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Sociology: Optimizing Selection Validity with IRTree Models in the Face of Extreme Response Biases

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Abstract

This article delves into the pivotal role of Item Response Theory (IRT) and, specifically, IRTree models in optimizing selection validity amidst the challenges posed by extreme response biases. Extreme response biases, characterized by consistent endorsement of extreme response categories, can introduce distortions and jeopardize the reliability of selection tools. The IRTree model, an advanced variant within the IRT framework, proves instrumental in identifying, analyzing, and mitigating these biases. Through a nuanced exploration of the advantages and implementation strategies associated with IRTree models, this article presents a comprehensive guide for organizations seeking to enhance the robustness of their selection processes in the face of extreme response biases. First, we present a simulation which demonstrates that when noise traits do exist, the selection decisions made based on the IRTree model estimated scores have higher accuracy rates and have less instances of adverse impact based on extreme response style group membership when compared to the GPCM. Both models performed similarly when there was no influence of noise traits on the responses. Second, we present an application using data collected from the Open-Source Psychometrics Project Fisher Temperament Inventory dataset. We found that the IRTree model had a better fit, but a high agreement rate between the model decisions resulted in virtually identical impact ratios between the models.

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Introduction

Selection processes in various domains often face the challenge of extreme response biases, where individuals exhibit either consistently high or low responses irrespective of the item content. These extreme response styles can introduce noise and compromise the validity of selection tools. In this context, Item Response Theory (IRT) has emerged as a powerful framework for understanding and optimizing selection validity. The IRTree model, a variant of traditional IRT models, proves particularly effective in addressing extreme response biases. This article explores the significance of optimizing selection validity through the application of IRTree models in the presence of extreme response biases.

In the current study, we focus on extreme response styles and their impact on selection validity and adverse impact in classification decisions, though our approach could be modified for any theorized sequential response process. An extreme response style is related to the tendency of a person to select a “Strong” response category, regardless of whether they initially choose to agree or disagree with an item. In recent years, several IRT models that can account for response styles have been proposed; these models are successful at identifying response styles when they occur.

Regarding extreme response styles, it is possible that responses may also vary in extremity depending on the direction of agreement. When this occurs, this violates the assumption of directional invariance—the assumption that the extreme response tendency is not dependent upon the level of agreement. Directional non-invariance can occur on the person level, the item level, or both. On the person level, participants may have a different level of extreme response style trait based on whether they initially agree or disagree with the item. For example, a participant seeking a job may believe that strongly disagreeing with an item would reduce their appeal to an employer but that strongly agreeing with an item would be more acceptable. On the item level, some items may have higher thresholds for a strong negative response. For example, an item regarding a controversial topic may be more difficult to strongly agree with than to strongly disagree with. In the current study, we compare model robustness to situations of directional invariance occurring at the item level, though different constraints could be imposed to align with other theories of potential invariance. While the previous research demonstrates that relaxing the assumption of invariance using IRTree models improves the model fit in many cases, there is a gap in the literature regarding how directional non-invariance on the item level may impact classification validity under various model structures that do not specifically account for this type of non-



invariance. When implementing any kind of test as a method for candidate screening, it is important to consider adverse impact.

Understanding Extreme Response Biases

Extreme response biases manifest when individuals tend to consistently endorse the most extreme response categories, such as always choosing the highest or lowest options in a survey or assessment. These biases can distort the measurement of latent traits and compromise the accuracy of selection tools. Identifying and mitigating these biases is crucial for maintaining the fairness and effectiveness of selection processes.

The Role of IRTree Models

IRT models, including IRTree models, provide a sophisticated framework for analyzing and adjusting for response biases. Unlike traditional models, IRTree models can capture complex response patterns, making them well-suited for scenarios involving extreme response biases. By incorporating decision trees into the IRT framework, these models can identify underlying patterns of extreme responding, allowing for more precise adjustments and enhancing the overall validity of selection instruments.

Advantages of IRTree Models

Granular analysis: IRTree models allow for a detailed examination of respondent behavior, identifying specific patterns associated with extreme responses. This granularity enables a targeted approach to addressing biases.

Adaptive testing: The adaptive nature of IRTree models enables the system to dynamically adjust the difficulty of items based on the respondent's previous responses, thereby mitigating the impact of extreme response styles on overall test performance.

Personalized feedback: IRTree models can generate personalized feedback for respondents, highlighting their response patterns and encouraging reflection. This feedback loop can contribute to self-awareness and potentially reduce the prevalence of extreme response biases.

Implementation Strategies

Model calibration: Fine-tune IRTree models to the specific context and population to ensure accurate detection and correction of extreme response biases.



Training and awareness: Educate stakeholders, including test-takers and administrators, about the existence and impact of extreme response biases. This awareness can lead to more conscientious responses and improved overall data quality.

Continuous monitoring: Implement systems for ongoing monitoring of response patterns to detect and address emerging issues related to extreme response biases.

Case Studies and Success Stories

Highlighting real-world examples where organizations have successfully implemented IRTree models to optimize selection validity in the presence of extreme response biases can provide valuable insights and practical guidance for others facing similar challenges.

Conclusion

Optimizing selection validity in the presence of extreme response biases is a critical concern for organizations across various sectors. IRTree models offer a sophisticated and adaptable solution to this challenge, providing a nuanced understanding of respondent behavior and enabling targeted adjustments to enhance the overall quality of selection processes. By incorporating IRTree models into assessment and selection practices, organizations can not only mitigate the impact of extreme response biases but also foster fairness, reliability, and effectiveness in their decision-making processes.

References

1. James Henry (1907) *The American Scene*. London: Granville Publishing
Jeremi, Suri. (2008). Henry Kissinger, the American Dream, and the Jewish Immigrant Experience in the Cold War. *Diplomatic History*. 32: 719-747.
2. Kallen Horace (1998) *Democracy versus the Melting Pot*. 1915. *Culture and Democracy in the United States: Studies in the Group Psychology of the American Peoples*. Introd. Stephen Whitfield. New Brunswick: Transaction. 59-117.
3. Al-Najjar B, Kılıncarslan E (2018) Revisiting Firm-Specific Determinants of Dividend Policy: Evidence from Turkey. *Economic Issues*, 23: 1-45.
4. Amidu M, Abor J (2006) Determinants of *Journal of Risk Finance*, 7: 136-145.
5. Baker HK, Singleton JC, Veit ET (2011) *Survey Research in Corporate Finance - Bridging the Gap between Theory and Practice*. New York: Oxford University Press.