

# PERSONAL TRAINER EXAMINATION PROGRAM TECHNICAL REPORT

December 5, 2006



## Introduction

This report provides an overview of examination program activities and the statistical properties of the new, practice-based version of the certification examination for Personal Trainers, administered by the National Exercise Trainers Association – Personal Trainer Certification Board (NETA-PTCB).

The version of the exam discussed in this report was administered in a number of locations at different times throughout the United States during the first 10 months of 2006. The data from these administrations were combined and served as the basis for the statistics and analyses appearing in this report.

## Background

NETA has certified Group Exercise Instructors (since 1977), Personal Trainers (since 1995), Pilates Instructors (since 2000) and Yoga Instructors (since 2005). It has always been a priority for NETA to provide fitness professionals with a cost-efficient way to obtain the best education, knowledge and skills to enter the fitness industry. To that end, NETA strives to stay abreast of industry trends and changes in order to communicate those to its certificants through continuing education and certification workshops.

In 2003 it became abundantly clear that the industry was headed towards a higher standard of practice in relationship to certification agencies. NCCA accreditation was held up as the highest standard to achieve. Therefore, NETA began the NCCA accreditation application process in early 2004.

NETA established a separate board, currently known as the NETA-PTCB, to govern all certification processes. Dr. Gerald Rosen was retained to consult with NETA's Certification Director to establish a psychometrically sound certification exam. A Job Analysis was conducted and completed in November of 2004, at which time a new exam was constructed to reflect the Job Analysis findings and to better reflect the changes that were in progress. The exam that was constructed, analyzed and deemed accurate, sound and fair. That examination was used throughout 2005. During that time all test construction processes required by NCCA standards were conducted and documented. The result of the test construction processes is the examination that was placed in service in January of 2006.

The new examination has been administered to more than 500 Personal Trainer Candidates throughout 2006 and has been psychometrically analyzed according to Standards.

## Section I: Examination Administration

The examination was administered via a paper-and-pencil format using scannable answer sheets under a secure, proctored arrangement. A total of 515 answer sheets were submitted for analysis. Due to mishandling during shipping and other anomalies, 10 of the 515 answer sheets were not able to be scanned on the optical equipment. The answer sheet problems appeared to be random, rather than systematic. Data from the remaining 505 answer sheets formed the basis for the analyses contained in this report.

## Section II: General Test Results

The Personal Trainer (PT) examination consists of 100 questions contained in one test booklet. The mean, standard deviation, reliability coefficient and standard error of measurement reported here are based on all 100 items (see Table 1). The raw score mean is the arithmetic average of the total number of items answered correctly by the group of examinees. For instance, the table shows that the mean or average raw score for 74.92. The median is the score point above and below which half of the candidates scores fall. The median for the examination was 77.00. The standard deviation is a measure of the dispersion of the raw scores about the mean. The standard deviation of the examination was 11.04.

The Kuder-Richardson-20 (or KR-20) reliability reflects the degree of consistency in the test score. The KR-20 coefficient for the examination was 0.88. This reflects a very high degree of internal consistency.

Table 1 also contains information on the reliability or consistency of pass/fail decisions computed via the Livingston method. The pass/fail decision consistency index was 0.90. This represents a very high degree of decision consistency.

The Standard Error of Measurement is interpreted as a standard deviation of the errors of measurement for the test, and is directly influenced by both the size of the standard deviation and the degree of unreliability of the test. The greater the standard error of measurement, the more the score reflects chance factors. For the PT examination, the standard error of measurement was equal to 3.85. The Standard Error of Measurement at the cut score was 4.12.

Table 2 summarizes the pass/fail statistics for the PT examination in terms of both the raw number of candidates and the percentage of candidates. A total of 369 (73.1%) of the 505 candidates passed the examination and 136 (26.9%) failed.

Table 3 contains a demographic profile of the personal trainers who responded to the validation survey. Review of the table reveals that 70% have been in practice five years or less, 67% work in a private fitness facility or at a YMCA, 78 % work in a non-managerial personal trainer role, and 80% have a bachelor or associate degree. These percentages closely reflect the characteristics of the overall NETA membership body.

