

The Health Implications of Resilience

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Introduction

Resilience is a developmental process that supports positive or better-than-expected adjustment despite exposure to incontrovertible adversity (Masten, 2014). Two pieces of information are necessary to “diagnose” resilience: (a) the individual must have encountered a clear threat to typical development, and (b) the individual must evidence competent adaptation as evaluated with respect to developmental and cultural expectations. In addition to *resilience* (i.e., positive adjustment in the context of high adversity), development can be characterized by *maladaptation* (i.e., negative adjustment in the context of high adversity), *competence* (i.e., positive adjustment in the context of low adversity), or, somewhat less commonly, *vulnerability* (i.e., negative adjustment in the context of low adversity). However, given that an estimated 64% of adults report exposure to at least one clear and pronounced adverse experience prior to age 18 (Anda et al., 2006), efforts to identify processes that promote positive adaptation in contexts of adversity (i.e., resilience) have significant implications for supporting human health and well-being in childhood and beyond.

Once thought to be an individual capacity for “invincibility” (Werner & Smith, 1982), current theories conceptualize resilience as a process of “ordinary magic” (Masten, 2014). In this view, normative developmental support systems enable individuals to function in developmentally and culturally expected ways despite the disruptive influences of adverse life experiences. Thus, resilience is no longer viewed as an extraordinary capacity of an individual, but rather as the natural expression of ordinary adaptive systems despite extraordinary experiences. Capacities for self-regulation, attachment, and cognitive reasoning comprise core systems that influence human development and adaptation. When these basic adaptive systems fail, negative adjustment will follow (i.e., *maladaptation* in the context of adversity and *vulnerability* in the absence of adversity). Thus, the quest to understand and promote resilience must advance beyond individual traits and characteristics, to encompass the entire system of dynamic developmental influences (Luthar & Cicchetti, 2000).

This entry provides an introduction to the construct of resilience with an explicit emphasis on its relevance for understanding and promoting health and wellness. First, we conceptualize resilience within a developmental framework wherein culturally and developmentally appropriate adaptation in the context of prior or ongoing adversity reflects a developmental process that may vary over time and contexts. Second, we explicate factors that contribute to resilience generally (i.e., main effects of risks and assets), as well as those that take on disproportionate salience in contexts of adversity exposure (i.e., moderating effects of vulnerability and protective factors). Third, we review mechanisms at biological, psychological, and social levels of analysis that may influence individual differences in the expression of resilience over time and across contexts. Finally, we consider the implications of resilience theory for health psychology and for specific efforts to bolster positive health outcomes, particularly in contexts of adversity.

Resilience as a Developmental Process

Although resilience can characterize a range of living systems, including schools, neighborhoods, and ecosystems, it is most often used to describe a pattern of individual development that proceeds in a (culturally) desired fashion despite encountering challenges and threats to positive development that go beyond the bounds of typical human experience (i.e., adversity). Contemporary models recognize that resilience is a process that may characterize the development of an individual but nevertheless reflects a range of influences beyond the individual. In this view, human resilience is not an expression of a singular trait or characteristic, but rather reflects a process of transactional exchanges among multiple systems within and beyond the individual (Luthar & Cicchetti, 2000). Together, these systems enable the individual to adapt effectively despite the presence of clear and present threats to their doing so (i.e., adversity).

Resilience is not about those who *have* or do not *have* resilience, or those who *are* or *are not* resilient; it is a description, rather than a causal agent. Resilience describes a developmental process by which core adaptive systems continue to operate in a healthy and desirable manner despite threats to their doing so. As described in the next section, resilience may be supported or thwarted by a range of factors. As these influences change over time, so, too, will the expression of resilience wax or wane across development. Likewise, expressions of resilience may vary over contexts within time, and individuals may have the resources to navigate one type of adverse experience, but not another. Resilience embodies a dynamic developmental process that rests neither in the individual nor in the context but rather in the transactional relation between individuals and their contexts.

