ Absent caregivers
Decrease Risk *(Decrease intensity or duration of the acute stress response)*	♦ Single event ♦ Perpetrator is stranger ♦ No disruption of family or community structure ♦ Short duration (e.g., tornado)	♦ Cognitively capable of understanding abstract concepts ♦ Healthy coping skills ♦ Educated about normative post-traumatic responses ♦ Immediate post-traumatic interventions ♦ Strong ties to cultural or religious belief systems	♦ Intact, nurturing family supports ♦ Non-traumatized caregivers ♦ Caregivers educated about normative post-traumatic responses ♦ Strong family beliefs ♦ Mature and attuned parenting skills

Defining trauma

Trauma is one of the most over-used, poorly defined concepts in neuropsychiatry. Popular use of the term “trauma” or “traumatic” has further confounded a physiologically meaningful or psychologically useful definition. People refer to an event as a trauma or as an event being “traumatic.” Yet we know that there are multiple individually-specific outcomes from any group experiencing the same event. Indeed most events labeled “traumatic” (e.g., school shooting, car accident, combat) don’t appear to result in enduring negative mental health

effects for the majority of individuals experiencing the "trauma." With this said, overt mental health problems such as post-traumatic stress disorder are not the only negative outcomes following an adverse experience. Many studies have documented long-term compromise in multiple domains of functioning following "traumatic" experiences. The Adverse Childhood Experience (ACE) studies, for example, have documented increased risk for a host of emotional, social, behavioural and physical health problems following abuse and related traumatic experiences in childhood (Anda et al., 2006; Felliti, 1998). These epidemiological studies examined the relationship between adverse childhood experiences including child abuse and a wide range of functional indicators in adult life. Among the ACE findings are a graded increase in risk (i.e., more abuse = more risk) for affective symptoms and panic attacks; for memory problems; for hallucinations; for poor anger control; for perpetrating partner violence; unhealthy sexual behaviour (early intercourse, promiscuity, sexual dissatisfaction); suicide; substance abuse; alcohol use and abuse; smoking. In addition there is a significant increased risk for a range of physical health problems following child abuse. Risk for the major causes of death in adult life is increased following adverse childhood experiences (Felitti et al., 1998).

So what is trauma? From a neurodevelopmental perspective, trauma is not the event--it is the individual's response to the event. Traumatic stress occurs when an extreme experience overwhelms and alters the individual's stress-related physiological systems in a way that results in functional compromise in <u>any</u> of the widely distributed stress-response systems (e.g., neuroimmune, neuroendocrine, autonomic and central nervous system networks). For example, if there are two children witnessing a violent act and one has a very reactive stress-response system--this child can experience prolonged stress-response activation that results in a long-term change in neural networks related to attention, sleep, cognition and affect regulation. He was traumatized; for him the act was a "traumatic event." The other child has a well-regulated stress-response system; after the event there are supportive and nurturing caregivers to help him make cognitive sense and receive relational and somatosensory (e.g., holding, hugging, rocking) regulation. Within weeks he is sleeping, eating, concentrating and, while the experience was negative, his stress response (and other functioning) has returned to a normal baseline. The event was not traumatizing; he demonstrated resiliency. Indeed, he may have actually strengthened his stress response, emotional and cognitive capacities in ways that result in "post-traumatic" growth. Again, this term, while common, is not neurodevelopmentally accurate. It is more accurate to label this as "resiliency-recruitment" growth; the growth occurred because of the presence of factors that recruited and reinforced his strengths – a belief system, a relational network, the somatosensory regulatory impact of loving caregivers, friends and family.

On a neurophysiological level it is impossible that an extreme experience will not change the person. The key questions are <u>whether</u> experience-related changes result in functional compromise and, if so, how will this manifest (e.g., physical, emotional, social, cognitive health)? Furthermore, we know that activation of the stress response in predictable, moderate ways leads to a more flexible and functional stress response capacity; i.e., stress in the right doses, patterns and timing makes the stress response systems stronger and more capable (Tronick, 2006).

Cassandra, Steven and Deanne illustrate the primary and essential point that multiple factors contribute to "vulnerability" and "resiliency" over the lifespan and will result in a lifelong <u>*process*</u> determining at any given point what an individual's stress-response capacities will be.

