



Resilience in the Context of Chronic Stress and Health in Adults

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Abstract

Over the past several decades, stress research has experienced a broadening of its pathologic focus to encompass the concept of resilience. There is a wealth of research on resilience but no general consensus regarding its conceptualization. Some define resilience as attaining eventual favorable outcomes following exposure to adversity. Others define it as specific relatively short-term responses characterized by a return to homeostasis after initial disruption due to a stressor, and still others refer to resilience as resources that enable the individual to withstand or recover from major stressors. Many of the existing conceptualizations of resilience are not applicable in the context of chronic stress which is particularly harmful to health. How do adults who experience chronic stress survive, manage, and thrive, and what resources enable them to do so? In this paper, we consider these questions by reviewing traditions of research and definitions of resilience in order to inform an understanding of resilience in general, and for the study of chronic stress in adults. Based on a review of the literature, we developed a taxonomy of resilience resources that can be applied broadly, and guide future research.

Stress is ubiquitous in modern life yet constant and long-term chronic stress is not usually thought of as a normal or optimal condition (Baum, Garofalo, & Yali, 1999). Furthermore, a growing body of research points to chronic stress as the most deleterious to health (McEwen & Stellar, 1993; Thoits, 2010). Existing formulations of resilience among adults focus disproportionately on the study of specific and often acute stressors, but they do not explicitly consider the question of how adults who experience chronic stress survive, manage and thrive despite it, or what resources enable them to do so. In this paper, we provide background on previous conceptual approaches to the study of resilience in order to develop a foundation for conceptualizing and defining resilience in the face of chronic stress among adults. In addition, we present a taxonomy of resilience resources that includes and organizes many of the factors identified in the literature. Our overall approach is particularly influenced by our interest in adults of low socioeconomic status (SES) in the United States; however, the taxonomy captures resilience resources broadly for wider applicability. Finally, we point out a few of the many possible directions for future research on resilience resources.

As is now well recognized, psychology's historical orientation in the study of human behavior has been negatively slanted. A paradigm shift occurred in the last decade coincident with the emergence of the subfield of positive psychology which broadened the focus of psychological inquiry to encompass optimal human functioning (Seligman & Csikszentmihalyi, 2000). We observe that this shift is mirrored in the subarea of interdisciplinary research on stress. Whereas stress researchers have focused historically on the negative effects of exposure to stressors in an effort to better understand physical and mental

illness, a few early approaches emphasized positive adaptation (e.g., Antonovsky, 1987; Kobasa, 1979; Taylor, 1983), and recent studies echo this theme (e.g., Antoni et al., 2009; Hou, Law, Yin, & Fu, 2010; Ong, Bergeman, Bisconti, & Wallace, 2006). Many researchers use the term *resilience* to describe various aspects of these adaptive processes.

Research Traditions in the Study of Resilience

The inherent resilience of humans in the face of adversity has been investigated from various different psychological perspectives. Three individual traditions of research set the stage for current research. A starting point was in the study of developmental psychopathology among children who experienced adversity in early life in the form of physically abusive homes, parents with mental illness or substance abuse, or poverty (Cicchetti & Garmezy, 1993; Cohler, 1987; Garmezy, 1991; Luthar, 1993, 2003; Masten, Best, & Garmezy, 1990; Werner, 1993). Outcomes of interest were typically children's mental health, school performance, social behavior or cognitive development. For example, the Dunedin study of childhood maltreatment studied effects on antisocial behavior (Moffitt, Caspi, Rutter, & Silva, 2001; Rutter, 2006). As Masten (2001) observed, resilience in this context was originally considered relatively rare and rather remarkable given the severity of the stressful situations. However, resilience was later described as 'ordinary magic', to convey that successful adaptation in children, while quite remarkable, is more common than originally thought.

A second tradition of research related to resilience involved the study of people with life threatening medical conditions such as HIV or cancer, and examined the factors associated with adjustment to the disease, quality of life, remission or survival. For example, Taylor (1983) documented the predominance of positive adaptation to breast cancer through intuitive and skillful use of illusory cognitions that afforded women a greater sense of control over their disease, higher self-esteem, and greater optimism about the future. Taylor's ensuing work pointed to adult emotional adaptability to threat and set the stage for considerable research that followed on growth, meaning and benefit-finding in illness or following other health-related threats and losses (Bower, Kemeny, Taylor, & Fahey, 1998; Pakenham & Cox, 2009; Park, Chmielewski, & Blank, 2010).¹