Influences on the Process of Resilience

Resilience is a dynamic developmental process that emerges out of broader contexts of risk and protection. Across multiple levels of developmental influence, there are factors that are universally good or bad for everyone (i.e., main effects), and there are factors that change the impact of specific events and experiences for better and/or for worse (i.e., moderating effects). Resilience is multiply determined by the influence of main and moderating effects on the individual's capacity to adapt effectively despite adversity exposure.

Asset and *risk* factors exert main or uniform effects on development for better or worse, respectively. Indeed, the expression of resilience is, in part, a reflection of cumulative or net

risk, namely, the compilation of factors that are known to threaten positive adaptation (i.e., risks) as they operate concurrently with factors that are known to support positive adaptation (i.e., assets). Some examples of common assets or resources that support health and wellness for *all* individuals include perinatal care, high-quality schools, regular health checkups, a safe and cohesive family environment, and strong cognitive and problem-solving skills. Risk factors that are statistically associated with negative human health outcomes include premature birth, family history of heritable illness, obesity, and smoking. Importantly, assets and risks rarely occur in isolation and tend to accumulate such that strength engenders strength and risk engenders risk. Unfortunately, as risks accumulate in number and severity, assets typically wane yielding high *net risk* and an increased probability of maladaptive outcomes (Appleyard, Egeland, Van Dulmen, & Sroufe, 2005).

Whereas assets and risks affect all individuals to a similar degree regardless of individual differences in adversity exposure, other developmental influences take on special significance when they occur in contexts of adversity. *Protective* and *vulnerability* factors are characterized by neutral or modest effects in contexts of low adversity but evidence stronger developmental effects as risks increase, assets decrease, and adversity becomes prominent. Protective factors moderate the impact of adversity on development by reducing its negative effects. For example, recent efforts to develop disaster-proof hospitals in high-risk areas will have neutral effects on patient health, except in the case of a natural disaster when such efforts will take on special significance to promote resilience to the negative impact of disaster on health service provisions. Much like an airbag takes its protective function from its ability to buffer the blow of an accident, protective factors are particularly important for understanding when and how individuals adapt effectively in the context of concomitant adversity. In contrast to the buffering effect of protective factors, vulnerability factors moderate the impact of adversity on development by magnifying its negative effects. For example, a person with an immune deficiency is vulnerable to negative health outcomes when challenged by toxins in the environment or disease processes in the body, but this vulnerability factor has a relatively neutral effect on health in the absence of such exposures.

Protective and vulnerability processes influence adaptation in many different ways. They may open or close avenues of opportunity, stop or initiate cascades of negative events, or interact with other developmental influences to foment or mitigate negative adjustment in contexts of adversity (i.e., maladaptation). Importantly, some factors may serve multiple moderating functions, thereby influencing the impact of adversity for better or worse. A classic example of this differential effect can be seen in research on how individuals' genes can interact with the environment to influence emotional adjustment. The serotonin transporter gene is responsible for helping the brain regulate the amount of the serotonin neurotransmitter, which is strongly implicated in various forms of psychopathology, including depression. The gene comes in two primary forms, short and long. On the one hand, a short serotonin transporter genotype is a vulnerability factor, which has the potential to magnify risks for depression in the context of clear adversity exposure, such as child maltreatment (Caspi et al., 2003). On the other hand, the long allele genotype serves as a protective factor that mitigates against this same negative outcome but only in the context of maltreatment. Operating as a vulnerability and protective process, the serotonin transporter genotype does not influence adjustment in all situations uniformly, but rather the meaning of this genotype takes its significance from the surrounding context of relative adversity, serving to moderate the impact of child maltreatment on emotional health outcomes for better and for worse.