Indeed, as seen with Deanne, at one point in life an individual may demonstrate remarkable "resiliency" yet at another point, a moderate stressor can overwhelm the individual and result in significant dysfunction.

Figure 1 - Variable life trajectories of "resilience" and "vulnerability"

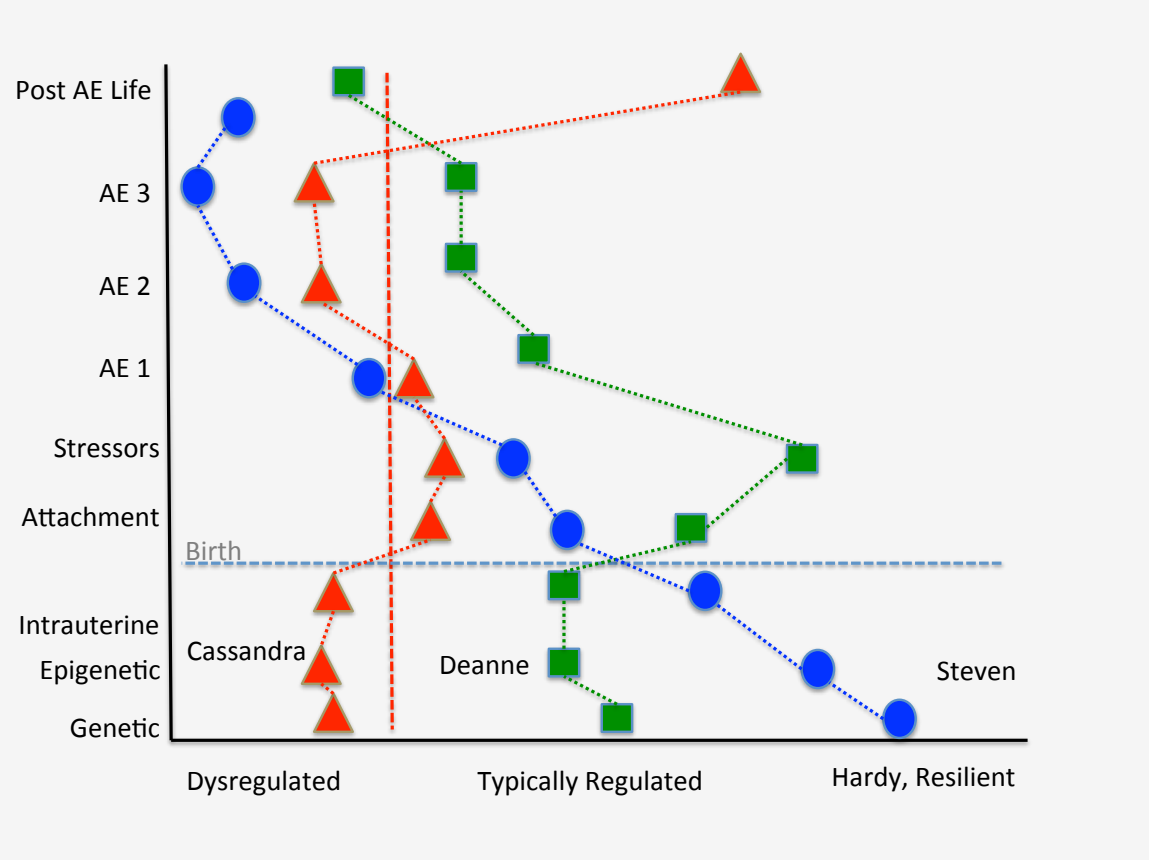

Figure 1 illustrates the three trajectories of variability in stress-response capacity for our three examples. At conception there are likely a range of genetic contributors to the development and optimal functionality of the stress response. At various points in development, factors known to influence the development and functionality of the stress-response networks influence the individual's specific capacity.