A third perspective on resilience focuses on responses to acute trauma. Here researchers have examined how adults adapt emotionally to traumatic events especially community disasters such as Hurricane Katrina (Kilmer, Tedeschi, & Calhoun, 2010), and also events such as traumatic injury (deRoon-Cassini, Mancini, Rusch, & Bonanno, 2010). Common outcomes in this research include trauma-related psychopathology especially post-traumatic stress symptoms, as well as positive outcomes ensuing from traumatic events, referred to widely as *posttraumatic growth*. This tradition of research has informed us that a majority of adults are able to withstand trauma and continue functioning reasonably well in the near aftermath (Bonanno, 2004, 2005). For example, a subset of adults who experienced either lower levels or shorter duration of negative emotional responses to major traumas such as the World Trade Center attack in New York City have been characterized as 'resilient' (Bonanno, Galea, Bucciarelli, & Vlahov, 2006). Related research has shown that despite adversity, human beings are happy or satisfied with their lives most of the time, and that various neural and affective mechanisms promote positive emotional states (Fredrickson & Joiner, 2002; Gilbert, 2006; Urry et al., 2004). Although not the main focus here, attention is directed to related research on biological resilience (cf. Bower et al., 2008; Dienstbier & Zillig, 2009; Epel, McEwen, & Ickovics, 1998; Feder, Nestler, Westphal, & Charney, 2010).

Thus, resilience and related phenomena have been popular topics in psychology. Past research has focused on developmental outcomes, adjustment to adult disease, and reactions to traumatic events and has established that resilience appears to be within the basic capacity of humans, but varies considerably across individuals like many other human characteristics (Bonanno, Westphal, & Mancini, 2010; Rutter, 2006).

Resilience: Different Things to Different Scholars

Although a popular concept in psychology, the term *resilience* has been used in many different ways (Bonanno, 2004; Carver, 1998; Garmezy, 1991; Kaplan, 1999; Luthar, Cicchetti, & Becker, 2000; O'Leary & Ickovics, 1995; Rutter, 2006). Many researchers use the term to refer to *outcomes* resulting from stressful situations. For instance, Masten (2001) defines resilience broadly as good outcomes in spite of serious threats to adaptation or development. Similarly, Bonanno et al. (2010) define resilience as "an outcome pattern following a potentially traumatic event" (p. 1.3). Others refer to resilience as particular types of *responses* to stressors (e.g. Carver, 1998). These researchers conceptualize resilience from a homeostatic standpoint, stating that the individual has a prestressor level of functioning that is disrupted by a threatening, harmful or challenging event, following which he or she may return to baseline functioning at some later point in time (cf., Neuman & Fawcett, 2002). Resilient responses may include functioning in different life domains (e.g., work, family, social) and emotional, behavioral and biological responses to acute stressors. Still other perspectives characterize resilience as *protective factors* that enable or facilitate positive adaptation to stress exposure (e.g., Bonanno, 2004; Fredrickson, 2001; Steinhart & Dolbier, 2008). Protective factors include individual characteristics or capacities and features of the environment that, when present, emergent or robust are associated with positive adaptation in the face of adversity.

Going a step further, some scholars have distinguished *resilience* from related concepts. For instance, Carver (1998) who defined *resilience* as a return to equilibrium following exposure to stressors used the term *thriving* for someone being better off after the experience than they were before (i.e., *transformation*; Tedeschi & Calhoun, 1995). A person might become more spiritual or more appreciative of life following a traumatic experience. Later, Bonanno (2004) defined *recovery* as a gradual return to previous levels of functioning after temporary disruption in normal functioning, as contrasted with *resilience* defined as the ability to maintain a stable equilibrium *without disruption* following a stressor.

In sum, despite substantial theoretical richness, the many differing definitions and conceptualizations of resilience in the literature foster confusion that must be addressed if research in this area is to progress. We observe that the definition of *resilience* is evolving over time, much like the parallel construct of stress did. Clarity in that literature was gained by distinguishing stressors (events or conditions) from stress responses (e.g., biological, behavioral), and from outcomes of stress processes (health indicators, well being, longer term functioning), and by further differentiating various aspects of the mediating processes (e.g., cognitive appraisal) (Cohen, Kessler, & Gordon, 1995; Lazarus & Folkman, 1984).

In a recent article, Zautra, Arewasikporn, and Davis (2010) advanced the study of resilience with a theoretical formulation that encompasses many of the aforementioned ideas. They define *resilience* as involving three distinguishable though often overlapping components. First, *recovery* is return to baseline functioning following a major stressor, consistent with a homeostatic approach. Second, *sustainability* is the capacity to continue forward during stressors and maintain functioning without any disruption. Third, the term *growth*

refers to enhanced adaptation beyond original levels of functioning. This framework, similar to that of Rutter (1996), is appealing because the term *resilience* refers to all of the processes involved.

Similar to the concept of stress, resilience may be clarified by viewing it as an overarching process (Glantz & Sloboda, 1999; Rutter, 1996), one which originates from the abilities of and resources available to the individual, which then enable the person to respond adaptively when exposed to a specific stressor or stressors, and can lead to more adaptive outcomes. This approach places greater emphasis on the mechanisms linking resources to outcomes and on moderation effects.

