

Importance of Stress Management in Sports

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Abstract: The purpose of this review was to identify and evaluate the counseling used to manage a component of the stress process in competitive sport performers. Inclusion criteria were devised to select research relevant to the topic area. Studies were assessed for inclusion by examining their title, abstract, and then full text. Based on the outcome of this process, many previous studies were included in the review. In general, a variety of stress management interventions are associated with athletes' optimized stress experience and enhanced performance. The findings suggest that the effectiveness of stress management is moderated by a number of diverse design features (e.g., treatment adopted, stress component outcome measured). These design features are important to consider when designing interventions for athletes of varying sports, ages, and competitive standards.

Keywords: anxiety, athletes, emotions, psychological skills, stress, management.

Introduction

Stress management plays a vital role in Sports and Games. There are many ways to reduce stress by choosing indoor or outdoor recreation. Outdoor recreation touches on all those aspects of health and can enhance not only physical health but also emotional well-being. Just being outdoors, for example, has been shown to confer health benefits. The research literature on outdoor recreation as it relates to human health is vast and growing. To help policymakers take these new and emerging findings into account when designing recreation and park services and initiatives for the 21st century, this paper summarizes the salient issues. Throughout, the reader will find questions that identify research gaps—an indication that the subject area is fertile ground for additional attention. Section 2 considers how being outside in natural surroundings may improve health, and Section 3, how outdoor physical activities benefit participants. Section 4 examines children's health problems—obesity and hyperactivity in particular—that can be mitigated through outdoor play, sports, and nature study. Section 5 describes approaches to measuring physical activity and recent trends in park visitation and outdoor activity participation, and Section 6 looks at the many variables that affect people's participation in outdoor activities. Section 7 considers the projected demographic changes that will affect policymaking in this arena. The concluding section brainstorms policy options.

When the President's Commission on Americans Outdoors reviewed the nation's policies on outdoor recreation in 1985, the social, economic, and environmental benefits of recreation were recognized, but little attention was paid to human health benefits. Since then, however, research has confirmed a link between physical activity that takes place outdoors and positive health outcomes—and also an association between an indoor, sedentary lifestyle and negative health consequences. There is also evidence that both being outdoors and viewing natural scenes can reduce stress. The links are sufficiently strong that researchers and practitioners in health-related fields are now beginning to identify parks and recreation as a health service. Outdoor recreation's contribution to health can be considered in the context of —wellness. The World Health Organization (2003) defines health as —a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. This definition moves from a strictly medical model of health toward the concept of well-being. The Alberta Centre for Well Being (1989) finds that —the concept of well-being or optimal health involves a delicate balance among physical, emotional, spiritual, intellectual and social health and then lists a wide range of dimensions, from fitness, nutrition, and stress management to meditation, education, and relationships.

General Health Benefits of Natural Spaces

There is increasing evidence that closeness to the natural environment is healthy. One study found that living in a green environment was positively related to such health indicators as levels of stress and amount of physical activity; the relationship between green space and health indicators was somewhat stronger for less educated people (de Vries et al. 2003). One health advantage of being outdoors today is that being indoors may pose greater dangers, since pollution

exposure in homes and offices is often greater than outdoors. The California Air Resources Board estimates that indoor air pollutant levels are 25 to 62 percent greater than outside levels and can pose serious health problems¹. Moreover, when indoors at home, people are more likely to snack. Medium and high TV viewership is associated with snacking more frequently, and frequent viewers also report more consumption of energy-dense snacks (Thomson et al. 2008). Thus, one benefit of outdoor recreation, from a health perspective, is a decreased likelihood of overeating and suffering pollution-related health problems. And of course, while outdoors, people are less likely to be sedentary.

Stress and the Environment

According to the American Institute of Stress (2002), 43 percent of U.S. adults experience adverse health conditions due to acute or chronic stress. Moreover, an estimated 75 percent of all visits to primary care physicians are for stress-related complaints and disorders. People with high stress levels are more at risk for the common cold, heart attack, and cancer. Stress has also been linked to obesity, high systolic blood pressure, and elevated heart rates (Bell et al. 1998; Brand et al. 2000). Mental stress can decrease blood flow to the heart. Circulation, the journal of the American Heart Association, has called stress a risk factor for coronary heart disease patients (www.news.health.ufl.edu/news/tape.aspx?ID=157). Migraine headaches, rheumatoid arthritis, chronic fatigue, receptiveness to allergies, and other maladies are also related to chronic stress. Stress may both suppress the body's immune system and lead to hormonal imbalances that increase production of abnormal cells.

