ENCYCLOPEDIA OF Sport and Exercise Psychology

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55 City Road
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Mathura Road, New Delhi 110 044
India

SAGE Publications Asia-Pacific Pte. Ltd.
3 Church Street
#10-04 Samsung Hub
Singapore 049483

Printed in the United States of America.

Library of Congress Cataloging-in-Publication Data

Encyclopedia of sport and exercise psychology / edited by Robert C. Eklund, Gershon Tenenbaum.

pages cm
Includes bibliographical references and index.

ISBN 978-1-4522-0383-6 (hardcover)

1. Sports—Psychological aspects—Encyclopedias.
2. Exercise—Psychological aspects—Encyclopedias. I. Eklund, Robert C. (Robert Charles), 1958– II. Tenenbaum, Gershon.

GV706.4.E5 2014
796.03—dc23 2013021776

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14 15 16 17 18 10 9 8 7 6 5 4 3 2 1

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Owen, T., Mellalieau, S. D., & Hanton, S. (2009). Stress management in applied sport psychology. In S. D. Mellalieu & S. Hanton (Eds.), *Advances in applied sport psychology* (pp. 124–161). New York: Routledge.

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Stress Reactivity

Although ubiquitous in life, stress is rather difficult to define. Stress reactivity is a dynamic process involving context-dependent, interactive factors subject to personal interpretation that dictate subsequent individual response patterns. Stress is an extremely influential element of any engagement in sport or exercise participation. The present entry provides an overview of stress. It discusses each individual stage of the stress process (while giving particular emphasis to the critical role of cognition and appraisal) and explores the evolution of key theories addressing the effects of stress on all performance with an especial eye to sporting pursuits.

Overview

Despite the universal nature of stress and its evident effect on all of human performance, a fully comprehensive understanding of its fundamental nature still remains elusive. Decades of research in both psychology in general and sport psychology (SP) in particular fail to fully explain why stress provides the impetus for outstanding physical achievement in some individuals, while debilitating others to the extent of spectacular failure regardless their level of preparedness. Notwithstanding the continued debate regarding an appropriate operational definition, much headway has been made to answer why humans vary so widely in their responses to stress, particularly in the realm of sport. One of the clearest explanations of this phenomenon has been provided by Charles Spielberger.

Spielberger envisaged a three-stage concept regarding the stress process. The first stage is constituted by the presence of a stressor; the second, the appraisal to what degree said stressor represents a threat; and, finally, the third comprises the level of state anxiety (SA) prompted by the extent to which the stressor was then judged to be threatening. Spielberger subsequently proposed that athletes' (re)action patterns were dependent on this induced level of anxiety. Each of these stages is herein examined in greater detail.

Stressors

Stressors are conditions that constitute an objective physical or psychological threat. As stress is a biopsychosocial phenomenon, stressors can emerge from any of these biological, psychological, or social factors. Biological stressors are those that test the physiological adaptability of the athlete. The key physiological stressors are the adaptations the human body experiences as the results of undergoing the physical activity (PA) associated with sport and exercise participation (i.e., pulmonary and cardiac efficiency, skeletal muscle development). Examples of biological stressors outside of the body include extreme temperatures, intense noise, high altitudes, and so on. Psychological stressors, on the other hand, exercise their most profound effect on the performer's cognitive capacities. Mental fatigue (exhaustion), worry (suffering from disturbing thoughts), and competitive anxiety (the predilection to interpret competitive situations as threatening) comprise typically experienced forms of psychological stress. Social stressors are those pressures that athletes perceive to be placed upon them by the sport community or society as a whole. Athletes subject to social stress can suffer from body image issues, pressure to return to training or competition after injury (with insufficient recovery time), as well as unrealistic expectations (such as the pursuit of perfection) from coaches, trainers, teammates, supporters, or their country (at the elite international level). There are stressors that impact the athlete via all three channels such as overtraining—a phenomenon whereby the volume and intensity of an individual's exercise surpass the person's ability to recover (physically and psychologically) that then consequently hinders their progress (causing great concern in the athlete and support staff).

It is critical to remember, however, that each of these so-called stressors merely possesses the potential to induce change in the athlete. With the exception of the very extremes of environmental stress, a stressor, almost independent of its origin, only exercises an effect if the athlete *perceives* it

as stressful or threatening. The following section addresses this crucial role of appraisal in stress reactivity.

The Importance of Appraisal

A stress reaction generally does not take place unless appraisal has first occurred. There are any number of potential stressors continually present within both the environment and the athlete himself or herself. A stress reaction is triggered only when one such stressor or several are interpreted as threatening to an athlete's goal fulfillment.

Not only is such cognitive assessment critical because it initiates the stress process, but appraisal is also crucial because it regulates the severity of the stress reaction. Therefore, the judgment of whether or not (as well as to what degree) a stressor is "stressing" dictates the reactivity of several objective and subjective states within the athlete that forthwith influence performance.

Such changes are referred to as SA, the emotional reaction to an immediate, specific perceived threat (thus subject to fluctuations over time). SA is not to be confused with *trait anxiety* (TA), the more stable, personality-based tendency (or frequency) to perceive stimuli as dangerous. TA does, however, mediate SA levels, as higher TA leads to elevated SA, which some athletes view as a hindrance to successful performance. SA is the final product of the stress reaction and its effects on the objective and subjective states of the athlete are explained next.