Conceptualizing resilience as a set of processes rather than responses or outcomes is an advancement for many reasons. First, in studies that equate resilience with outcomes, individuals are often categorized as resilient post hoc or after a stressor occurs as a function of adaptive responses or favorable outcomes. This post hoc approach means the definition of resilience may vary depending on the outcome studied (Kaplan, 1999). Second, outcomes are often not final endpoints; rather they also function as mediators of other longer term outcomes (Glantz & Sloboda, 1999; Kaplan, 1999). Third, a focus on resilience as outcomes minimizes the effects of the situation or context in which resilience occurs. Finally, a focus on resilience as outcomes examines the phenomena downstream whereas moving the focus upstream permits better prediction and possible prevention.

With these points in mind, we defined *resilience* in the context of chronic stress as *the process involving an ability to withstand and cope with ongoing or repeated demands and maintain healthy functioning in different domains of life such as work and family*. This definition of resilience is consistent with that of Ryff and Singer (2003) who refer to resilience as the *capacity* to maintain or regain multiple aspects of positive psychological functioning in the face of difficult life circumstances or demanding transitions. Similarly, Garmezy (1993) writes of resilience as a *capacity* for successful adaptation in the face of hardship. We are neither the first nor undoubtedly the last to discuss resilience as a capacity of individuals, but we hope to clarify these issues somewhat in this review by positing that a focus on individual capacities as a distinct component of resilience processes is useful (cf., Waugh, Fredrickson, & Taylor, 2008).²

The Context of Chronic Stress

Several authors have suggested that resilience is only meaningful in the context of a stressor, especially particular types that serve as elicitors of resilience (e.g., Glantz & Sloboda, 1999; Kaplan, 1999; Luthar et al., 2000). For resilience to be relevant, a threat, challenge or loss (i.e., a stressor) must be of large enough magnitude to disrupt functioning for at least some individuals who experience it. Furthermore, a person may be resilient with regard to some kinds of stressors, but not others (Rutter, 2006). Thus, one way resilience research may advance is by more closely examining the properties of the stressor or the stressful context, and how it is appraised. For example, homeostatic conceptualizations of resilience that involve return to prior level of functioning after a stressor apply well to acute or episodic stressors which are typically discrete or time-constrained with defined start and end points. However, findings within this context may not apply well to ongoing, chronic stress such as the stressors involved in life-long socioeconomic disadvantage that have no clear beginning or ending. It is precisely this phenomenon – resilience in adults who experience high levels of chronic and ongoing stressors – that interests us.

Chronic stress has not been uniformly defined either. A key feature across definitions, however, is the nature of the demands as *enduring and without a clear ending*. Chronic stressors are long-lasting and the person either does not know whether or when the challenge will end, or can be certain that it will go on for a very long time and may never end. In fact, the circumstances are often composed of multiple stressors. Gottlieb (1997) broadly describes *chronic stress* as a vast array of life difficulties and conditions, varying in form and severity and, among which, some appear in the foreground and some are the background of people's daily lives. For example, a noisy, dirty and unsafe neighborhood is a background stressor whereas an auto accident or robbery is episodic. Stronger conceptions of stress distinguish between chronic and episodic stressors (e.g., Hammen, 2005), which is a critical distinction for advancing the science on stress and resilience.

Chronic stress is defined here as ongoing demands that threaten to exceed the resources of an individual in areas of life such as family, marriage, parenting, work, health, housing and finances, and often ensuing from very low income, role strains, or their combination. Those who face chronic stressors in the domains of parenting and family life include single parents, parents of children with learning disabilities or major health problems, and also caregivers of aging parents or spouses who have chronic diseases such as Alzheimer's disease. Long term caregiving turns out to be a potent health threatening stressor (Fortinsky, Tennen, Frank, & Affleck, 2007; Kiecolt-Glaser, Dura, Speicher, & Trask, 1991; Schulz & Beach, 1999). Chronic stress processes in marriage may ensue from low commitment, poor communication and high conflict, or separation or divorce (Powell et al., 2002). Again, there is considerable evidence that marital stress influences health (e.g., Kiecolt-Glaser & Newton, 2001). Chronic stressors in the work domain includes jobs with demanding workloads, with risk of burnout, exposure to physical stressors such as hazards in factories or plants, and work conditions with constant over or under demand. These examples highlight a few of the many sources of chronic stress in various life domains.