Table 1  
**EXAM STATISTICS**

	PT Exam
Number of Scored Items	100
Total Number of Examinees	505
Raw Score Mean	73.91
Raw Score Median	77.00
Raw Score Variance	121.88
Raw Score Standard Deviation	11.04
KR-20 Reliability Coefficient	.88
Standard of Error of Measurement	3.85
Cut Score SEM	4.12
Raw Passing Score	70
Percent Passing Score	70
Decision Consistency (Livingston)	.90

Table 2  
**PASS/FAIL FREQUENCY DISTRIBUTION**

	PT Examination
Pass	369 (73.1%)
Fail	136 (26.9%)
Total	505 (100.00%)

Table 3  
**DEMOGRAPHIC PROFILE OF RESPONDENTS (N = 40)**

<b>I. Years In Practice</b>	Respondents	<b>III. Position Held</b>	
1 - 5	28 (70.0%)	Personal Trainer	31 (77.5%)
6 - 10	7 (17.5%)	Dept Manager	6 (15.0%)
10 - 20	4 (10.0%)	Facility Manager	1 (2.5%)
21+	1 (2.5%)		
<b>II. Practice Setting</b>		<b>IV. Education</b>	
Private Fitness Facility	21 (50.0%)	HS Diploma	4 (10.0%)
YMCA	9 (25.0%)	Associate Degree	5 (12.5%)
Community Rec Center	6 (15.0%)	Bachelors Degree	27 (67.5%)
Independent Practice	3 (7.5%)	Advanced Degree	3 (7.5%)
Other	1 (2.5%)	No Response	1 (2.5%)

## Section III: Test Development

### A. Role Delineation and Test Specifications Development

In an effort to certify industry professionals, the National Exercise Trainer's Association - Personal Trainer Certification Board (NETA-PTCB) has undertaken the task of developing and implementing certification examinations for personal trainers. From its inception through 2005, the content of NETA-PTCB's certification examination for personal trainers was keyed to training program curricula and training materials providing comprehensive instruction for exercise professionals working as personal trainers. More recently, NETA-PTCB decided to change the foundation of the examination from "curriculum-based" to "practice-based". In so doing, the organization sought to enhance the legal defensibility of the personal trainer certification program and, in addition, make it eligible for national accreditation. A necessary first step in the process of changing to a practice-based examination program was to perform a practice (job) analysis identifying the domains of practice, tasks, and knowledge required for safe and effective performance on the job. Once in place, these Domains, Tasks and Knowledge Statements formed the basis for item (question) writing and examination construction.

On August 21st, 2004, a workshop was conducted in Minneapolis, MN wherein a diverse group of six subject-matter experts (SMEs) selected by and representing NETA-PTCB met to conduct the practice analysis for the personal trainer examination program. Specifically, the purpose of this meeting was to produce a document delineating the knowledge required for the safe and effective performance of the tasks carried out by the entry-level personal trainer. An additional goal of the workshop was to identify a weighting factor associated with each Domain and Task. The weighting factors represented the pooled judgments of the SMEs of the relative importance of, and time spent on, each of the Tasks typically performed by the entry-level personal trainer. Information on the participants in the Role Delineation study can be found in Table 4.

Table 4  
**PRACTICE ANALYSIS WORKSHOP PARTICIPANTS\***  
Minneapolis, MN August 21, 2004

Name	Title	Organization	City/State
Lu Herbeck	Program Director Certification Director	NETA-PTCB	Minneapolis, MN
Mike Iserman	Director of Personal Training	YMCA	Minneapolis, MN
Jon Giese	Personal Trainer Personal Trainer	Holiday Spa Mayo Clinic Patient Education	Huntington Beach, CA Rochester, MN
Jeanne Johnson	Personal Trainer	HomBody	St. Paul, MN
Tom Conroy	Personal Trainer Personal Trainer/Owner	Northeastern Illinois Univ HomBody	Chicago, IL St. Paul, MN
Steph Maks	Fitness Director Area Group Fitness Director	Gold's Gym Gold's Gym	Reno, NV Minneapolis, MN
Nick Hudson	Personal Trainer Personal Trainer	Hard Body Lifetime	Santa Monica, CA Maplewood, MN
<i>Not in attendance but contributed to the practice analysis process:</i>			
Amy Stitt	Personal Trainer	NWAC	St Louis Park, MN
Lisa Servais	Personal Trainer	Independent Contractor	Durango, CO

\* Please Note: All of these individuals have provided health and exercise training and educational workshops in nearly every state in the U.S. They have a broad prospective on consumer needs across the U.S. and the myriad of niche markets that make up the various regions.

