Health & Place 28 (2014) 1–13

Contents lists available at ScienceDirect

Health & Place

journal homepage: www.elsevier.com/locate/healthplace

Green schoolyards as havens from stress and resources for resilience in childhood and adolescence

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ARTICLE INFO

Article history:
Received 29 August 2013
Received in revised form
28 February 2014
Accepted 2 March 2014

Keywords:
Children
Schoolyards
Nature
Stress
Resilience

ABSTRACT

This paper investigates how green schoolyards can reduce stress and promote protective factors for resilience in students. It documents student responses to green schoolyards in Maryland and Colorado in the United States under three conditions: young elementary school children's play in wooded areas during recess; older elementary school children's use of a naturalized habitat for science and writing lessons; and high school students' involvement in gardening. Drawing on ethnographic observations and interviews, it describes how the natural areas enabled students to escape stress, focus, build competence, and form supportive social groups. These findings have implications for theories of resilience and restoration and school interventions for stress management.

1. Childhood stress, resilience, and access to nature

This paper connects the study of stress, resilience, and contact with nature by showing the potential of green schoolyards to reduce stress and enhance protective factors for resilience in children and adolescents. It summarizes observations and interviews in the United States that explored the value of green school grounds for young people: a wooded area for recess play in an elementary school (ages 6–12), an outdoor classroom for older elementary school students (ages 9–13), and gardening programs for high school students (ages 14–18). From the extensive ethnographic data gathered, a finding that emerged across all sites was that natural areas served as places where young people could find refuge from stress and develop protective factors for resilience in the form of supportive relationships and a sense of competence.

There is a current movement to naturalize school grounds through woodlands, gardens and spaces for nature-based play and learning (Banning and Sullivan, 2011; Danks, 2010; Keeler, 2008; Kiewra et al., 2011; Moore and Wong, 1997; Rivkin and Schein, 2014; Warden, 2012). In contemporary urbanized societies, where few children have opportunities to encounter nature in forests, fields and gardens through free-ranging play and exploration, schoolyards are increasingly seen as sites where children can develop knowledge and care for the natural world (Louv, 2008). Proponents of schoolyard greening also point to evidence that the hands-on study of nature can improve academic achievement across the curriculum (Smith and Sobel, 2010; Williams and Dixon, 2013). Bell and Dyment (2008) reviewed research on health benefits of naturalized school grounds, and found better conditions for physical activity for students of all abilities (not just those who excel at team sports), social health because of the cooperative and creative play that natural areas afford, and mental health in the form of reduced stress and enhanced self-confidence. They argued that health promotion must extend beyond interventions that target individual behavior to a more comprehensive, ecological model that addresses the settings of people's lives, including schools. What is not yet reflected in this literature is the evidence that children under conditions of hardship and stress often seek refuge in nature for restoration and healing (Chawla, 2014).

Through its focus on ways that contact with nature can help children and adolescents cope with stress and anxiety and build protective factors for resilience, this paper brings together three fields of inquiry that are rarely connected. In part, the failure of research on stress and resilience to acknowledge benefits of contact with nature may be explained historically. Since the early 20th century, stress has been an important topic in medical and psychological research (Cooper and Dewe, 2004). The 1970s were

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http://dx.doi.org/10.1016/j.healthplace.2014.03.001
1353-8292

marked by major studies of how children cope with stress and develop resilience (Masten and Reed, 2002). Research on the benefits of contact with nature in places of everyday life is more recent. The first studies with adults were published in the 1980s (Frumkin, 2008), but studies with children did not begin to appear until the 1990s (Faber Taylor and Kuo, 2006). Therefore major ideas related to stress and resilience in childhood were already established before evidence about the importance of contact with nature began to accumulate. The lack of cross references among these three literatures may also be explained by the fact that they emerged in different disciplines: the study of stress primarily in medicine and clinical psychology, childhood resilience in medicine and developmental psychology, and contact with nature in environment and behavior studies that draw from diverse disciplines such as human ecology and landscape architecture.

1.1. Stress and anxiety in childhood and adolescence

Most theoretical and empirical work on stress and anxiety has been done with adults, but research indicates that children too can experience high levels of stress and anxiety (Humphrey, 2004; McNamara, 2000). In the early 20th century, Cannon (1928), a physiologist, extended interest in mechanical stresses on the body to emotional stresses such as fear and worry (Cooper and Dewe, 2004). Since this time, "stress" has referred broadly to physical wear and tear and emotional strain (often distinguished as stressors), and resulting physiological reactions or subjective feelings. Anxiety defines a specific form of stress: fear and worry over an impending event, or vague apprehension that something negative is about to happen (Ghinassi 2010).

