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# Introduction to the Brockport Physical Fitness Test Technical Manual

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Health-related criterion-referenced physical fitness has developed into an important domain for all youngsters in American schools. Although considered important for youngsters with or without disabilities, much less attention has been given to measuring and assessing health-related physical fitness of youngsters with disabilities. The Brockport Physical Fitness Test (BPFT) was developed as a health-related criterion-referenced test of fitness as a part of a federal grant entitled Project Target: Criterion-Referenced Physical Fitness Standards for Adolescents with Disabilities. This special issue of the *Adapted Physical Activity Quarterly (APAQ)* presents the conceptual framework for the BPFT and the technical information used as a basis for the selection of test items and standards associated with the test. Technical information is presented in separate articles covering aerobic functioning, body composition, muscular strength and endurance, and flexibility/range of motion. This first article introduces the reader to health-related fitness testing, Project Target, the BPFT, the general organization of information in this issue, and key contributors to Project Target and the development of the BPFT.

## Early Health-Related Physical Fitness Tests

Since 1980 there have been two important advances regarding physical fitness testing. The first was the distinction between health-related and skill-related fitness and the second was the assessment of participant performance against criterion-referenced standards rather than norm-referenced standards. Examples of health related physical fitness tests developed and published since the 1980s have included the South Carolina Physical Fitness Test (Pate, 1983); the FITNESSGRAM tests (Cooper Institute for Aerobics Research, 1987, 2004); the Physical Best developed by the American Alliance for Health, Physical Education, Recreation and Dance (AAHPHERD; McSwegin, Pemberton, Petray, & Going, 1989); and the President's Challenge (President's Council on Physical Fitness and Sports, 2004). Although these tests acknowledge the need for modifications and accommodations for youngsters with disabilities in their test administration information, none provide specific criterion-referenced standards for youngsters with disabilities. Each was

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clearly developed for populations without disabilities. As stated in the Physical Best manual, "Unfortunately, there is not enough objective information on the health and fitness status of many handicapped individuals; therefore, it is difficult to provide specific standards and guidelines" (McSwegin et al., 1989, p. 23). Project Target was designed to address the need for health-related criterion-referenced tests and standards appropriate for youngsters with disabilities.

## **Project Target**

Between 1993 and 1998, the U.S. Department of Education Office of Special Education and Rehabilitative Services funded Project Target, a research study designed to develop a health-related, criterion-referenced physical fitness test for youngsters ages 10 to 17 with disabilities. The project was entitled "Project Target: Criterion-Referenced Physical Fitness Standards for Adolescents with Disabilities." Project Target was centered at the State University of New York, College at Brockport, directed by Joseph P. Winnick and coordinated by Francis X. Short. The essence of the project was to develop standards for the attainment of healthful living through physical fitness and to enhance the development of health-related fitness of youngsters with disabilities.

The project created the Brockport Physical Fitness Test (BPFT; Winnick & Short, 1999a), including criterion-referenced standards for adolescents with mental retardation and mild limitations in fitness (MR), visual impairments (blindness; VI), cerebral palsy (CP), spinal cord injury (SCI), and congenital anomaly/amputation (CA/A). Readers are referred to the BPFT test manual (Winnick & Short, 1999a) for more detail. The test also provided a process that could be employed to develop a test and standards for youngsters with other disabilities.

## **Technical Information**

The information included in this special issue presents technical information associated with the BPFT. It is drawn from the technical manual developed in connection with the final Project Target report submitted to the U.S. Department of Education, Office of Special Education and Rehabilitative Services (Winnick & Short, 1998) and subsequently published as part of the Physical Challenge software (Winnick & Short, 1999b) associated with the BPFT. Although presented in the software package, it became evident that the information presented in this manner was not reaching the desired population for which it was intended. The authors had hoped that publishing the information in software associated with the BPFT would serve to educate professionals, especially those interested in research, about health-related physical fitness, the current status of assessment associated with the BPFT, and suggestions for further research. Instead, the authors continually received requests for information about these topics. It became obvious that the software was not reaching interested persons and that another strategy was necessary to disseminate the information. This special issue provides the technical information undergirding the BPFT. Although most of the information presented represents the original information presented in the final report of Project Target and the Physical Challenge software, it has been reorganized slightly and updated

to provide more recent information on the topic. Thus, this special issue presents the basis and rationale for the selection of test items and health-related criterion-referenced standards associated with the BPFT. To best understand the rationale for the selection of test items and standards, readers should be familiar with the conceptual framework presented in the next article of this issue.