A prototype of chronic stress in the literature is that of individuals living under conditions of poverty who are faced with ongoing, high, and simultaneous demands in work, parenting, marriage and other major life domains. Low SES has been linked to higher levels of many forms of stressors including higher chronic threats and challenges (Baum et al., 1999; Chen et al., 2006) ensuing from neighborhood, residence, and financial disadvantage. Many chronic stressors are more likely to be experienced by the poor – living in communities with unsafe conditions such as violence or crime, crowding, noise and air pollution (Fleming, Baum, Davidson, Reitan, & McArdle, 1987); household density (Johnston-Brooks, Lewis, Evans, & Whalen, 1998); housing instability/frequent relocation; financial strain and food insecurity; long-term unemployment (Ockenfels et al., 1995); physical stressors (e.g., exposure to carcinogens and pathogens); and lack of adequate health care access or low quality health care. Characterizing these chronic stressors associated with low SES underscores that for those living in poverty, stressors tend to co-occur, accumulate and persist. Resilience under conditions of chronic stress in these populations is especially important to study given that low SES is associated with higher rates of adverse physical and mental health outcomes (Adler, Marmot, McEwen, & Stewart, 1999; Adler et al., 1994; Cohen, Doyle, & Baum, 2006; Evans & Kim, 2010; Matthews & Gallo, 2011).

Mechanisms Linking Chronic Stress and Health

Chronic stress can cause physiological dysregulation including impaired cardiovascular, endocrine, and immune functioning, all processes that individually and together pose a

variety of health threats. For instance, chronic stress has been implicated in such outcomes as cardiovascular disease and immunosuppression (Miller & Blackwell, 2006; Segerstrom & Miller, 2004). Chronic stressors may also disrupt health protective behaviors such as exercise, sleep and healthy diet, and can give rise to more unhealthy and risky behaviors such as tobacco and substance use (Shaver, Johnston, Lentz, & Landis, 2002; Sinha, 2008).

Various theories and some evidence have addressed the mechanisms linking chronic stressors to morbidity, the most prominent of which involves *allostatic load* (AL). AL is 'wear and tear' on the body's systems over time from repeated and/or constant adaptation to stressors (McEwen, 1998). This cumulative physiological burden is characterized by impaired function across multiple regulatory systems, particularly the stress arousal systems (i.e., high glucocorticoids and catecholamines) and longer-term measures of metabolism (i.e., poor blood sugar control, accumulation of visceral fat). Empirical evidence implicates AL as an explanation for the link between chronic stress and morbidity (Juster, McEwen, & Lupien, 2010). For instance, Ryff and Singer (2008) found that individuals experienced enduring economic hardships had higher AL compared to those with more fortunate economic histories (see also Geronimus, 1996, 2001; Geronimus, Hicken, Keene, & Bound, 2006 on weathering).

Resilience Resources in the Context of Chronic Stress

Given the current emphasis on resilience as a set of processes beginning with an individual's capacity or abilities, we present a conceptualization of *resilience resources* that may operate as direct and indirect contributors to adaptation or as moderators of the effects of stressors on various indicators of health and adjustment. Broadly speaking, *resilience resources* can be defined as one or more predispositions or characteristics at the individual, social, or community level that foster the ability to maintain functioning and cope despite repetitive and long-lasting demands (Dunkel Schetter, 2010). The emphasis here is on predispositions within the person and, to some extent, within his or her environment. These resources vary among individuals and groups, and may help to provide a comprehensive consideration of the many ways individuals in adverse contexts might withstand and manage stress exposures.

Early stress researchers drew attention to the importance of various types of individual resources such as social support and personality traits in the coping process (Moos & Billings, 1982); these are sometimes also referred to as personal or coping resources (Taylor & Stanton, 2007). However, few have broadly conceptualized what those psychological resources might be, who possesses them, and how they operate to assist in adaptation in the context of chronic stress. One exception is Conservation of Resources (COR) theory developed by Hobfoll (1989, 2011) proposing that individuals try to obtain and conserve resources so as to be prepared to manage stress when it occurs (Hobfoll, 2002). A key premise of COR is that individuals strive to obtain or foster, retain or protect things that they value to aid in the regulation of self, social relations and behavior (Hobfoll, 2011).

Aspinwall and Taylor's (1997) proactive coping model outlined *resource accumulation* as the building of a reserve of resources in an effort to cope proactively with future threats, but provided limited detail on what the resources were or how they operate. More recently, Gallo and Matthews (Gallo, de los Monteros, & Shivpuri, 2009; Gallo & Matthews, 2003) developed a framework to explain the higher rates of cardiovascular disease in low SES populations. Somewhat similar to these predecessors, they suggest that various types of resources such as perceptions of control or social support operate as a *reserve*

capacity for addressing coping demands and, importantly, that individuals of low SES have lower resource levels and less ability to replenish them. Thus, a person's 'reserve capacity' resembles a gasoline tank that may be full, low, or even empty which explains why coping effectively is particularly difficult for some individuals compared to others. Although developed for heart disease, the reserve capacity model has implications for studying SES and health disparities more broadly.