Just as the short and long serotonin transporter genotypes may magnify or mitigate the impact of adversity on emotional health, respectively, other factors may moderate the

contributions of both positive and negative environmental factors on human health and well-being. For example, contemporary research on physiologic stress reactivity points to a biological sensitivity to context effect, wherein the organism is rendered more sensitive to both positive and negative environmental influences. In a now-classic study of psychobiologic stress reactivity and illness, Boyce et al. (1995) demonstrated that children with sensitive stress response systems (i.e., children who exhibit higher cardiac reactivity in response to challenge) developed more respiratory health problems in the context of high environmental stress (i.e., family and childcare setting stressors) but actually developed fewer respiratory illnesses in the absence of such exposure.

Taken together, the main effects of assets and risks, the moderating effects of protective and vulnerability factors, and the differential effects illustrated in recent research on biological models of contextual sensitivity and impact illustrate that resilience is multiply determined. The impact of a given factor on adjustment may vary across time, across contexts, and in tandem with other factors to engender or undermine resilience processes in development. In addition to identifying these factors, efforts to clarify the mechanisms by which they influence resilience have significant implications for developing the most efficacious interventions to prevent maladaptation and promote resilience in contexts of adversity.

Explanatory Mechanisms

Multiple mechanisms underlie the main, moderating, and differential effects of various influences on resilience. Although classical theories of risk and protection favored psychosocial conceptualizations, recent years have witnessed a complementary rise in the consideration of resilience (and the factors that promote or thwart it) in biobehavioral models of health and wellness. Clarifying *how* processes of resilience emerge and diverge at multiple levels of analysis will reveal opportune moments and sites for interventions to promote human health and well-being (Cicchetti, 2010). A range of biological, psychological, and social processes may explain the impact of varied risks and assets, or protective and vulnerability factors on health and health behaviors in contexts of adversity.

The primary biological mechanism by which organisms adjust to environmental variation and stress is allostasis. *Allostasis* is the process by which individuals mobilize physiologic responses to manage challenge and return to a homeostatic condition that promotes health and restoration (McEwen, 1998). Multiple systems mediate this process, particularly the neuroendocrine hypothalamic–pituitary–adrenal (HPA) axis and the parasympathetic and sympathetic branches of the autonomic nervous system. With exposure to chronic stress (e.g., disease, malnutrition, violence), allostatic capacities may become overloaded. *Allostatic load* refers to the excessive demand placed on psychobiologic systems in contexts of chronic stress and adversity, which, in turn, may contribute to negative health outcomes (McEwen, 1998). At the level of biology, assets and risks, as well as protective and vulnerability factors, may operate to increase or decrease the allostatic demand on the organism. For example, assets may reduce the need for allostatic adjustment directly and/or provide additional support if allostatic adjustment is needed (e.g., medication to reduce the physiologic demands of illness; food, blankets, and shelter to offset the physiologic demands of homelessness).

Influences on resilience may also operate via psychological mechanisms. For example, a sense of personal coherence supports one's ability to understand the world and one's experiences in it (particularly difficult life experiences) and is thought to be an important process for

coping with stress and managing health (Amirkhan & Greaves, 2003). Various factors may influence the capacity for coherence and meaning making and, by extension, for resilience. For example, individuals living in contexts of increased mortality risk (e.g., life-threatening illness, active military service) may have a foreshortened sense of time such that they struggle to project themselves into the future. By undermining the psychological sense of continuity across past, present, and future that defines a person's sense of coherence, these factors may negatively impact the individual's use of healthcare and/or health-related activities, such as healthy eating, exercise, or risk-taking. In a recent study of natural disaster preparation, investigators showed that a sense of personal agency (i.e., the belief that one's action will have an effect on one's outcome) facilitated positive and preventive action (Paton, Parkes, Daly, & Smith, 2008). In contrast, influences that confer a sense of helplessness, fatalism, and limited opportunity (e.g., poverty, racism) can jeopardize a sense of personal coherence and, by extension, undermine the capacity to express resilient adaptation.