Lazarus (1966) emphasized the subjective dimension of stress, as a relationship with the environment that people appraise as exceeding their resources and endangering their well-being. He noted that people evaluate levels of harm, loss, threat and challenge differently, and respond with different coping mechanisms and degrees of success. Although many studies support his psychological model, recent research indicates that even when people may not consciously evaluate a situation to be stressful, biomarkers may show that they are reacting physiologically (Campbell and Ehlert, 2012). In a comprehensive model to study stress in young people, McNamara (2000) includes objective stressors, perceived stressors, short-term responses, long-term outcomes, and moderating factors such as social support and perceptions of control.

Research on stress and anxiety in young people typically involves self-ratings, parents' reports, or medical diagnoses based on behaviors that children present. Comparisons of similar measures over time in Western nations indicate that levels of stress and anxiety in young people are increasing (Collishaw et al., 2010; Eckersley, 2008; Twenge, 2000; Twenge et al., 2010). It could be objected that these trends reflect contemporary constructions of "childhood in crisis" and increased efforts by adults to diagnose stress and mental illness in young people (Wyness, 2000); but studies by Twenge et al. in the United States (Twenge, 2000; Twenge et al., 2010) suggest that rising rates of worry and anxiety in young people reflect real changes in their sociocultural environment, including less social connectedness, less valuing of meaning in life, greater materialism and individualism, and environmental threats such as crime and fear of war.

Young people with high measures of stress and anxiety are at increased risk for mental disorders, suicide, headaches, gastrointestinal disorders, respiratory disorders, and compromised immune systems (McNamara, 2000). Therefore it is important to find ways to reduce the stress and anxiety that young people experience. Twenge (2000) recommended creating conditions where young people can feel safe and connected to others, but programs that aim to reduce stress in schools or teach students skills for stress management typically emphasize individual approaches. A meta-analysis of evaluations of 19 school programs found that primary strategies were social–emotional training, problem-solving, deep breathing, muscle relaxation and mental imagery (Kraag et al., 2006).

1.2. Protective factors for resilience

Balancing the study of stress and anxiety, a large literature explores resilience in children, defined as their capacity to overcome challenging stressors such as poverty or illness to become competent, confident and caring individuals (Benard, 2004). Resilience can take different forms (Masten and Obradovic, 2008). It includes resistance, when someone continues to function well during a crisis, recovery of normal functioning after an initial decline, and transformation, when someone shows personal growth through positive adaptations to challenges.

Resilience is promoted by protective factors: qualities in a person, the person's context, or interactions with the environment that predict better outcomes despite risk (Garmezy and Masten, 1991; Wright and Masten, 2005). As characteristics of the child, protective factors include social competence, problem-solving abilities, initiative, a sense of self-efficacy, and a sense of positive meaning and purpose in life. These internal strengths, however, do not develop independently of protective factors in the child's environment, such as supportive social relationships, effective schools, social services, and prosocial youth organizations. Therefore resilience reflects an interactive process that occurs when children exhibit personal strengths by reaching out to find care and support, and people and places around them provide the resources they need (Benard, 2004). Consequently resilience can be enhanced through strategies that focus on the child or the environment: reducing risks (such as a child's impulsive behavior, or bullying at school), building assets (such as a child's concentration, or a more engaging school curriculum), and mobilizing human adaptational systems (such as friendships and supportive adults) (Masten and Reed, 2002).

The importance of supportive contexts has led to interest in collective resilience, the ability of groups and communities to prevent, minimize or overcome the damaging effects of adversity (Norris et al., 2008). Historically, resilience research focused on individuals and social systems, but recent socioecological models acknowledge that the well-being of individuals and communities is embedded in larger processes of ecosystem resilience – the adaptive capacity of natural systems to maintain biodiversity and life-sustaining functions despite change (Masten and Obradovic, 2008). These processes are interactive when people work to conserve and restore ecosystems from which they derive physical, social and psychological benefits (Tidball and Krasny, 2014).

1.3. A missing element in resilience research: access to nature

For the most part, the literature on coping and resilience has failed to reflect the importance of positive human connections with the natural world (Besthorn, 2005; Chawla, 2014; Masten and Obradovic, 2008). A rapidly growing number of studies with adults indicate that access to green spaces predicts restoration from stress, lower levels of mortality and illness, higher levels of physical activity outdoors, greater social capital, more positive emotions, and an improved sense of well-being (Wells and Rollings, 2012). Physiologically, when people have trees and other vegetation around them in contrast to built surroundings, biomarkers show lower blood pressure (Hartig et al., 2003), better neuroendocrine functioning (van den Berg and Custers, 2011; Ward Thompson et al., 2012), better immune system functioning (Li, 2010), and brain wave patterns associated with meditative calm (Aspinall et al., 2013).