Induced Anxiety (Experience of Threat)

Objective and Subjective Changes

Significant objective changes take place throughout the athlete's physiological system during stressful events. Typical physical reactions include increases in perspiration, respiration (R) rate, muscle tension, pupil dilation, heart rate (HR) and blood pressure (BP) elevations as well as accompanying decreases in food consumption and digestive rate.

The subjective reactions of SA include emotions (or feelings) and cognitions. Conventional emotional reactions include nervousness, apprehension, fearfulness, and tension. Each of these emotional reactions is based on the person's subjective evaluation of their own preparedness to cope with the stress of the situation and the knowledge that failure to perform will lead to aversive outcomes. The thoughts that result from a stress reaction are characteristically adverse or unpleasant in nature and most often include uneasiness and worry that such undesirable outcomes will come to pass. The following section presents a number of theories of how these physical and psychological changes collectively influence performance, with special reference to sport activity.

Theories of Stress and Performance

Several sport-specific theories regarding stress and performance have evolved from more general psychological theories; here we will discuss each of the latter major perspectives in turn. Each theory, however, defines stress in its own way, which is somewhat understandable as they were established some decades apart. Acknowledging this compilation of decades of research, we begin each with an examination of the stress process as described by Richard Lazarus.

Lazarus's explicitly stated prerequisites necessary for an accurate model (that agree with Spielberger's in many respects) are that stress is (a) a dynamic process that is (b) iterative and interdependent in nature, (c) composed of unique interactions between an individual athlete and the environment, and is (d) dependent on the athlete's appraisal of said environment and his or her ability to cope with the potential demands imposed and perceived. To explain these effects on performance, three explicit theories are considered.

Yerkes–Dodson Inverted-U Hypothesis

In the earliest of the three theories, Robert Yerkes and John Dodson proposed in 1908 that superior performance occurs when stress levels are moderate, but as arousal levels reached extremes (i.e., too high—hyperexcitement or too low—boredom), learning capacity deteriorates in a symmetrical and increasingly drastic fashion. Graphically, such a relationship resembles an inverted-U form (hence the theory's enduring name). However, inspection of Yerkes and Dodson's original data reveals many inconsistencies, indicating that the range of arousal deemed "moderate" and therefore optimal is fairly small.

The inverted-U hypothesis, as originally presented, leaves much to be desired, most critically when trying to predict performance outcome. Additionally, attempting to explain past performance using Yerkes and Dodson's theory leads

one to deduce that when performance is poor, the performer is either too aroused or insufficiently aroused, but this may not actually be the case.

Individual Zones of Optimal Functioning Model

Yuri Hanin attempted to take the idea of optimal functioning a step further by stating that the most advantageous state of arousal is not necessarily "moderate" but in fact differs across individuals. Yuri Hanin's individual zones of optimal functioning (IZOF) model holds that performance is successful when initial stress levels are within an optimal zone, which is specific to that individual athlete. If the athlete's stress level falls outside his or her personal range, performance degrades. In contrast to the Yerkes–Dodson inverted-U hypothesis, which implies that stress levels should be ubiquitously moderate for optimal performance, Hanin's model does not specify what level is ideal. The optimal level (whether high, moderate, or low) depends solely on the individual performer.

The Dynamic Adaptability Model

Peter A. Hancock and J. S. Warm's dynamic adaptability model integrates and synthesizes aspects of the aforementioned theories. Much like Spielberger's conceptualization, the theory is founded on a trinity of stress, namely *input, adaptation,* and *output.* Input encapsulates the physical sources of stress in the environment. Adaptation consists of physiological and psychological adaptations to this input and so reflects the appraisal process. Output denotes the change in goal-directed response efficiency. In sport, this latter selection would represent efficiency on any particular task-related performance. When represented graphically, the dynamic adaptability model resembles an extended-U shape, which retains the inverted-U notion that performance deteriorates quickly at the extremes of stress. However, here there is also an optimum range between the extremes, which yields a successful plateau of stable performance. The extended-U also incorporates the IZOF model's view that the optimum range is based on the individualistic nature of each performer. Hancock and Warm's theory further contends that the extent of the optimum range not only is subject to the athlete's physical and psychological capacities for adaptation to stress but is also crucially contingent upon the recognition that the task itself is the major proximal source of stress. Collectively, these conceptions serve to describe stress reactivity and provide a theoretical and quantitative basis to understand how athletes respond to the stresses that their sports impose upon them.

G. M. Hancock and P. A. Hancock

See also Adaptation; Basic Emotions in Sport; Burnout; Coping; Emotional Reactivity; Psychological Skills; Psychological Well-Being; Psychophysiology; Resilience; Stress Management

Further Readings

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SUPERVISION

Supervision is a central component of professional training and development, providing opportunities for sport psychology (SP) practitioners at all levels to use the experiences and knowledge of others to examine themselves. Supervision is also required for certification or licensure (e.g., registration, chartering) in most of the psychology and helping professions (e.g., psychology, counseling, social work), and in the exercise and sport science fields (e.g., athletic training, strength and conditioning). Those seeking supervision to fulfill degree requirements, or to become eligible for certification or licensure, must know what requirements are expected by their institutions, and the licensing bodies in that area (e.g., American Counseling Association, American Psychological Association [APA], Association for Applied Sport Psychology