Finally, main and interactive influences on resilience can operate via social mechanisms. For example, social capital refers to knowledge and resources that derive from the interdependence of social networks (Caughy, O'Campo, & Muntaner, 2003). In times of need, access to and inclusion in social networks can provide necessary resources to navigate life's difficulties. Influences on resilience may operate by providing connections with positive networks and/or blocking engagement with negative networks. With regard to health, assets and protective factors on the one hand and risks and vulnerability factors on the other hand may provide or hinder the social capital (e.g., relevant connections) to successfully navigate the healthcare system. For example, in the context of a life-threatening illness, these factors may influence the patient's ability to advocate for a second opinion, locate an expert physician, and/or martial support for care and recovery.

Multiple mechanisms underlie resilience and may work together at any given time to produce various outcomes. For example, studies of post-traumatic stress disorder (PTSD) show that the presence of a supportive other can reduce the *biological* hyperarousal that characterizes the trauma response and other features prominent in the onset of PTSD (Ozbay, Fitterling, Charney, & Southwick, 2008). Through conversation and empathic exchange, a supportive other may also buffer, engender, or restore the individual's *psychological* sense of coherence in the wake of a traumatizing experience. Finally, a supportive *social* connection may provide access to tangible resources, such as a therapist referral or a safe place to stay, that may foster resilience to the impact of traumatic experiences.

The fundamental adaptive systems thought to most strongly support the "ordinary magic" of resilience likely operate across biological, psychological, *and* social levels of analysis and action. As yet another example, attachment processes promote adaptive stress modulation at the biological level (Gunnar & Quevedo, 2007), a sense of coherence at the psychological level (Sroufe, 1979), and connections to support networks at the social level (Kawachi & Berkman, 2001). Additional core systems of adaptation, such as self-regulation and cognitive processing, likely operate across multiple levels of developmental influence as well. In a complementary fashion, the most potent risks to development also undermine adjustment across multiple systems. For example, poverty likely taxes allostatic capacities (Blair, Raver, Granger, Mills-Koonce, & Hibel, 2011), distorts an individual's sense of coherence (Amirkhan & Greaves, 2003), and limits social capital (Caughy et al., 2003). In future research, it will be important to elucidate whether and how specific mechanisms take on differential salience as a function of the kind of adversity exposure (e.g., illness, poverty, maltreatment), the specific type of adjustment outcome (e.g., immune function, behavior, mood), and the period of development in question (e.g., infancy, adulthood, old age).

Implications for Health and Health Resilience

A developmental process framework adopts a systems view in which resilience is conceptualized as a pattern of individual adaptation in a given context and over time. Moreover, this process may be engendered or compromised by the operation of multiple factors working at biological, psychological, and social levels of action. This view has significant implications for how we understand and promote health and health resilience.

Time is of central importance in a developmental model of resilience. Development is cumulative such that early adaptations provide a foundation for subsequent adjustment. In some instances, the health consequences of adversity exposure may be readily apparent (e.g., if you bump your head, a bruise will appear immediately), yet in others the effects may be quite delayed (e.g., maintaining homeostasis despite childhood stress exposure may lead to a range of physical ailments in middle adulthood; Brody et al., 2013). Moreover, the impact of these influences may vary over time (e.g., breaking a growth plate in childhood may result in a shortened limb, whereas the same break would not stymie growth in later development). Likewise, some traumatic experiences are especially pernicious when they occur early in life, whereas the same events may have less impact in later life if previous experiences have provided necessary skills to better navigate that adversity. For example, being in a rare natural disaster in childhood may lead to increased anxiety of another occurrence, while the same experience in adulthood would be accompanied with the knowledge of its rarity. In other ways, such events may be less consequential for early development relative to later development. For example, experiencing a hurricane and losing one's possessions in infancy is perhaps less detrimental than in adolescence when youth place greater importance on material markers of status and identity. Finally, the expression of resilience itself may vary over time amidst shifts in the balance of assets and risks, of protective and vulnerability factors.