Taxonomy of Resilience Resources

Given existing theory and research on resilience and related research, we posed this question: What predispositions and emerging characteristics enable a person to withstand long-term and relatively high levels of chronic stressors in adult life? We propose that adaptation³ in the context of chronic stress is likely to result from one or more personal characteristics or resources that can be called resilience resources (RR), which foster the ability to cope and function well despite severe, repetitive and long-lasting demands (cf., Dunkel Schetter, 2010). To assist researchers in examining the many and varied resources, we compiled a taxonomy of individual resilience resources found in the literature. It centers on the individual and the resources that an individual may possess or access, although the resources themselves may operate at multiple levels of analysis, i.e., intra-individual, interpersonal, group, and the larger collective. The taxonomy includes relatively objective characteristics of the individual such as physical strength, good health or high intelligence, as well as subjective perceptions such as perceived mastery over the environment or perceived support. While the focus of this taxonomy is on the individual who experiences stress, we recognize that resilient relationships such as strong marriages or friendships and cohesive families and communities are also worthy of study (cf. Mullings & Wali, 2001; Reich, Zautra, & Hall, 2010). In general, resources may be inborn, or learned from parents or other role models, and through experience. Also resilience resources may change over time (Segerstrom, 2007), although many of them are quite stable over months or even years. Furthermore, particular resources may emerge from personal experience, and individual resources or combinations of them, may become stronger or weaker as a function of prior experience in confronting earlier stressors (Bonanno et al., 2010).

For classification purposes, the resources are grouped into the following six categories: (1) Personality or dispositional resources; (2) Self and ego-related resources; (3) Interpersonal and social resources; (4) World views and culturally-based beliefs and values; (5) Behavioral and cognitive skills; (6) Other resources. Table 1 lists several resilience resources within each of these categories and a few representative citations for each. Some of these entries such as *dispositional optimism* have been developed and extensively studied by individual researchers whereas others have no single easily identifiable source. There is inevitably some overlap among the categories and the list is unlikely to be fully comprehensive. Of note, this taxonomy includes single characteristics and clusters of some of the more commonly studied resources in the psychological literature.

Referring to Table 1, considerable psychological research has demonstrated that there are stress-resilient personality and dispositional resources such as the *self-healing personality* (Friedman, 1991, 2007). This category of resilience resources consists of relatively stable individual traits that develop over the life course, that may have genetic components, and that remain constant over years but may vary in expression across situations (Tedeschi & Calhoun, 1995). It is a rich set of traits that an individual may be fortunate to possess and, in some cases, it may be possible to cultivate them through intervention. Included in this category, although they could be grouped separately, are emotional constructs such as positive

Table 1 A Taxonomy of Resilience Resources

	Representative References
I. Personality & Dispositional Resources	
Dispositional Optimism, Hope	Carver, Scheier, and Segerstrom (2010); Snyder (2001)
Big Five personality factors: Conscientiousness, Extroversion, Openness, Agreeableness, Emotional Stability	John and Srivastava (1999)
Positive affectivity, positive emotional resources (e.g. sense of humor)	Fredrickson, (2001); Martin (2007); Moskowitz (2010)
Empathy, compassion	Batson (1990); Goetz, Keltner, and Simon-Thomas (2010)
Goal oriented disposition (e.g. tenacious/persistent)	Kumpfer and Hopkins (1993)
Hardiness: Commitment, Control, Challenge	Kobasa, Maddi, and Kahn (1982)
Sense of Coherence: Comprehensibility, Manageability, Meaningfulness	Antonovsky (1987)
II. Self and Ego-related Resources	
Self-esteem, self confidence, ego strength	Block and Kremen (1996); Kashdan and Rottenberg (2010); Buhrmester, Blanton, and Swann (2011)
Mastery, control, personal agency (generalized expectancy that one can influence environment)	Antonovsky (1987); Bandura (1997); Masten and Wright (2010); Rutter (1985); Ryff, 1995; Wallston (2001)
Self efficacy (perception that one can perform behaviors to attain desired outcomes)	
Secure adult attachment style	Mikulincer and Shaver (2007)
Diversified self image or identity/self concept flexibility/self complexity/multiple roles	Rafaeli and Hiller (2010); Ryff (1985)
Autonomy, independence (to think and act on own)	Ryff (1985, 1989)
III. Interpersonal and Social Resources	
Social network & integration, social connectedness	House, Landis, and Umberson (1988); Berkman and Glass (2000)
Available support (perceived support)	Cohen and Wills (1985); Cohen (1988); Sarason, Pierce, and Sarason (1990); Uchino (2004)
Social cohesion (work, family)	Friedkin (2004); Kawachi and Berkman (2000)
High quality close relationships	Proulx, Helms, and Buehler (2007); Johnson, White, Edwards, and Booth (1986); Zautra, Hall, and Murray (2010)
IV. World Views & Culturally-Based Beliefs and Values	
Spirituality/religious beliefs and practices	Hill and Pargament (2003); Ryff, Singer, and Palmersheim (2004)
World assumptions (e.g. benevolence, justice, meaningfulness)	Janoff-Bulman (1992); Johnson, Hill, and Cohen (2011); Masten and Wright (2010)
Purpose in life, commitment	Antonovsky (1987); Kobasa et al. (1982); Ryff (1995)
Collectivism/familism	Cohen (2009); Gaines et al. (1997); Sabogal, Marin, Otero-Sabogal, Marin, and Perez-Stable (1987); Triandis (1995)
V. Behavioral & Cognitive Skills	
Relaxation skills (e.g. mindfulness, meditation)	Brown, Ryan, and Creswell (2007)
Active or proactive coping skills or style (problem solving, planning, approach coping)	Aspinwall (2011); Aspinwall and Taylor (1997); Lazarus and Folkman (1984); Rutter (1985)