Cassandra (red triangles) has genetic vulnerability but experiences a good prenatal environment with a supported, healthy mother. At birth, she is born with a difficult-to-sooth temperament but is provided attentive, attuned and responsive caregiving by experienced and well-regulated parents. Cassandra and family are connected to community and culture with many stable and enduring relationships. When the grandfather's abusive behaviours increased (*see Figure 1; AE = Adverse Event*) there is a transient deterioration of stress-response capacity and expression of various emotional, social, cognitive and physical problems associated with this dysregulation (She "crosses" the red line from marginally regulated to dysregulated). Over time,

however, Cassandra benefits from the continuing investment of family, community and therapeutic efforts and she begins to "heal," restores her regulated stress-response capacity and shows improvement in all of the areas of previous dysfunction. Indeed, over time she develops significant regulatory strengths and is able to use her history of adversity to enrich and reinforce her belief system, capacity for empathy and sense of competence—*"Look what I've overcome*." Post-traumatic growth is an important but under-studied area where concepts of trauma and resilience merge.

Deanne (green squares) had an average and typical genetic potential and optimal prenatal environment. At birth, she also had a very attentive, attuned and responsive mother attending to her first-born. The household was not yet chaotic or threatening and as a toddler Deanne had multiple opportunities in early childhood for moderate, predictable and controllable stress – essentially creating an "inoculation" against future stressors. In contrast to Cassandra, her genetic potential allows her to begin to develop a more flexible and "hardy" stress-response capability with very similar high quality bonding and developmental opportunities (i.e., she moves further to the right than Cassandra with the similar developmental experiences). Anchored internally by a strong set of beliefs, buffered by strong, enduring relational connections and with more "hardy" stress-response systems, she is able to cope with the increasing dysfunction, threat and chaos of her home as more children are born, her mother suffers severe depression, and she experiences sexual abuse at several points in her development. Despite all of this she remains to the right of the "dysregulation" red line and is able to function at a high level in school, work and the community. Yet the long history of adversity has had a cost. Her stress-response systems are more vulnerable despite her success; and the experience of fondling by her brother-in-law triggers cue-associated stress-response activation from her previous abuse. This overwhelms her adequate but strained stress-response capacities and she becomes dysregulated and dysfunctional. Despite this, with therapeutic, family and community supports, she will likely be capable of return to a more functional state. In this case, the fondling was "traumatic." It overwhelmed her stress-response's capacity to regulate. While a more extreme experience (when judged by any observer) such as being the victim of her father's physical abuse while a child resulted in less "trauma"--she was able to continue functioning at school and with friends--her stress-response systems were more flexible and capable at that point in her life. Yet the assaults by father did contribute to the long-term deterioration and "wearing out" of the early inoculation to stressors she received from her genetic, epigenetic, intrauterine and attachment-related experiences.

Steven (blue circles) is born with the genetic gifts that under typical circumstances, could lead to a very well regulated, flexibly responsive and "hardy" stress-response capacity. Yet, as described in the introduction, Steven developed with the epigenetic and intrauterine vulnerabilities that profoundly compromised the capacity of his stress-response systems to develop normally. Maternal-child interactions were inconsistent, chaotic and episodically disrupted by domestic violence. By the time Steven was exposed to the chaos and violence in his community and home, he had a poorly organized, sensitized stress-response system and was living in a transient, disconnected relational milieu. With no social supports beyond his family or community to anchor, buffer or heal Steven from these extreme experiences, he was highly vulnerable and reactive to almost any challenging experience--including novelty, transition, and the typical challenges of school. The inability to self-regulate--such as seen with Steven--means that he will be highly likely to seek forms of regulation from external and, often, unhealthy sources--alcohol, huffing, various drugs of abuse, cutting, sexual activity. Conventional western

mental health interventions are likely to fail; once, twice, even every day contact with a therapist is inadequate to meet the profound relational and regulatory needs of Steven. In contrast, re-connection to culture and community, relational permanence with stable and nurturing adults capable of patience, persistence and predictability, are necessary for Steven to begin to regulate and recover his functional potential. Only then would conventional therapeutic interventions be likely to contribute to his long-term healthy development.