The product of this role delineation workshop was a draft practice analysis that was subsequently returned to NETA-PTCB staff and selected panel members for final review and comment. Since the product of this workshop represented the work of only eight individuals, the decision was made to validate the practice analysis document by submitting it to a randomly selected group of 200 professionals, all personal trainers. In addition to the practice analysis document, participants were provided with an introductory letter from NETA-PTCB, a cover memorandum from Dr. Gerald A. Rosen, Consulting Psychologist, retained by NETA-PTCB to develop the practice analysis, and a packet of materials containing the following: a list of definitions of terms so that participants would become familiar with job analysis terminology; a set of detailed instructions for reviewing and commenting on the practice analysis, and a set of comment sheets containing the survey questions. The respondents recorded their responses to the survey questions directly on the comment sheets. The respondents were asked to review the practice analysis document and: (1) identify those Domains, Tasks and/or Knowledge Statements they would like to eliminate, reword, or revise; (2) suggest any additional Domains, Tasks and/or Knowledge Statements that they would like to add to the practice analysis; and (3) confirm or suggest changes to the Domain weights.

Based on the data obtained from the Role Delineation, the document was revised and a final set of test specifications was developed. The revised, practice-based test specifications formed the basis for subsequent item-writing and test development. Additional information on the Role Delineation and Test Specifications Development can be found in the NETA-PTCB Practice (Job) Analysis Development and Validation Report.

## B. Item Development

A panel of 8 subject matter experts (SMEs) (Table 5) was assembled for the purposes of writing exam questions. Each expert received a copy of the Role Delineation (Appendix P), with specific content assignments, and a copy of the “Guide to Preparing Multiple Choice Questions (Exhibit A of this document) provided by Dr Gerald Rosen. Each SME / Item Writer was asked to write an specified number of questions, from their assigned section, to be included in the NETA-PTCB item bank.

Table 5 contains information on the participants in the item development project.

Table 5  
**NETA-PTCB Item Writers\***

Name	Title	Organization	City/State
Lu Herbeck	Program Director Certification Director	NETA-PTCB	Minneapolis, MN
Mike Iserman	Director of Personal Training	YMCA	Minneapolis, MN
Jon Giese	Personal Trainer Personal Trainer	Holiday Spa Mayo Clinic Patient Education	Huntington Beach, CA Rochester, MN
Jeanne Johnson	Personal Trainer	HomBody	St. Paul, MN
Tom Conroy	Personal Trainer Personal Trainer/Owner	Northeastern Illinois Univ HomBody	Chicago, IL St. Paul, MN
Steph Maks	Fitness Director Area Group Fitness Director	Gold's Gym Gold's Gym	Reno, NV Minneapolis, MN
Nick Hudson	Personal Trainer Personal Trainer	Hard Body Lifetime	Santa Monica, CA Maplewood, MN
Amy Stitt	Personal Trainer	NWAC	St Louis Park, MN

\* Please Note: All of these individuals have provided health and exercise training and educational workshops in nearly every state in the U.S. They have a broad prospective on consumer needs across the U.S. and the myriad of niche markets that make up the various regions.

Item development was accomplished via an iterative review process. The initial stages of the process were coordinated by the NETA-PTCB certification director. Items written were subjected to several rounds of critical content, editorial and psychometric review prior to their import into the item bank. On August 19th, 2005, each SME was sent, via password protected PDF file, the entire bank of items, with instructions to review each item for content, clarity, and errors. The SMEs were also instructed to return the items, with revisions, to the Certification Director on or before September 9th. Revisions were made by the Certification Director, as were deemed necessary to improve the quality, content, clarity and accuracy of the item.

The revised items were sent, via password protected PDF file, back to the SMEs for review on September 19th, 2005 for a second round of revisions. The SMEs met on October 6th, 2006 for 4 hours to review each item, make changes, additions and deletions as needed. The item-writing and review activities, concluded with a conference call facilitated by the examination consultant. During the call the items were finalized. The process of finalization included final revisions to surviving items and final decisions on exclusion for those items that did not survive the iterative review process. During the conference call the SMEs verified that each of the retained items measured content that was of at least some importance to safe and effective practice, that the items did not stereotype any groups of individuals, and that the items did not contain any content that would result in bias or disadvantage to any candidate on the basis of group membership. The SMEs succeeded in producing 295 items for the NETA-PTCB item bank.