In developing the BPFT, it was decided to select FITNESSGRAM as an important reference for test construction. FITNESSGRAM was adopted by AAHPERD as its recommended test of health-related physical fitness for youngsters without disabilities and was considered to be conceptually consistent with the goals of Project Target. Also, this coordination with FITNESSGRAM would enhance inclusionary practices at the practitioner level. Thus, the rationale for the items and standards recommended for the general population already have been presented. Readers are referred to The Prudential FITNESSGRAM Technical Reference Manual (Morrow, Falls, & Kohl, 1994) for much of this material. Emphasis in this issue is placed on the conceptual framework and rationale for selecting test items and standards for youngsters with disabilities.

The selection of test items and standards for the BPFT was influenced by years of previous research in adapted physical activity, data collected on 1,542 youngsters over the life of Project Target, and the opinions of a panel of experts in the areas of health, fitness, and adapted physical activity. The final product represents a good beginning for health-related criterion-referenced physical fitness assessment related to youngsters with disabilities. After reading this issue, it will be very clear, however, that this area is fertile ground for further research activity and hopefully the information presented will serve as a good foundation and point of departure for future work.

The BPFT includes 27 different test items under three components of health-related physical fitness: aerobic functioning, body composition, and musculoskeletal functioning (muscular strength/endurance and flexibility/range of motion). Criterion-referenced (CR) standards are provided for all test items (see Table 1). This issue is designed to provide interested readers with a detailed rationale for the selection of test items and standards associated with the Brockport Physical Fitness Test. Thus, it is consistent with the contemporary view that validity is the degree to which evidence and theory support the interpretation of test scores entailed by proposed users of tests (American Educational Research Association, AERA; American Psychological Association, APA; and National Council on Measurement in Education, NCME, 1999). Following the article focusing on the conceptual framework for the BPFT, four additional articles associated with components or subcomponents of health-related fitness are presented: aerobic functioning, body composition, muscular strength and endurance, and flexibility/range of motion. (Muscular strength and endurance and flexibility/range of motion are subcomponents of musculoskeletal functioning, but are treated separately because of the large number of items associated with this component.) Each article includes information on *validity* and *reliability*.

The *validity* section of each article includes opening paragraphs to establish that the fitness component, or subcomponent, in question does, in fact, relate to health status. The opening paragraphs also attempt to define criterion levels of the component that can be used as the basis for selecting health-related physical fitness standards (critical values of  $VO_{2max}$ , percent body fat, etc.).

**Table 1 Components and Test Items for the Brockport Physical Fitness Test (BPFT)**

<b>Aerobic function</b>	
20-m PACER	
Modified 16-m PACER	
Target aerobic movement test (TAMT)	
One-mile run/walk	
<b>Body composition</b>	
Skinfold measures	
Body mass index (BMI)	
<b>Musculoskeletal function</b>	
<u>Muscular strength and endurance</u>	<u>Flexibility or range of motion</u>
Bench Press	Modified Apley test
Curl-up	Back-saver sit and reach
Modified curl-up	Shoulder stretch
Dumbbell press	Modified Thomas test
Extended arm hang	Target stretch test (TST)
Flexed arm hang	
Dominant grip strength	
Isometric push-up	
Pull-up	
Modified pull-up	
Push-up	
40-m push/walk	
Reverse curl	
Seated push-up	
Trunk lift	
Wheelchair ramp test	

*Note.* From *The Brockport Physical Fitness Training Guide*, p. 3, by J. Winnick and F. Short, 1999c. Champaign, IL: Human Kinetics. Reprinted with permission.

Following the validity section of each article, test items are presented with available information on standards and attainability. Test items are linked to the component or subcomponent of fitness being discussed. Readers must refer to the test manual (Winnick & Short, 1999a) for a complete description of test protocols.

Standards are then discussed with each test item. The *standards* subsection provides a rationale for recommended CR standards. Links between test scores (laps, times, skinfolds, etc.) to criterion levels of the component ( $VO_{2max}$ , percent body fat, 20th percentile, etc.) are provided. We have linked standards to indices of either *physiological* or *functional* health. *Physiological health* is related to the

organic well-being of the individual. Indices of physiological health include traits or capacities that are associated with well-being, absence of a disease or condition, or low risk of developing a disease or condition. *Functional health* is related to the physical capability of the individual. Indices of functional health include the ability to independently perform important tasks, such as activities of daily living and the ability to sustain the performance of those tasks.

In the BPFT, health-related standards are either *general* or *specific*. A general standard is one believed to be appropriate for the general population. A specific standard is one that has been adjusted to account for the effects of a particular impairment or disability on test performance. For many items, general standards are provided for both minimal and preferred levels. A minimal general standard represents the lowest *acceptable* criterion for health-related fitness for a particular item for the general population. A preferred standard is established to represent a good level of health-related fitness for members of the general population. In some cases, only a single general standard is provided for a particular item. Youngsters who attain a single general standard also are considered to have reached a good level of health-related fitness.