Table 1 Continued

	Representative References
Cognitive reappraisal or reframing ability 'positive coping'	Folkman and Moskowitz (2000)
Coping diagnostic skills and flexibility	Cheng (2003); Fresco, Williams, and Nugent (2006)
Social skills (e.g. communication, support seeking)	Kumpfer and Hopkins (1993); Wills and DePaulo (1991)
Emotion regulation or management skills (e.g. emotional approach coping skill)	Kumpfer and Hopkins (1993); Stanton (2011)
Behavioral and cognitive flexibility	Fresco et al. (2006)
VI. Other Resources	
Social position & SES: Income, financial resources, wealth, education; social capital	Adler et al. (1994); Adler et al. (1999)
Intelligence (in multiple forms such as insight, creativity, high cognitive functioning)	Kaplan (1999); Kumpfer and Hopkins (1993); Masten and Wright (2010); Zautra, Hall, et al. (2010)
Genetic predisposition to good health/healthy constitution (e.g. low disease risk, strong immune system)	Kaplan (1999); Zautra, Hall, et al. (2010)
Temperament (calm, stable)	Garnezy (1993); Werner and Smith (1982)
Healthy behavioral practices (diet, physical activity, abstinence from substances, safe sex practices)	Zautra, Hall, et al. (2010)
Physical fitness (endurance, strength, flexibility) & vitality, energy	Zautra, Hall, et al. (2010)
Past instructive experience with adversity, biological toughness	Dienstbier and Zillig (2009); Seery, Holman, and Silver (2010)

affectivity and the tendency to experience specific emotions such as humor, empathy and compassion. Recent research on positive emotional states has indicated the importance of such experiences as stress buffers, and general resources in producing positive well being and optimal health (Fredrickson, Tugade, Waugh, & Larkin, 2003; Kok, Catalino, & Fredrickson, 2008; Richman et al., 2005; Tugade, Fredrickson, & Barrett, 2004).

Self and ego-related resources such as perceived control, self efficacy, self esteem and secure adult attachment style have been studied extensively in different ways in psychology. Considerable evidence indicates that confidence, mastery and other aspects of a strong ego are assets in combating adversity (Block & Kremen, 1996; Mäkikangas, Kinnunen, & Feldt, 2004; Marmot, 2003; Mausbach et al., 2007; Mikulincer & Shaver, 2007; Pudrovskaya, Schieman, Pearlin, & Nguyen, 2005). For example, secure adult attachment style has been linked to better psychological and biological response to trauma in adolescents (Petromonaco, Uchino, & Dunkel Schetter, forthcoming; Simeon et al., 2007).

Interpersonal and social resources include being socially integrated, having extensive social contacts and a strong social network, and perceived support. Thousands of studies indicate the importance of this set of social resilience resources to stress management and health in general (Cohen, 1988; House, Landis, & Umberson, 1988; Taylor, 2011). However, a complete understanding of how to cultivate various aspects of our interpersonal life to manage stress has eluded researchers thus far (Helgeson, Cohen, Schulz, & Yasko, 2000; Lu, Lu, & Dunkel-Schetter, 2005). Combinations of social resources with personality and self/ego resources are sometimes referred to under the general term 'psychosocial resources' in the literature.

Three decades ago, Janoff Bulman drew attention to world views as they influence cognitive and emotional responses to trauma (Bulman & Wortman, 1977; Janoff-Bulman, 1992). Beliefs in a just and meaningful world, for example, can be shattered and rebuilt following major trauma. Cultural and religious ideologies are important in shaping world views and may also provide a sense of meaning, safety, and higher power or control over the events in one's life and the world at large. Such beliefs are formed on the basis of early experience and can be reshaped over the life course by subsequent events and conditions (Seery et al. 2010; Tedeschi & Calhoun, 1995). For example, adverse environments may lead to the beliefs that the world is not just, that events happen at random, and that people cannot be trusted or to strengthened beliefs in humanity.