Stress is particularly problematic for older adults, since aging is accompanied by physical, psychological, and social changes. Age-related changes—from chronic disease and disability to care-giving responsibilities and loss of a loved one—are potential stressors (Baltes and Baltes 1990). Some research has shown that too much —artificial stimulation and time spent in purely human environments may cause exhaustion and a loss of vitality and health (Katcher and Beck 1987; Stilgoe 2001). The demands of everyday life—commuting, work, complex decisions— cause mental fatigue, a state characterized by inattentiveness, irritability, and impulsiveness. —In contrast, according to Kuo and Sullivan (2001, 545), —natural settings and stimuli such as landscapes and animals seem to effortlessly engage our attention, allowing us to attend without paying attention.

That the physical environment can trigger human aggression is well established. Crowding, high temperatures, and noise have all been linked to aggression and violence (Kuo and Sullivan 2001). High stress levels are associated with youth violence. Some believe that stress produces —social illness—pathological responses such as violent and reckless behavior, crime, or drug abuse. Antisocial behavior is a common reaction to stressful life situations. Spending time in nature or even viewing nature appears to reduce stress, however, and thus contact with nature may reduce aggression and violence (Kaplan 1995).

Rejuvenating effects have been associated with natural settings, including wilderness areas (Hartig et al. 1991; Kaplan 1984), prairies (Miles et al. 1998), community parks (Canin 1991; Cimprich 1993), and even rooms with houseplants (Lohr et al. 1996). Numerous studies find speedier recovery time from injury through exposure to plants or nature, fewer illnesses in prison inmates whose cell windows face nature, and calming effects of viewing natural landscape images after people are stressed (e.g., Frumkin 2001; Moore 1981; Ulrich 1984; Parsons et al. 1998).

Empirical, theoretical, and anecdotal evidence demonstrates that contact with nature positively affects blood pressure, cholesterol, outlook on life, stress reduction, and behavioral problems among children (Moore 1981; Kaplan and Kaplan 1989; Hartig et al. 1991; Ulrich et al. 1991a, 1991b; Kaplan 1993; Rohde and Kendle 1997; Leather et al. 1998; Parsons et al. 1998; Frumkin 2001). These outcomes have particular relevance for mental health and cardiovascular disease, which are expected to become the two biggest contributors to disease worldwide by the year 2020 (Murray and Lopez 1996).

Search Strategy

The procedure for identifying appropriate studies was based on well-established systematic review guidelines reported in the fields of health care (Edwards, Hannigan, Fothergill, & Burnard, 2002; Egger & Davey Smith, 2001), occupational psychology (Cooper, 1982; Cooper, 2003), and sport psychology (Goodger, Gorely, Lavalley, & Harwood, 2007; Nicholls & Polman, 2007). The search strategy adopted three main approaches to gather research evaluating stress management interventions with sport performers. Firstly, between April 2009 and May 2010, research papers were gathered and identified from the following electronic databases: ArticleFirst (1990 to present), Applied Social Sciences Index and Abstracts (1987 to present), MEDLINE (1965 to present), Physical Education Index (1970 to present), PsycARTICLES (1894 to present), PsycINFO (1967 to present), SPORTDiscus (1985 to present), Web of Science (1945 to present), and