The *attainability* subsection typically reports passing rates for the various tests by disability groups. In a strict theoretical sense, the issue of attainability in the development of a criterion-referenced test is moot. CR standards are selected because they are believed to reflect important elements of a particular domain (e.g., health). If the standards accurately reflect desirable levels of health-related fitness the fact that they may be “too easy” or “too hard” technically is irrelevant. In a practical sense, however, attainability is an important aspect in CR fitness development, especially for youngsters with disabilities. One of the reasons for fitness testing is to draw both student and teacher attention to the importance of fitness and to motivate students to pursue higher (or at least healthy) levels of fitness. When test items cannot be performed and/or standards are perceived as being out of reach, the message seems to be that physical fitness is not an appropriate pursuit for youngsters with disabilities. One of the goals of the BPFT, therefore, was to select items and standards that could be linked to some index of health status but also would be attainable for youngsters with disabilities.

A major section on *reliability* is also included in each of the four articles. Reliability sections generally focus on available “norm-referenced reliability” data for each test item. Test-retest information is expressed as either an interclass, intraclass, or alpha reliability coefficient. Some “criterion-referenced reliability” data (i.e., consistency of classification) also are presented, although this information is more limited. Each of the four articles concludes with implications for future research.

## Advisory Committee and Consultants

A very important step in conducting Project Target was to select an advisory committee and a panel of experts as well as a variety of consultants to provide overall guidance and content validity. The advisory committee served as the project’s panel of experts. In concert with recommendations by Yun and Ulrich (2002), these persons were extremely highly qualified and represented important perspectives from multiple fields. The procedure employed in the project was to adopt recommendations from the panel of experts when total consensus was attained. Contributors as

advisory committee members or consultants are presented in the next section with their affiliation at the time of development of the BPFT.

### **Advisory Committee**

Dr. Kirk J. Cureton (University of Georgia), a major contributor to the development of the FITNESSGRAM, who wrote the technical reference material for the measures of aerobic capacity associated with that test (Cureton, 1994);

Dr. Harold W. Kohl (Cooper Institute for Aerobics Research), a co-editor of the technical reference manual for the FITNESSGRAM (Morrow, Falls, & Kohl, 1994);

Dr. James H. Rimmer (University of Northern Illinois), an expert in adapted physical education and author of *Fitness and Rehabilitation Programs for Special Populations* (1999);

Dr. Margaret Jo Safrit (American University), an author in measurement and evaluation in physical education and exercise science (Safrit, 1990);

Dr. Roy J. Shephard (University of Toronto and Brock University), a pre-eminent authority on physical fitness of persons with disabilities and author of *Fitness in Special Populations* (1990);

Dr. Kenneth J. Richter (Mercy Hospital, Pontiac, Michigan), medical director of the United States Cerebral Palsy Athletic Association with particular expertise in physical activity of persons with physical disabilities; and

Dr. Julian U. Stein (George Mason University), a distinguished authority on adapted physical education with extensive experience particularly in the area of mental retardation.

### **Consultants**

Project staff also drew upon the expertise of a number of consultants who are authorities in their field. Among those who played significant roles as consultants to Project Target were the following:

Mr. Jeffrey Jones (President, United States Cerebral Palsy Athletic Association) and Dr. Michael Paciorek (Eastern Michigan University), who along with advisory committee member Richter, provided valuable information on fitness testing of youngsters with cerebral palsy;

Dr. Bo Fernhall (George Washington University) and Dr. Ken Pitetti (Wichita State University), who consulted on tests of aerobic functioning and were principal investigators of a validation study on Project Target measures of aerobic capacity using participants with mental retardation;

Dr. Paul Surburg (Indiana University), who critiqued Project Target field tests and accompanying rationale and contributed to the flexibility/range of motion chapter in the BPFT training manual;

Dr. Pat DiRocco (University of Wisconsin, La Crosse), who provided commentary on Project Target field tests and contributed a chapter on muscular strength and endurance in the BPFT training manual;

Dr. Timothy Lohman (University of Arizona), who provided standards for certain measures of body composition and contributed to the subsequent article in this issue on body composition, which included information on skinfolds and body mass index;

Dr. Jeff McCubbin (Oregon State University) and Dr. Georgia Frey (Texas A&M University), who contributed to the area of aerobic functioning; and

Dr. Stephen Klesius (University of South Florida), who filmed the administration of virtually all Project Target test items and edited the instructional videotape.

## Closing Remarks

Health-related criterion-referenced physical fitness testing and assessment are of vital importance in the lives of individuals with disabilities. Unfortunately, relatively little research has been systematically conducted to advance this area. The development of the BPFT represents a comprehensive and serious attempt to advance knowledge in this area. This special issue summarizes technical information underlying the BPFT and suggests areas of need for future research. Hopefully, scholars will reflect and build on this information to enhance the physiological and functional health of individuals with disabilities.

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