Concerning culturally-based beliefs and values, psychological research is becoming increasingly sophisticated about the study of culture while also integrating it into studies on world views (Johnson, Hill, & Cohen, 2011). For example, collectivism and familism may function as resilience resources in stress adaptation with favorable health effects (Abdou et al., 2010; Campos et al., 2008; see Castro & Murray, 2010 and Unger, 2010, for broad issues). That is, interdependent norms may function as a resource that reduces perceptions of threat and increases perceived support, thereby enhancing a person's capacity to cope with chronic stressors.

A topic that deserves further attention is the study of behavioral and cognitive skills such as support seeking (Wills & DePaulo, 1991), skills in emotion regulation such as relaxation or emotional approach coping (Stanton, 2011), and in active and proactive coping such as planning and problem solving (Aspinwall, 2011). These can be conceptualized broadly as coping skills (Chesney, Neilands, Chambers, Taylor, & Folkman, 2006); for present purposes, they are construed as a set of resilience resources. Possessing a strong set of coping skills for managing stress is adaptive and can be taught (Antoni et al., 2009). In addition to a large and well-developed repertoire of coping skills, the ability to diagnose what is needed in a particular situation, and flexibility in utilizing specific coping methods are also advantageous (Cheng, 2003; Fresco et al. 2006; Schwartz, Peng, Lester, Daltroy, & Goldberger, 1998).

A final category combines further resources that are either endowed or acquired, but that do not fit easily into the above categories. Among endowed resources are physical health, high intelligence, and a calm temperament. Genetic factors in general are increasingly being studied as strengths in adversity (Lemery-Chalfant, 2010; Uddin et al., 2010). Adult SES in the form of more education, higher occupational status and income, and greater social capital (Adler et al., 1999) is an example of a resource that may be either endowed or acquired; regardless, it can enhance the ability to adapt to stressors and promote the development of other resources. Other resources that may be acquired, learned or strengthened are physical fitness through exercise and healthy behavioral practices. Being fit and healthy enhances one's ability to survive chronic stress without adverse health effects. Past experience with adversity may also provide insight and knowledge that become resources in coping with future stressors (Bonanno et al., 2010; Ellis & Boyce, 2008; Hopwood & Treloar, 2008; Rutter, 2006).

These resources function to enable individuals to better manage their lives, persist, and even grow in the context of long-term chronic stress, and thereby reduce adverse physical and mental health consequences. However, future research must further examine these categories and test specific resilience characteristics. Very little research has approached the study of chronic stress from a resilience perspective. By examining resilience resources under conditions of low SES over the lifespan, we have much to learn. Researchers can

hypothesize a priori which resources constitute resilience in specific situations and populations, and predict, based on theory, how they operate and who will exhibit the most adaptive responses.

Combinations of Resilience Resources

There is relatively little research or theory concerning how specific resources work together (cf., Segerstrom, 2007). Hobfoll (2001) reviewed resource theories of stress and adjustment thoroughly especially individual resources such as optimism, self efficacy and coping, and discussed combinations and interactions of multiple resources. Some resilience resources are likely to be moderately correlated with each other (i.e., mastery, self esteem and optimism) and have occasionally been examined with multivariate models (e.g., Rini, Dunkel Schetter, Wadhwa, & Sandman, 1999; Waugh et al., 2008). Such approaches strengthen the power to detect hypothesized effects on mediators and outcomes. Many interesting research questions also arise from conceptualizing resources as a collective set of potential capacities or available strengths. For example, if you measure a large set of resources in a group of individuals, do you simply count the number of resources they have? Or, as in early research using life event checklists, do you weight them by how strong each is and create a summary score of weighted components? Similarly, in intervention planning do you pick specific resources to strengthen or build, and target specific subgroups of individuals who are low in them? Or do you try to enhance a set of the most potent resources regardless of their existence or strength in a population? Finally, can we determine what resources are most valuable in the context of particular stressors such as chronic low SES in minority communities? These and other questions regarding RR can be generated based on our taxonomy.