Defining resilience

Resilience is a process that engages the biological, psychological and social resources individuals require to resist the negative impact of adversity, recover from exposure and the temporary decline in functioning that follows, or grow as a consequence of the experience. While one could argue that 'resiliency' refers to the individual qualities (intellectual capacity, executive functioning skills, positive self-regard, etc.) that make it more likely individuals will succeed, it is more useful to focus on 'resilience' as process. This latter view highlights the mechanisms by which individuals and their environments interact to optimize human development in contexts where there is significant exposure to risk (Masten, 1994, 2010, Luthar, Cicchetti, & Becker, 2000). In this regard, resilience is not something one has or doesn't have. Instead, resilience is a dynamic phenomenon, facilitated at multiple levels, from early interventions that help neglected children develop the neurophysiological capacity to form healthy attachments, to social service interventions that ensure abused children are empowered in their case planning and given a voice in decisions concerning their programs of care (Ungar, 2011). Therefore, rather than thinking of resilience as a quality of the individual alone, resilience is better defined as the capacity of individuals to navigate their way to the resources they need, and negotiate for those resources to be provided in ways that are meaningful (Ungar, 2005). A definition such as this highlights resilience as a process. Individuals may need motivation and the biological capacity to seek change in threatening contexts and establish homeostasis in a way that supports well-being, but that can only be achieved when the individual's social and physical ecology--their environment--provides the relationships and opportunities required to succeed. When supportive resources are provided in ways that are consistent with the individual's values, they are much more likely to be appreciated and used.

Key principles

Because of the complexity of the interrelated factors that predict resilience after extreme adversity, resilience is best understood as reflecting these key principles: *dynamic process, equifinality and multifinality and differential impact.*

Dynamic process: For individuals who have experienced trauma, their capacity to cope afterwards is the result of individual qualities facilitated, or constrained, by their environments. Resilience is not a state, but a description of the dynamic processes individuals engage in with others. As Luthar et al. (2000) explained, depending on the level of risk, and the degree of competence shown to cope with risk, resilience-promoting processes may be protective (helping individuals avoid further decline in functioning), stabilizing (maintaining normal levels of functioning), enhancing (increasing functioning beyond normal expectations), or reactive (there is progressively more decline in functioning over time as exposure to stress continues). The processes most likely to occur are always the result of the individual's resources interacting with the resources available and accessible to them in their environments.

Equifinality and multifinality: From psychology, the concept of equifinality—different causal factors leading to similar outcomes—can also be applied to resilience. For example, different early experiences such as sexual abuse and divorce can lead to the same negative outcome such as a particular psychological disorder like depression. The concept of multifinality—similar or identical causes leading to different outcomes—can also be applied to resilience-related processes. For example, children from marginalized communities who are removed from their families and placed with families from the dominant culture report widely divergent experiences with many deeply distressed by their placements while others view their placements outside their culture as advantageous (Blackstock & Trocmé, 2005). The processes that lead to a set of outcomes (such as gainful employment or a caring, committed relationship with a peer) may be widely divergent and dependent upon the resources available and accessible to an individual. On a related note, it is important to consider how we *perceive* or *understand* 'desirable outcomes'—it is not enough to try to influence a child's navigations to successful coping; we must also look at whether the outcomes *the child* perceives as positive are also those that are valued by others around them.

Differential impact: People react very differently to similar adversities. Likewise, the protective quality of a particular individual capacity (like an optimistic attitude) or environmental resource (a good school, or progressive parental leave policy) will vary depending on the amount and nature of stress an individual experiences. In low stress environments, a particular strength may have little or no effect on overall development, while for a child in a very difficult and dangerous home or community, a protective factor like persistence, a mentor, or a safe school, may provide an immense advantage to the child's psychosocial well-being. Therefore, a protective process that may be helpful to an individual exposed to catastrophic stressors may exert little influence, or a negative influence, on another individual who is exposed to the same degree of stress. For example, neglected children whose parents have a mental illness may experience their role as caregivers for their parents (adultification) as a source of self-esteem and the means to compensate for a lack of caring from others (Godsall, Jukovic, Emshoff, Gerson & Stanwyck, 2004). This same process of engaging a child in the care of a parent is likely to have a negative impact on the child when the parent is not perceived by the child (or the community) as requiring the child's help. In these cases, the emotional dependency of the parent on the child is experienced as a threat to the child's development (Hooper, Marotta, & Lanthier, 2008). In other words, the process of demonstrating caring for someone else can contribute to a child's resilience under some circumstances, but may harm a child's psychosocial development in contexts where the same process of adultification is perceived as exploitive (Ungar, Theron, & Didkowsky, 2011).