Zetoc (1993 to present). For each database various keyword combinations were used to identify relevant empirical studies, including: affect regulation, anxiety, appraisals, athletes, biofeedback, burnout, cognitive-behavioral therapy, coping, demands, depression, emotions, goal setting, imagery, interventions, relaxation, self talk, sport, strain, stress, stressors, stress inoculation training, stress management, stress management interventions, stress management programs, and well-being. The first author contacted eight experts in stress in sport to establish if there were any keywords missing from this list. This resulted in the inclusion of two additional keywords: competition and pressure. The second search strategy involved conducting a manual search of the following journals from the first issue of publication: International Journal of Sport and Exercise Psychology (2003 to 2010), International Journal of Sport Psychology (1994 to 2010), Journal of Applied Sport Psychology (1989 to 2010), Journal of Clinical Sport Psychology (2007 to 2010), Journal of Sport Behavior (1990 to 2010), Journal of Sport and Exercise Psychology (1979 to 2010), Journal of Sports Sciences (1983 to 2010), Psychology of Sport and Exercise (2000 to 2010), Research Quarterly for Exercise and Sport (2001 to 2010), and The Sport Psychologist (1987 to 2010). Once this strategy was complete, the third search strategy involved citation pearl growing (Hartley, 1990), which involved searching reference lists of the full papers that were collected and met the inclusion criteria.

Inclusion Criteria

The literature search was conducted to gather and identify the studies that employed psychosocial interventions used to manage a component(s) of the psychological stress process in sport performers. In this way, psychosocial interventions refer to studies of social influences and their effect in modifying individual behavior (Frosh, 2003). An example of some typical interventions include cognitive (e.g., imagery, self-talk) and multimodal treatments (e.g., stress inoculation training, progressive muscular relaxation). For research papers to be included in the review, the subjects within each study were required to train and compete regularly in a specific physical activity to be considered authentic sport performers. In this way, novice individuals were not considered as sport performers. On the basis of this criterion, a selection of intervention studies were excluded from the review. For example, two studies by Griffiths and colleagues (Griffiths, Steel, Vaccaro, Allen, & Karpman, 1985; Griffiths, Steel, Vaccaro, & Karpman, 1981) that tested the effects of relaxation techniques on anxiety levels of scuba divers were rejected.

These studies were not included due to the sample of novice students. Additionally, psychophysiological interventions were not included since they did not measure athletes' psychological stress. When retrieving the interventions that had been conducted with sport performers, it was also a requirement that the papers were published in peer-reviewed journals and available in the English language. Although this approach represents a publication bias (Egger & Davey Smith, 2001), it is impractical and expensive to obtain copies of unpublished documents and translate foreign written material. In addition, given the limited amount of information that is provided in published abstracts of conference proceedings, it is unlikely that these studies can be evaluated with sufficient rigor to determine whether an intervention is effective (Scharf et al., 2008).

Results

Study Characteristics

Table 1 summarizes the following study characteristics of the interventions that were included: sample size, gender, mean age, type of sport, skill classification of the sport, competitive standard of the athletes, research design employed, type of measures used, stress concept measured, type of intervention implemented, and the duration of intervention. In terms of the sample sizes gathered for each of the studies, 52 studies (82%) recruited between 1-50 participants, and only two studies (2%) had sample sizes over one-hundred (viz., Bakker & Kayser, 1994; Devlin & Hanrahan, 2005). In view of smaller sample sizes, it is possible that any significant effects reported are more likely to display insufficient power.

When considering the potential moderators of intervention effects, it was revealed that the mean age of participants ranged from 12-21 years for over half of the intervention research ($n = 38$, 59%). Seventeen of the studies (27%) failed to provide participant age related data. With regards to the sport classification of studies, the results showed that 26 studies (40%) were classified as team sports, 32 (50%) were classified as individual sports, and only 3 studies (5%) combined both sport types. Fifty-three interventions (83%) included sports that require gross motor skills movements, with only one study sampling a fine motor skilled sport in isolation (viz., Prapavessis, Grove, McNair, & Cable, 1992). Turning to the competitive standard of participants, 20 studies (31%) recruited collegiate performers, while elite ($n = 4$, 6%) and semi-professional populations ($n = 3$) were largely neglected. Thirteen studies (21%) did not provide sufficient information as to the competitive standard of the participants. An analysis of the research designs revealed that 21 studies (33%) employed true experimental designs, which involved the randomization of participants to an intervention and control or comparison

group. Of the remaining studies, 16 (25%) utilized single-subject designs, 16 (25%) used a variety of quasi-experimental designs, and 11 (17%) employed pre-experimental designs. Additionally, the use of predominantly experimental designs meant that 47 studies (74%) implemented quantitative measures, 15 used mixed methods (23%), and only 2 studies (3%) employed qualitative methods exclusively (viz., Mace, Eastman, & Carroll, 1986; Mace, Eastman, & Carroll, 1987).