Conclusion and Research Directions

Researchers in the past have usually studied resilience in only a single context or type of context such as following a loss, diagnosis of an illness, a traumatic event or other adverse conditions. These approaches make sense from the practical standpoint of design and methodology, but whether findings in one context generalize to another is unclear. Very few have studied multiple stressful contexts to build theory and an empirical base on resilience (cf., Ryff & Singer, 2003; Werner, 1993). Building stronger theoretical knowledge of resilience requires comparisons across contexts to determine commonalities in the processes involved as well as differences. Rutter (1996) argues that there can be no universal resilience factors because specific genetic contexts interact with individual traits (Rutter & Silberg, 2002). However, many of the factors in our taxonomy appear to be widely adaptive. Although they may be more protective in some cases than others (i.e., when a genetic risk factor is present), such interactions are unlikely to be the entire story of the capacities of individuals to be resilient. Many resources may also operate in causal chains such as the effects of intelligence on coping skills or the effects of mastery on improved fitness, which in turn lead to better health outcomes.

Prospective and longitudinal designs are highly recommended for the study of resilience. One of the earliest longitudinal studies examined the characteristics of children who had good developmental outcomes despite being exposed to adverse conditions such as chronic poverty, family discord, and parental psychopathology (Werner, 1993; Werner & Smith, 1982). Studies mapping trajectories of adjustment to chronic stressors over time in adults and the role of resilience resources as predictors, mediators and modifiers of

outcomes are critical to future theory and research refinement (Conger & Conger, 2002; Norris, Tracy, & Galea, 2009). This point is further underscored given that “people may be resilient at one time period in their life but not others” (Rutter, 1996, p. 4). Selecting low-income and at-risk populations to study over the lifespan is also essential for advancing our knowledge of health disparities.

Finally, there are limits to resilience effects. For example, children from severely deprived institutions in Romania who were adopted into well functioning homes after 6 months of age showed persistence of adverse outcomes over many years whereas those adopted before 6 months of age did not (Rutter, 1996). Similarly, some adults who are low in resilience resources, may be resistant to enhancement efforts for a variety of complex reasons. Moreover, we cannot shift from the belief that successful adaptation in response to severe adversity is rare to the temptation to believe that everyone can adapt well, as some authors wisely caution us. Adaptation to stressors, even severe ones, may be ‘ordinary’ but in extremely disadvantaged groups facing high levels of chronic stress over long time spans, it may be relatively rare and would seem to be ever more magical.

In summary, our intent has been, first, to point out the variability in conceptualizations of resilience and the parallel to earlier confusion over the conceptualization of stress; second, to suggest a greater focus on the capacities of individuals to adapt to stressors while maintaining a framing of resilience overall as a process; and finally, to provide a definition and taxonomy of resilience resources to spur researchers on in useful directions.

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Short Biographies

Chris Dunkel Schetter, Ph.D. has broad research expertise concerning stress, coping and social support in a variety of physical and mental health contexts. Her published papers include research on social relationships and adjustment to cancer, coping with stress and social support in middle-aged couples, psychological adjustment to infertility, genetic screening for cystic fibrosis, and adjustment to HIV/AIDS. Her primary program of research is on stress processes in pregnancy. Dunkel Schetter and collaborators examine various aspects of prenatal maternal stress and anxiety and effects on preterm birth, low birth weight, and other outcomes, and the mechanisms involved. Her lab’s current research is focused on dyadic social support interactional processes; pregnancy anxiety; risk factors for postpartum depression; racism and discrimination in African American women; and prenatal intervention planning. In 1983, Chris joined the faculty at UCLA

where she is now Professor of Psychology and Chair of the Health Psychology Area. She completed postdoctoral training with Richard Lazarus at U.C. Berkeley, and received her Ph.D. from Northwestern University in Evanston, Illinois.

Christyn Dolbier received her interdisciplinary Ph.D. in Health Education and Psychology from the University of Texas at Austin, and went on to do a postdoctoral fellowship in Health Psychology at the University of California at San Francisco. She is currently an Associate Professor in the Department of Psychology, Adjunct Professor in the Department of Obstetrics and Gynecology, Director of the Stress and Health Laboratory, and Director of the Academic Psychology MA program at East Carolina University. She studies mechanisms by which stress influences health and well-being, factors that enable favorable adaptation to stress, and stress reduction interventions.

Endnotes

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¹ Notably, growth or thriving is always defined as a particular set of processes leading to favorable outcomes from stress. Clearly, the study of resilience processes must somehow incorporate this set of processes and the growing evidence of their health benefits (Bower, Low, Moskowitz, Sepah, & Epel, 2008; Bower, Moskowitz, & Epel, 2009), although there is some concern that they are not as prevalent following some tragedies as research interest might suggest (Wortman, 2004).

² Of note, we do not incorporate health impact into the definition of resilience in order to allow for the assessment of physiological and health indicators as mediators and outcomes. To incorporate these into the definition would continue to confound concepts that must be distinguished to move forward in future research.

³ We sidestep the definition of adaptation here but refer to others who discuss the many details of its multidimensionality and of determining what is adaptive in a particular situation (Holahan, Moos, & Schaefer, 1996; Lazarus & Folkman, 1984).

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