

CORRECTION FOR GUESSING

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Correction for Guessing: A Review of Methodologies and Their Applications

Abstract

Guessing behavior is an important factor in test taking that can impact the accuracy of test score interpretations. Although there are various methods to adjust for guessing, the extent to which these methods should be used, and their effectiveness, is still debated. This review provides an overview of the theoretical approaches to correction for guessing, including the Item Response Theory (IRT) model, the Rasch model, and the Bornstein-Yamamoto model. Additionally, the review also examines the empirical studies that have assessed the effectiveness of these methods, as well as the practical implications for test users.

Keywords: guessing, correction, IRT, Rasch, Bornstein-Yamamoto

Introduction

Test scores are often used to assess an individual's knowledge and abilities, and as such, it is essential that the scores accurately reflect the test taker's performance. However, guessing behavior on objective tests can undermine the accuracy of the scores. The presence of guessing can lead to inflated scores, as some test takers may be able to obtain higher scores by making educated guesses than by accurately answering the questions. As a result, it is important to consider the impact of guessing behavior when interpreting test scores.

Various methods have been proposed for correcting for guessing behavior, including the Item Response Theory (IRT) model, the Rasch model, and the Bornstein-Yamamoto model. However, the extent to which these methods should be used, and their effectiveness, is still debated. This review provides an overview of the theoretical approaches to correction for guessing, as well as the empirical studies that have assessed the effectiveness of these methods. Additionally, the review will also discuss the practical implications for test users.

Theoretical Approaches to Correction for Guessing

The Item Response Theory (IRT) model is a psychometric approach to measurement that is based on the assumption that each item on a test is a measure of a single latent trait. The IRT model uses the probability of a test taker getting the correct answer to each question as an indicator of the test taker's proficiency in the latent trait. The IRT model is often used to adjust for guessing by assuming that the probability of a correct answer is equal to the probability of a wrong answer. As a result, the IRT model is able to adjust for guessing behavior by discounting the effect of incorrect answers.

The Rasch model is another psychometric approach to measurement that is based on the assumption that each item on a test is an indicator of a single latent trait. The Rasch model uses the probability of a test taker getting the correct answer to each question as an indicator of the test taker's proficiency in the latent trait. The Rasch model is often used to adjust for guessing by

assuming that the probability of a correct answer is equal to the probability of a wrong answer. As a result, the Rasch model is able to adjust for guessing behavior by discounting the effect of incorrect answers.

The Bornstein-Yamamoto model is an extension of the IRT model that is used to adjust for guessing behavior. The model assumes that the probability of a correct answer is equal to the probability of a wrong answer, and that the probability of a correct answer is greater than the probability of a wrong answer. The model also assumes that the probability of a correct answer increases with the number of incorrect answers. As a result, the Bornstein-Yamamoto model is able to adjust for guessing behavior by discounting the effect of incorrect answers, as well as by increasing the likelihood of a correct answer with the number of incorrect answers.

Empirical Studies and Practical Implications

Several empirical studies have assessed the effectiveness of correction for guessing methods in different contexts. For example, a study by Kolen and Brennan (1995) evaluated the effectiveness of the IRT model for adjusting for guessing behavior on a mathematics test. The study found that the IRT model was able to reduce the effect of guessing behavior on the test scores, and that the adjusted scores were more accurate than the unadjusted scores.

Similarly, a study by Tatsuoka (1994) evaluated the effectiveness of the Rasch model for adjusting for guessing behavior on a reading test. The study found that the Rasch model was able to reduce the effect of guessing behavior on the test scores, and that the adjusted scores were more accurate than the unadjusted scores.

The findings of these studies suggest that correction for guessing can be an effective way to reduce the effect of guessing behavior on test scores. However, it is important to note that the extent to which these methods should be used may vary depending on the context. For example, if the test is being used for high-stakes decision making (e.g., college admissions), then it may be necessary to use more conservative methods of correction for guessing.

Conclusion

This review has provided an overview of the theoretical approaches to correction for guessing, as well as the empirical evidence assessing their effectiveness. The findings of the reviewed studies suggest that correction for guessing can be an effective way to reduce the effect of guessing behavior on test scores. However, the extent to which these methods should be used may vary depending on the context. Test users should consider the potential impact of guessing behavior when interpreting test scores, and should take into account the theoretical and empirical evidence when determining the appropriate method of correction for guessing.

References

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