### C. Test Construction

The test construction process began with the construction of a draft examination by NETA-PTCB's examination consultant. The draft examination was built by selecting items from the NETA-Item bank in strict accordance with the content and weightings in the test specifications document. The consultant subjected the draft to editorial and psychometric review and sent it in a password-protected file to the SMEs who participated in the test construction process. Information on this group of SMEs can be found in Table 6.

Table 6  
**NETA-PTCB Test Construction Participants\***

Name	Title	Organization	City/State
Lu Herbeck	Program Director Certification Director	NETA-PTCB	Minneapolis, MN
Mike Iserman	Director of Personal Training	YMCA	Minneapolis, MN
Jon Giese	Personal Trainer Personal Trainer	Holiday Spa Mayo Clinic Patient Education	Huntington Beach, CA Rochester, MN
Jeanne Johnson	Personal Trainer	HomBody	St. Paul, MN
Tom Conroy	Personal Trainer Personal Trainer/Owner	Northeastern Illinois Univ HomBody	Chicago, IL St. Paul, MN
Steph Maks	Fitness Director Area Group Fitness Director	Gold's Gym Gold's Gym	Reno, NV Minneapolis, MN
Nick Hudson	Personal Trainer Personal Trainer	Hard Body Lifetime	Santa Monica, CA Maplewood, MN
Amy Stitt	Personal Trainer	NWAC	St Louis Park, MN

\* Please Note: All of these individuals have provided health and exercise training and educational workshops in nearly every state in the U.S. They have a broad prospective on consumer needs across the U.S. and the myriad of niche markets that make up the various regions.

Following the individual review of the draft examination by the SMEs, a conference call facilitated by the examination consultant was scheduled. During the call the examination was considered item-by-item. For each item a decision was made to keep the item in the examination "as-is", keep the item in the examination with revisions, or return the item to the item bank. For each item returned to the bank a substitute item was selected from the item bank. In the course of the discussions the SMEs verified that each of the retained items measured content that was of at least some importance to safe and effective practice, that the items did not stereotype any groups of individuals, and that the items did not contain any content that would result in bias or disadvantage to any candidate on the basis of group membership.

The examination consultant executed all of the changes that resulted from the SME review of the draft examination. In making the changes the examination consultant verified that the examination still faithfully reflected the test specifications and, in addition, subjected it to another round of editorial and psychometric review. These activities on the part on the examination consultant resulted in the production of Draft 2 of the NETA-PTCB personal trainer examination. Examination draft 2 was sent to NET-PTCB for a final review by a selected group of the SMEs. The final review was conducted to ensure that the examination consultant had accurately executed all of the requested revisions to Draft 1. In addition, review of Draft 2 provided an opportunity for the SMEs to once again consider the examination item-by-item on all of the dimensions that comprised the review of Draft 1. As a result of this review, several more changes were requested by the SMEs.

The examination consultant executed the SMEs changes to Draft 2 of the examination and once again verified that the examination continued to faithfully reflect the test specifications. At the conclusion of these activities the finalized form of the NETA-PTCB personal trainer examination was produced and submitted.

### D. Cut-Score Determination

The study was conducted on January 16, 2006 in the NETA-PTCB office in Minneapolis, MN. The panel of SMEs was selected by NETA-PTCB. Dr. Gerald A. Rosen, Consulting Psychologist was facilitator for the study.

Table 7 contains the names of the SMEs and relevant biographical information.

The procedure used in this study was the Direct Standard Setting Method (DSSM) (Schoon, Rosen & Jones, 1988). The DSSM differs from some of the other criterion-referenced methodologies (e.g., Angoff, Modified Angoff) in that the process of making DSSM ratings is one of setting performance standards; the process of making Angoff ratings is one of estimating item difficulties for a hypothetical group of barely qualified examinees.

The DSSM requires judges to answer the following question for each set of 10 items on the examination, "How many questions in this 10 item set should a Personal Trainer certification candidate answer correctly to be considered just barely qualified for certification?"

Prior to making these estimates, the SMEs: 1) engaged in a discussion of the characteristics of the "barely qualified" or "just good enough" candidate for certification. The discussion proceeded until the group arrived at a shared notion of "barely qualified for certification"; 2) received an orientation to the use of the DSSM. The orientation focused on the notions of item importance and difficulty as guides to making DSSM estimates; and 3) applied the DSSM to groups of items as practice in using the methodology. Discussion of the estimates made during the practice session allowed the SMEs to further refine the use of and comfort with the methodology.

