Current state and future directions of the National Board of Chiropractic Examiners

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INTRODUCTION

The objective of this paper is to describe changes made to chiropractic national board examinations in the United States, including methodologies in test scoring, and to discuss future directions in test development and administration being considered by the National Board of Chiropractic Examiners (NBCE). Additionally, this paper serves as an introduction to the articles written by the NBCE staff and published in this issue of the journal. Statistical perspective on the properties of a test are presented, and reasons for the NBCE moving to item response theory for test scoring are described. NBCE consideration of on-demand testing and changes implemented in the Part IV practical examination are also discussed.

Key Indexing Terms: Chiropractic; Educational Measurement; Education; Certification/Standards

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DISCUSSION

The NBCE engages in constant review of its practices and compares its operational procedures of test development, administration, scoring, and reporting to the practices of sister fields in health care. In the last 5 years, the NBCE evaluated all of its products in terms of validity, reliability, fairness, and alignment with the best practices accepted in the health care industry and the field of educational measurement. The first change was that the NBCE implemented computer-based testing (CBT) for the Part I, II, III, and Physiotherapy exams. The CBT administration was previously adopted by the National Board of Medical Examiners,1 the National Board of Dental Examiners,2 and the National Board of Osteopathic Medical Examiners.3

The second change was to introduce item response theory (IRT) scoring to all NBCE exams. Previously, not all NBCE exams were scored using IRT, which is the practice in the fields of medical,4–7 dental,8,9 and osteopathic10,11 examinations. As a result, a decision was made to gradually adopt new IRT-based scoring methodologies while closely monitoring classification consistency and pass/fail rates.

The third change was to revise the Part IV exam (chiropractic practical exam). The exam needed revisions of the postencounter probe stations in order to better assess the examinees’ case management skills. In particular, diagnostic images and laboratory results were excluded from all postencounter probe stations. This was implemented for better evaluation of entry-level competence. Furthermore, electronic presentation of the images was introduced to the diagnostic imaging portion of the exam.

What Is a Test?

As the articles published in this issue address NBCE exams and scoring methodologies, we would like to start by explaining the essential parts of a test. A test (or exam) is an assessment intended to measure examinees’ competency in a subject, aptitude, or skill.12 However, the relationship between a test score and actual knowledge is often misinterpreted or even misunderstood. Because this can be confusing, we provide a definition of a test from a statistical perspective. The relationship between a test score and actual competency is similar to the relationship between an estimate and a true value (parameter). Test scores are sample-based estimates of the real competency. The parameter, if we could measure it directly, is a population-based true value.13 For example, it may be very
provide an in-depth discussion of the differences between the 2 theories. For example, Himelfarb et al.20 explain how Part IV is scored with IRT models using the diagnostic imaging portion of the exam.

**Future Directions: Is On-Demand Testing Right for Chiropractic?**

Beginning in 2019, the NBCE fully implemented CBT for the Part I, II, III, and Physiotherapy examinations, which allows for more test innovation, more convenient scheduling, and a smaller scoring window. Adopting Parts I and II for CBT administration, we reduced the exams to 300 items each (50 items per domain). Preliminary validity studies have been conducted,21 and now a validity argument is being built while developing and using the assessments.

Recently, however, there have been several inquiries concerning on-demand testing (a testing service that is available anytime) and its feasibility for the chiropractic profession. Although on-demand testing is being increasingly used in many areas of assessment, it has not been easily adopted by high stakes testing22 such as the NBCE licensure exam programs. One of the major issues with on-demand testing is that some of the psychometric methods used in conventional testing are no longer available when tests are administered on demand. While new methodologies have been developed, today they require per-administration sample sizes prohibitively larger than that which the chiropractic profession is currently able to produce.23 Currently, per-administration sample sizes for written exams are between 1,000 and 1,200 test takers, which includes first-time examinees and repeat test takers. However, the NBCE uses only item responses from a norming group (first-time, nonaccommodated test takers) to fit the IRT models, which further reduces the available sample sizes. Excluding repeaters helps to control for the possible effect of repeaters on equating.24,25

If NBCE exams were given on demand to our current number of examinees, we would not have sufficient data to perform psychometric analyses properly, as specified by the best practices detailed in the Standards for Educational and Psychological Testing.26

Yet, in the context of competency assessment, a computer adaptive testing (CAT) approach may be a conceivable alternative to on-demand tests.27 CAT is a form of assessment that adapts to the ability level of each examinee. Based on the examinee’s previous responses, for subsequent questions CAT selects from test items that maximize the precision of the exam. Consequently, test takers with different ability levels will receive different tests. IRT methodology is used to select optimal items for the test, which are chosen based on the statistical estimates of the information and difficulty. The advantage of using CAT is in uniform precision for all test takers, whereas traditional testing provides the best precision for examinees in the middle of ability range. Matching the difficulty of items on the test with the ability of the test taker allows for obtaining maximum information from each item, so the length of the test could be reduced without loss of reliability. Furthermore, by transitioning to CAT, the NBCE will be able to increase the number of testing windows.
Transitioning to IRT was a necessary step in that direction. The implementation of CBT challenged us to construct a fair, valid, and reliable assessment system, to minimize examinees’ frustration, and to limit sources of test anxiety. CBT also prompted us to shorten the test and increase the number of testing windows. We hope that the rest of the chiropractic community will share our perception of successful testing on computers. For our part, we will augment the effectiveness of this new mode of assessment through better orientation, easier registration, and possibly, even more testing windows.

Ignoring the evolution in assessment of skills and changes in testing technology may result in a mismatch between the professional skills and testing instruments. The current efforts to modernize the Part IV exam will align the chiropractic OSCE with the standard practices currently accepted in health care. Certainly, a critical part of this transition is to ensure that there will be no disadvantage to our examinees.

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