Greater consideration of the individual's developmental status and the timing of factors influencing resilience will inform future prevention and intervention efforts. Identifying periods of marked vulnerability to subsequent maladaptation may provide information about the most opportune times to intervene. For example, because smoking behaviors most often begin in adolescence, prevention efforts should target this developmental epoch. In addition, a developmental perspective emphasizes the cumulative nature of both adversity and resilience. For example, individuals who have had positive health encounters in the past will be more likely to negotiate future health challenges in an effective fashion, both because the developmental system itself is healthier and because the individual is able to mobilize adaptive resources within and outside the self to engage positive health change.

A comprehensive model of health resilience must consider the simultaneous operation of multiple influences at multiple levels of action over time. The roots of individual health and health resilience extend well beyond the individual. In a study of patients with diabetes, Yi, Vitaliano, Smith, Yi, and Weinger (2008) found that stable glycemic control and fewer diabetes-related health problems reflected the simultaneous operation of both individual processes (e.g., self-efficacy and self-esteem) and systems external to the patient (e.g., social support and health education resources). Extending to the community, access to medical facilities, professional guidance, and effective treatments can increase the likelihood that a person may resist or recover from the negative impact of adverse health events. At the broadest level, health welfare and insurance policies influence individuals' access to affordable, reliable, and immediate healthcare. Together, these factors transact to influence individuals' relative risk or resilience to negative health outcomes.

The emphases on time and multiple levels of influence in a developmental model of resilience suggest that efforts to promote health may operate in various periods of development

and at different levels (see Yates & Masten, 2004 for discussion). When risks are identifiable and modifiable, risk-focused interventions can eradicate threats to development. For example, given that adolescence is a period of heightened risk for smoking, we can strive to decrease risk by preventing youth from purchasing nicotine products prior to age 18. However, in cases where the source of risk is unclear or intractable, asset-focused interventions can combat threats to development. For example, genetic vulnerabilities to illness resist modification, but we can ensure access to basic healthcare and preventive screening to increase the possibility of a positive health outcome in the event of disease expression. Preventing risks and increasing assets are important intervention initiatives in their own right, but their impact will be magnified by process-focused approaches that aim to increase individuals' capacities to make use of a new resource context and/or to navigate ongoing risks. Such process-focused interventions can target basic systems known to promote resilience (e.g., attachment, self-regulation) to protect them from harm and/or to promote or reactivate their optimal functioning.

Just as the most pernicious threats to development undermine multiple systems, the most efficacious interventions incorporate multiple avenues to health and wellness (Wyman, Sandler, Wolchik, & Nelson, 2000). For example, obesity is a prominent health concern with negative and enduring health ramifications. Soda bans in various states constitute a *risk-focused* intervention that decreases exposure to a known risk for obesity, namely, excess sugar consumption. At the same time, *asset-focused* interventions may provide nutritional education or low-cost opportunities for health and fitness to combat obesity. Finally, a *process-focused* model could target core systems of self-worth and self-efficacy to activate individuals' motivation to take responsibility for their health and promote their agency to enact a healthy lifestyle. In combination, these approaches have the potential to combat cumulative sources of risk and vulnerability associated with obesity.

Closing Comments

Resilience is a prominent area of interest for psychologists and health researchers alike. Amidst contemporary debates about vaccinations and struggles with infectious diseases, meeting the need to understand why and how people are differentially susceptible to risk and achieving the challenge to elucidate mechanisms by which we can bolster health and wellness are of increasing importance. Resilience theory and research have the potential to guide these efforts. However, opportunities for translation from resilience science to practice may be limited by barriers among research, practice, and policy. Moving resilience ideas forward into the lived experiences of individuals and communities will require open minds and new collaborations. In this chapter, we explicate the multitude of factors and processes that support or undermine positive adaptation in contexts of adversity. We encourage and guide the application of a developmental view of resilience to the fields of health and health psychology with the hope of advancing and informing ongoing and collaborative efforts to promote positive health trajectories for all people.

Author Biographies

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