

## **Setting Cut Scores: How the NBCE Determines Passing Scores**

### Introduction

In many professions, the fair and accurate assessment of a candidate seeking licensure holds significant importance for the public as well as for the candidate. Providing exams that accurately identify those candidates who do or do not meet entry-level standards for safe and effective practice is the work of the National Board of Chiropractic Examiners (NBCE). The NBCE follows testing standards that were developed by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education in determining the passing scores for their licensing exams. Our continual adherence to these professional testing standards has given us a strong record of success in this area.

### Cut Scores (or Passing Scores)

The first step we use in determining the cut score is to gather a team of chiropractic experts. The experts then define what competent entry-level chiropractors should know and do in practice to effectively address patient health conditions and to protect the welfare of their patients. The cut score is based on these experts' judgments. In essence the experts determine what minimum score is necessary to demonstrate adequate knowledge, skills and abilities required for entry-level practice. In the experts' opinion those who score below the cut score are not qualified for practice and are more likely to make serious errors due to insufficient knowledge or skills. This standard setting requires a structured process with clear documentation; the NBCE uses a version of the most widely accepted process, known as the Angoff method.

In addition to setting the cut score, the NBCE prepares exams based on documented evidence of test validity and reliability to ensure the accurate measurement of a candidate's knowledge, skills and ability.

### Test Validity

Test validity means that a test score can be interpreted as an accurate evaluation of the knowledge, skills and abilities the test is designed to measure. Test validity is critical for states to be able to base their licensure decisions on NBCE test results. The NBCE accumulates evidence of test validity in a variety of ways.

- Delphi studies, which are designed to reach consensus among multiple stakeholders, are conducted with chiropractic college instructors that validate the content of the written Part I & II examinations.
- Content experts review and document all test questions before they appear on NBCE exams.
- The NBCE Chiropractic Practice Analysis Survey provides the foundation for test validity for the Parts III & IV examinations. We link the content of these examinations to the knowledge and skills required for safe entry-level practice as revealed through this national survey.

What evidence does the NBCE have that Parts I and II test scores are valid indications of a person's ability in the basic and clinical sciences? The evidence of test validity comes from several sources:

- First, the test outlines for Parts I and II are determined by the input of college faculty from each of the chiropractic colleges;
- Second, the questions that appear on the exams are written by instructors on the various campuses and are put in a standard format by the NBCE;
- Third, scores on the Parts I and II exams are highly correlated with course grades.

The validity of the Parts III and IV exams is directly related to how well scores in those exams measure a person's knowledge, skills and abilities required for safe and effective practice. Evidence of the validity of the Part III and IV exams stems from several sources:

- First, the content of these exams is based upon an extensive study of chiropractors in practice (the Practice analysis Survey). Several thousand chiropractors have completed an extensive survey indicating the conditions they see and the professional tasks they perform;
- Second, all of the test questions for the Parts III and IV are selected by licensed chiropractors;
- Third, the assessment of examinees in the Part IV exam is conducted by licensed chiropractors;
- Fourth, Parts III and IV scores are highly correlated with clinical grades.

### Test Reliability

Credentialing examinations must also be reliable, meaning that they provide a consistent measure on repeated administrations of the test. Many issues can influence reliability including too few questions to adequately address the knowledge, skills and abilities in the test domain; exams that are too difficult or too easy; inadequate overall exam length; and factors unique to performance testing, such as rater inconsistency, etc. In order to ensure that our exams fairly and accurately assess candidates' knowledge, skills and abilities, the NBCE psychometrician performs a statistical analysis of the difficulty and relevance of each question. The relevance of right versus wrong answers is estimated. The statistical performance of each question is determined and documented over

time so that if an item shows a significant change in difficulty and/or relevance, the question is retired. Finally, the NBCE psychometrician calculates the overall reliability for each examination.

### Cut Scores Effect on State Boards

It has been the practice of the NBCE to set rigorous standards that meet or exceed state-legislated requirements for an acceptable level of achievement.

The NBCE complies with Standard 14.17 of the *Standards for Educational and Psychological Testing* developed by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education. Standard 14.17 states, "The level of performance required for passing a credentialing test should depend on the knowledge and skills necessary for acceptable performance in the occupation or profession and should not be adjusted to regulate the number or proportion of persons passing the test."

As a result, state boards and the public should feel confident that examinees whose performance falls below the recommended cut scores (NBCE has standardized the cut score for each of its examinations at 375) are at higher risk of making serious errors due to a lack of knowledge or skills and should therefore be denied practice privileges.

Although individual state boards have the right to specify their own minimum passing scores on a licensing test, departure from the psychometrically sound and legally defensible standards established by the NBCE may result in an increase of false positive errors or false negative errors. In other words, decreasing the standard below 375 may result in more incompetent candidates being declared eligible for licensure; conversely, increasing the standard above 375 may result in the denial of licensure to candidates who in truth have competence to practice safely and effectively.

### Summary

Consistent with what has been stated in this report, establishing appropriate and legally defensible cut scores, calculating reliability coefficients, and documenting evidence for the validity of examinations are complex and demanding procedures and processes. The NBCE is confident that our approaches and methods are thorough and appropriate to validly determine who is ready for practice.

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