Resilience and trauma - extreme ends of the same continuum?

Are trauma and resilience extreme ends of the continuum of the capacity of the body's stress-response systems? Popular understanding would suggest yes, but in fact the story is much more complex. A key challenge to studying the impact of developmental trauma is that it is almost impossible to study all of the meaningful outcomes following adversity. Do we label the boy who does not meet clinical criteria for active psychiatric disorder (e.g., post-traumatic stress disorder) following physical abuse, resilient? Did these adverse experiences result in altered immune function or increased autonomic reactivity that will lead to increased risk for heart disease, asthma and diabetes later in life? When adversity alters his development in ways that greatly diminish his potential but do not cause overt failure or pathology, is that resilience? Are

there processes at play that mitigate the impact of risk on the boy's functioning, maintaining adaptive behavioural outcomes, behaviours that are not overtly problematic (i.e., the boy still goes to school but does not excel)? Understood this way, extreme adversity produces both immediate and long-term changes in adaptation, meaning that resilience must be understood as *processes over time* that help individuals cope in the best way possible with adversity and trauma (Schoon, 2006; Werner & Smith, 2001). In other words, even with trauma can come resilience.

We do not use the term 'resilient' or invoke resilience other than in the context of stress, adversity or trauma. Why is this? First, from a neurophysiological perspective, then, it is the individual's response to the event that defines the degree of trauma. While trauma and resilience may be intertwined; in neurobiological terms, they are not extreme ends of the continuum of the capacity of the body's stress-response systems. Likewise, when understood sociologically, trauma and resilience are both interactional processes where one thwarts human development after exposure to dangerous situations, while the other supports recovery and adaptation. Second, the processes that create resilience are related to the nature and amount of adverse circumstances that surround the developing child. To illustrate, a supportive grandparent is helpful to every child's development; but if there is no threat to the child's development, then the influence of the grandparent is relatively small, diluted by the sheer number of other supports a child has and the lack of need for a close attachment with a parent substitute. However in a context where development is threatened, that same grandparent may exert a potentially large influence on the child's developmental trajectory, ensuring later success through his or her encouragement and support. A grandparent, for example, may provide an abused child with a safe place to stay away from the offending parent, a source of validation, as well as cultural resources that enhance identity.

Dialogue: The intersecting concepts of trauma and resilience

Returning to the three earlier case studies, Cassandra, Steven and Deanne, we can speculate which protective factors might mitigate the impact of extreme adversity (reducing vulnerability) and promote resilience. Given that each has been exposed to significant levels of violence, and all are showing the impact of that violence on their functioning, there are a number of protective processes that might benefit them and that reflect what we know about resilience. Two of the most important are those related to relationships and context.

a) The power of relationships

A major determinant of stress-response activation is the relational milieu. This powerful relationally-mediated effect is due to mirroring qualities of the human brain. We tend to mirror the affect and physiological "states" of the people around us. When an anxious child is with loving and supportive adults, she will calm. When another child is in the immediate aftermath of an extreme experience and he is alone, there can be no relationally-mediated calming effect; or if the adults who are with the child are equally overwhelmed and anxious, their fear will be contagious. In very powerful ways, then, people who are present in a person's life will modulate the activity and reactivity of the stress response (see Ludy-Dobson & Perry, 2010). Many of the documented factors associated with resilience can be viewed as working through the relational mediated modulation of the stress-response networks. Social connectedness, for example, is viewed as a protective factor against many forms of child maltreatment, including physical abuse, neglect and non-organic failure to thrive (e.g., Belsky, et. al., 2005; Caliso & Milner, 1992;

Chan, 1994; Coohey, 1996; Egeland, Jacobvitz & Sroufe, 1988; Guadin, et al, 1993; Hashima & Amato, 1994; Rak & Patterson, 1996; Travis & Combs-Orme, 2007).