After the training and orientation session, the SMEs proceeded to make their independent estimates. The NETA-PTCB personal trainer examination consists of 100 items. Therefore, each SME made 10 estimates, one for each group of ten items on the examination.

Table 7  
**CUTSCORE STUDY WORKSHOP PARTICIPANTS\***  
Minneapolis, MN - January 16, 2006

Name	Title	Organization	City/State
Lu Herbeck	Program Director Certification Director	NETA-PTCB	Minneapolis, MN
Steph Maks	Fitness Director Area Group Fitness Director	Gold's Gym Gold's Gym	Reno, NV Minneapolis, MN
Nick Hudson	Personal Trainer Personal Trainer	Hard Body Lifetime	Santa Monica, CA Maplewood, MN
Amy Stitt	Personal Trainer	NWAC	St Louis Park, MN
Susie Supper	Manager	NETA	Minneapolis, MN

\* Please Note: All of these individuals have provided health and exercise training and educational workshops in nearly every state in the U.S. They have a broad prospective on consumer needs across the U.S. and the myriad of niche markets that make up the various regions.

**Results**

The results of the standard setting exercise are summarized in Table 8. Inspection of the data contained in the table reveals that the SMEs' DSSM cut scores ranged from 75 to 83 items out of 100. As is customary, it was determined that the DSSM cut score would be adjusted by subtracting an amount equal to one standard error of measurement (SEM). For a voluntary certification program, such adjustments are commonly made to ensure that the number of otherwise qualified candidates who might fail the examination due to measurement error alone is minimized. Subtracting the SEM of 3.48 from the DSSM cut score of 78 resulted in a cut score of 74.52. Because fractional cut scores are routinely rounded up, the final recommended passing score was 75 correctly answered items out of 100.

The Board of Directors considered the suggested cut-score derived from the process described above. Several members expressed concerns that the cut-score, if adopted, would be unacceptably high and dramatically increase the number of failures. From that perspective, it was argued that the suggested passing score might be inconsistent with the mission of the program. It was also noted that the pass/fail rate based on the suggested cut-score would be markedly different than the pass/fail ratio than had been observed in the past. This fact was particularly troubling to some Board members given that there was no basis in fact for concluding that the preparation and/or characteristics of candidates had changed significantly in the recent past. Given these facts and the Board's discussion of the suggested passing score, a resolution for setting the passing score at 70% was proposed and adopted by the Board. The text of the resolution can be found below.

Table 8  
**DSSM ESTIMATES AND RECOMMENDED CUT SCORE**

	SME 1	SME 2	SME 3	SME 4	SME 5
	8	8	7	9	8
	7	8	7	8	8
	8	8	8	8	8
	8	7	7	8	8
	7	8	7	8	8
	7	9	7	8	9
	7	8	7	8	8
	8	8	7	8	8
	7	8	7	8	9
	8	8	7	8	9
MEAN	7.5	8	7.1	8.1	8.1
Grand Mean = 7.8					
DSSM Cut Score = 78					
Standard Error of Measurement SEM = 3.48***					
DSSM Cut Score - SEM = 74.52					
Recommended Cut Score = 75					

\*\*\* (Current examination at the time of the workshop)

## Resolution

WHEREAS, The Board of Directors of NETA-PTCB has considered the following:

1) The results of the passing score study conducted with a panel of subject-matter experts using a criterion-referenced methodology; 2) The content and psychometric characteristics of the examination (i.e., test specifications and reliability and standard error of measurement; and 3) The credentialing mission of the organization and determined that a passing score of 70% would be a reasonable standard to employ in making its credentialing decisions. Furthermore, it was noted that the use of the 70% standard would minimize the failure of otherwise qualified candidates by virtue of measurement error alone.

NOW, THEREFORE, BE IT RESOLVED, that the Directors of NETA-PTCB, agree to adopt the resolution to set the passing score for the NETA Personal Trainer Certification examination at 70%.

## References

Angoff, W.H. (1971). Scales, norms and equivalent scores. In R.L. Thorndike (Ed.), *Educational Measurement*. Washington, DC: American Council on Education.

Cizek, G.J. (2001). *Setting Performance Standards: Concepts, Methods, and Perspectives*. Mahwah, NJ: Lawrence Erlbaum Associates.

Schoon, C.G., Rosen, G.A. and Jones, J.P. (1988, April). A critique of difficulty estimation methodologies in the setting of cut points and a discussion of an alternative methodology: The Direct Standard Setting Method. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.