A perusal of the stress component outcomes that were measured revealed that 46 interventions assessed state and trait anxiety (72%). When further analyzing the anxiety interventions ($n = 46/64$), imagery ($n = 28$), relaxation ($n = 27$), and self-talk training ($n = 10$) were the most frequently implemented, either in isolation or in combination with other treatments. In terms of the imagery programs that measured state anxiety ($n = 26$), 17 studies (65%) reported a post-intervention reduction in state anxiety, while three out of the total 28 imagery interventions (11%) reported a decrease in trait anxiety. In the main, imagery only produced beneficial effects for anxiety when included as part of a multimodal intervention, of which 35 (76%) were effective. When assessing relaxation techniques, 16 out of 23 (70%) studies reported state anxiety reductions. When imagery and relaxation were both employed with a combination of additional treatments ($n = 18$), the findings showed positive effects for state anxiety in 11 studies (61%). In terms of the self-talk techniques that were utilized exclusively, or as part of a multimodal program, nine out of the ten studies were effective in reducing state anxiety.

Obesity and Outdoor Activity

Because the major causes of death for people in developed nations have shifted from disaster (starvation, war) and disease (smallpox, malaria) to decay (heart disease, cancer), individual behaviors play an increasingly bigger role in both longevity and quality of life (Nesse and Williams 1996). Among the behaviors that have changed is physical activity: Americans are less physically active today than in the past. Although the causes of obesity are multiple and not completely understood, insufficient physical activity is one factor. The incidence of obesity in the United States has been increasing steadily over the past two decades. Between 1991 and 2001, obesity rates increased 75 percent among adults. Thirty four percent of American adults are overweight, and 27 percent—45 million people—are obese. Only 25 percent of adults in the United States report engaging in recommended physical activity levels, 29 percent report no regular physical activity during leisure time, and only 27 percent of high school students engage in moderate-intensity physical activity. Only 50 percent of young people ages 12–21 regularly participate in vigorous physical activity, and 25 percent report no vigorous physical activity at all (Hedley et al. 2004).

Exercise today can be classified by cultural function:

- exercise necessary for work, housework, and personal care (walking to the car, mopping a floor, taking a shower);
- exercise undertaken to improve health (aerobics, weightlifting); and
- exercise undertaken for pleasure (gardening, hiking, playing tennis, dancing).

Of the three, inherently pleasurable activities have the greatest potential to increase human movement in daily life. Middle-aged and older adults are more physically active during leisure activity than they are at their jobs or doing housework or personal care (Chow 2007).

Factors that Affect Participation

A growing research literature supports the proposition that people who live in activity friendly environments are more likely to be more physically active during their leisure time (Sallis et al. 2000; Humpel et al. 2002; Killingsworth 2003; Owen et al. 2004). Active Living Research (www.activelivingresearch.org) summarizes the important findings of such research: that the proximity, safety, supply, and design of recreational spaces are important factors in predicting physical outdoor activity. Other factors affecting participation are availability of leisure time and the nature of the community. The following subsections consider these variables.

Leisure Time

Time use studies show that Americans have an average of 35 to 40 hours of free time per week (Robinson and Godbey 1999; BLS 2006). The majority of this time, however, comes in small chunks during weekdays, rather than in big blocks on weekends. TV viewing takes up about half of all free time (Table 1). Add to this the 27 hours per month of Internet use (for both work and leisure) and it is apparent that staring at screens is a major use of Americans' time (Nielsen and Hansen

2007). By contrast, exercise, sports, and outdoor recreation account for only about 8.5 hours per month. Outdoor recreation, then, is comparatively rare. Indeed, if car travel is considered an —indoorl activity, Americans spend 95 percent of their lives indoors (Robinson and Godbey 1999).

Table 1: Americans' Leisure Time, 2006

<i>Leisure activity</i>	<i>Average minutes per day</i>
Watching TV	156 (2.6 hours)
Socializing, communicating	46
Other leisure activities	29
Reading	22
Relaxing, thinking	19
Playing games, using computer for leisure	19
Sports, exercise, recreation	17
Total	308 (5.1 hours)

Note: Data include persons ages 15 and older. Data include all days of the week and are annual averages.
 Source: American Time Use Survey, U.S. Bureau of Labor Statistics, 2006.