Therefore, for young people like Cassandra and Steven, a change in the relational milieu can be expected to change the nature of their stress response. The removal from a home of an abusive adult (in Cassandra's case, the grandfather), or placement in a stable, nurturing and culturally appropriate foster placement (a possible benefit for Steven) would be expected to create the optimal environment to change troubling patterns of reactivity that follow stress exposure. In a context where abuse is severe enough to require the involvement of child protection services, these same protective processes are evident in models of effective practice that emphasize systems of care that increase the stability of placement for children who must be removed from their families. Optimizing the potential for bonding with a primary caregiver is of primary importance to the child who has experienced prolonged neglect or abuse (Newton, Litrownik, & Landsverk, 2000).

In the case of an adult like Deanne, the same principles apply. Relational quality, density and permanence are key elements in creating a safe and regulating environment in which to heal. Often if these are present, psychoeducation and supportive therapeutic processes take hold quickly and restoration of previous regulatory capacities can take place. Without these, conventional therapeutic efforts are often ineffective.

b) Contextual factors

Despite the multiple physical and psychological effects of adverse experiences, interactions among family, school and other community subsystems, as well as cultural and political factors, can create the conditions for children to experience the resilience associated with recovery from trauma. These systems, alone and in interaction with one another, provide a milieu in which abused children find the resources that match their needs and are perceived as meaningful to them (Ungar, 2005). Among the contextual processes required for resilience among children who have been traumatized by neglect and abuse are experiences of social justice, access to material resources such as housing and safety, a sense of belonging in their community (and a sense of life purpose that is acknowledged by others) and cultural adherence (Kirmayer, Dandeneau, Marshall, Phillips & Williamson, 2012; Ungar et al., 2007). These factors, like the individual and relational factors mentioned earlier, are interactive; as one changes others change as well. For example, a child like Cassandra from a more advantaged community, or Steven from a marginalized community, who receives child protection services may be further harmed unless the manner in which those services are delivered is sensitive to the child, and the child's family's, unique culture and context. Likewise, since more children from lower SES homes are brought under protection orders than children from higher SES homes, sociopolitical factors such as access to affordable housing, safe streets, income support, employment programs, and other indirect factors that increase the capacity of the child's environment to care for the child, are important aspects of promoting resilience. Furthermore, the chances of healing from trauma will be better in contexts where there are functioning primary caregivers who themselves are treated fairly in their communities and for whom there are opportunities to gain access to the resources required to provide care for their child (Armstrong, Birnie-Lefcovich & Ungar, 2005; Yoshikawa & Kalil, 2010).

In this regard, a wealthy nation like Canada should be able to provide the resources that make children and adults more resilient. It is unfortunate that some marginalized communities,

including Aboriginal peoples, rural Canadians, and Canadians with mental illnesses or living in poverty, are all at greater risk of having children who are both traumatized and likely to suffer the secondary trauma of apprehension (Trocmé, Phaneuf, Scarth, Fallon & MacLaurin, 2003). For adults like Deanne with a mental health problem, strategies that optimize access to services are likely to help increase their resilience, especially when these services are also responsive to the person's context and culture.

Translating understanding into practice

There are practical implications that follow from an understanding of trauma and resilience when working with children who have been exposed to severe, prolonged threats to their development, such as domestic violence (Perry, 2009). There is a desperate need to infuse developmentally sensitive and trauma-informed concepts into our efforts to serve maltreated children and their families. Neurophysiological adaptability, relational aspects of resilience associated with epigenetics, as well as the social determinants of biopsychosocial growth should all inform policies and programming that mitigate the negative impact of stressors and promote positive development. Among the processes that are most likely to bolster resilience are early intervention, promoting relational density, maintaining relational permanence, creating congruence between child and resources, and multisystemic integration of services.

Early intervention: Results from longitudinal studies of children living in poverty suggest that while earlier is always better, it is never too late to intervene (Garmezy, 1991; Sroufe, Egeland, Carlson & Collins, 2005). Early interventions tend to have the most impact when the original threat to the child's development is removed and changes in living conditions and supports are sustained. Head Start programs, for example, are most likely to show positive results when children are adequately resourced for learning throughout their childhoods (Webster-Stratton, 2001).

Relational density: Relational density refers to the amount, or dose, of attachments that contribute to children's positive development. With the principle of differential impact in mind, children who need the most secure attachments are those who have experienced the greatest number of stressors. In this regard, more connections are better for the children most exposed to violence (Combrinck-Graham, 1995; Wekerle, Waechter & Chung, 2012).

Relational permanence: The impact of relational density, or the proximity and number of close relationships a child experiences, is balanced by the need for relational permanence. For child welfare systems, permanence may be difficult to achieve when foster placements break down and primary workers, tasked with supervising a child, change jobs. The more services support children's secure attachments to individual foster parents or caseworkers, the more likely children are to experience a social ecology that facilitates optimal development under stress (Barter, 2000).

Congruence between the child's needs and services: A growing trend towards both child-centred practice and a postmodern appreciation for competing discourses regarding children's experiences of health and well-being is changing services for trauma-affected children (Bottrell, 2009; Ungar, 2004). Increasingly, congruence is sought between the individual needs of the child and the interventions that are offered. In practice this means that service providers are striving to appreciate the meaning attached by children themselves to the processes associated with resilience. Across cultures and contexts, a child's meta-cognitions and culturally-

embedded value systems make some interventions less relevant than others. When service providers negotiate with children for the right constellation of services that meet a child's needs in ways meaningful to the child, it is more likely that the negative sequelae from exposure to traumatic events will be prevented (Eggerman & Panter-Brick, 2010).

Multisystemic integration: Moving up one more ecological level to the domain of multiple systems that are tasked with providing services to children who experience trauma, there is abundant evidence that the more systems integrate their responses to children, the better children cope (Madsen, 2009; Santisteban & Mena, 2009). Multisystemic integration congruent with the child's perception of need has the potential to optimize services and create coherent service models that avoid disjointed or conflicting programming. For example, the mental health needs of a child may contribute to a plan of care that involves a period of time away from school, while educational providers may want to maintain the child in school. The same child is often a client of the child welfare service whose mandate to place the child in a foster placement to secure the child's safety, may conflict with the expressed desire of an older child, for example, to remain at home, or to continue at the same school, assuming foster placement would result in the child changing schools (Ungar, 2007). The better coordinated the goals of each system; the more likely children are to have their resilience facilitated.

In combination, these principles of effective practice provide the resources to both sustain children's capacities to cope and facilitate biopsychosocial development by matching the child's needs with social service programming and infrastructure. There are many examples of initiatives that are successful because they reflect these principles. Mental health interventions that are coordinated between a child's school, social workers, parents and other supports have the potential to address patterns of problem behaviour among children (e.g., Barfield et al., 2011). Likewise, coordinated child abuse treatment centres provide safe spaces to investigate child abuse (Jones, Cross, Walsh, & Simone, 2007). These centres are a particularly good example of these principles in practice, providing a density of relationships, continuity in care, and service coordination that match the needs of children for efficient assessment and treatment after abuse. Services for older youth may also reflect these best practice principles. For example, well-integrated multiservice centres for homeless youth that meet their needs for housing, employment counseling, educational support, psychological services and address the stigma associated with homelessness, provide a service structure that reflects best practices with regard to youth who have experienced trauma (Kennedy, Agbenyiga, Kasiborski, & Gladden, 2010). While most of these interventions have not been examined for their impact on trauma specifically, the changes in behaviour and engagement in positive relationships that result are likely to predict positive developmental gains that counter the effects of past victimization.

Looking to the future

Though the effects of trauma are now known to cause long-term threats to normative biopsychosocial development, there is abundant evidence that the deleterious effects of extreme adverse experience during childhood can be mitigated and vulnerability prevented. As we now know, resilience only partly reflects the individual's capacity to recover; it also depends on how well the environment facilitates recovery and growth at neurological and interactional levels. Social policy and the services that it informs can "change the odds" stacked against children who have experienced trauma. Whether there is the motivation to make resources available and accessible, however, remains the question. What we know is that early and

developmentally targeted interventions that address the functional vulnerabilities caused by extreme adversity can repair much of the damage done by adverse life events. Contextual and cultural sensitivity can help guide interventions so they are more likely to be effective for populations that experience the marginalization associated with the problems that both cause trauma and the resulting subsequent behaviours. To the extent that we use the emerging concepts of traumatology and development to further our understanding of the processes that contribute to recovery and growth, the more likely we are to respond to children coping with stress with interventions well suited to nurturing resilience.

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