Americans take shorter and fewer vacations than the residents of any modern nation. According to Take Back Your Time (www.timeday.org), only 14 percent of Americans have vacations of two weeks or longer. A third of women and a quarter of men have no annual leave. Some people do not use their paid leave for fear they could be laid off or demoted. Unlike 127 other countries, the United States has no minimum paid-leave law. By law, Australians have four weeks off, Europeans four or five weeks, the Japanese two weeks. The paucity of vacations and extended personal time has health consequences for Americans, leading to fatigue, accidents, and injuries. Job stress and burnout cost the U.S. economy more than \$300 billion a year (www.timeday.org). A recent survey determined that two-thirds of Americans thought vacations should be mandated by federal law (www.timeday.org). While on vacation, people spend more time outdoors, walk more, and watch TV less (Robinson and Godbey 1999). More frequent annual vacations for middle-aged men at high risk for chronic heart disease are associated with a reduced risk of all-cause mortality and specifically mortality attributed to chronic heart disease (Gump and Matthews 2000). Vacations can alleviate perceived job stress and burnout (Westman and Etzion 2001). In short, vacationing may be good for one's health (Gump and Matthews 2000). Yet comparatively little is known about health and the durations and types of vacations, or about the relation between the amount and sequencing of free time during the weekly cycle and health-related variables, such as the amount and types of outdoor recreation participation. Research question: How does free time—its duration, its frequency, its occurrence over the course of a week or year—affect the likelihood of engaging in outdoor recreational activities?

Community Attributes

Increases in obesity have been blamed on the single-use zoning that helped create today's sprawling suburbs because it is said to have removed physical activity from daily life: when people can no longer walk to work or the grocery store, they get less exercise. People living in urban sprawl do tend to have higher body mass indices. Conversely, people with higher body mass indexes are disproportionately likely to move to and prefer areas of urban sprawl (Plantinga and Bernell 2007). A review of 17 studies found that walking as a mode of transportation was strongly related to living in high-density residential neighborhoods and short distances to destinations (Saelena and Karr in press). Although such findings are not unequivocal—Eida et al. (2008) find no evidence that urban sprawl causes obesity—Active Living Research (2008) reports that six studies show walking is positively related to population density and only two do not; eight studies show that walking is positively related to mixed land use and only three do not; and seven studies show that distance to destination is related to walking and only two do not.

Active Living Research (2008) concludes that people living in traditional communities—defined as those with walking and bike trails, easy access to public transportation, and a town center where homes are clustered around shops and office buildings—are more physically active and less likely to be overweight. The organization also notes that traditionally

designed neighborhoods are endorsed by the Surgeon General and the Institute of Medicine. Interest in living in Smart Growth communities may be increasing. National survey data show that public support for traditionally designed communities increased from 44 percent in 2003 to nearly 60 percent in 2005 (Handy et al. 2008). Several strategies recommended by advocates of Smart Growth⁴ relate to outdoor recreation and access to green spaces and parks:

- creating walkable neighborhoods;
- preserving open space, farmland, natural beauty, and critical environmental areas; and
- providing a variety of transportation choices.

Research questions: What government policies best promote Smart Growth outcomes, and how do parks, open space, and natural areas figure into those outcomes? What aspects of Smart Growth best promote physical activity in the daily life of community residents?

Conclusion

In summary, stress management interventions appear to be generally associated with optimized stress in competitive sport performers. This is particularly apparent when only evaluating the interventions' effects on the stress process. However, the findings for optimizing both stress and performance were relatively weak. An important finding to emerge from the systematic review was that multimodal programs appeared to be the most effective technique employed. However, more studies need to investigate the moderating factors (e.g., type of treatment adopted, stress component outcome measured, age, competitive level) that affect the relationships between interventions and effects. Also, these moderators need to be considered prior to intervention design. Finally, the systematic review indicates that future researchers must find a better balance between attending to athletes' personal and situational needs, at the same time as delivering strong experimental research designs, with the controls required to infer causality.

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