Common Demographic groups used in DIF research

<table>
<thead>
<tr>
<th>Gender</th>
<th>Race</th>
<th>SES</th>
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<tbody>
<tr>
<td>Disability status</td>
<td>Rural/Urban</td>
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Why I-DIF?

- Compared to traditional DIF methods which focus on isolated group differences, i.e. due to race or gender, the I-DIF approach allows for a broader and more accurate understanding of potential item bias, as it captures a more realistic intersection of test-taker identity and lived experience.

- Available literature suggests that the intersectionality idea is rooted in Critical Race Theory and operationalized in some Quantitative Critical Race Theory (QuantCrit) applications as an interaction between sub-groups of interest (Castillo & Babb, 2023).

Introduction

- Intersectionality, as explained by CRT literature examines how different social categories such as gender, race, sexuality, and class intersect and interact, influencing an individual’s experiences of privilege or oppression (Carrado et al., 2013).

- The adaptation of intersectionality in education research has been transformative, especially in how scholars and educators understand and address the complexities that come with identity, power, inequality, and privilege within education systems.

- The intersectional approach to differential item functioning (I-DIF) provides a new lens for psychometricians and quantitative researchers to contextualize the multiple identities of test-takers that may exist in their sample of interest.

Research Questions

1. What is the intersectional approach to differential item functioning?

2. What are the limitations of the current methods used in I-DIF studies?

Methods used I-DIF Literature

- Logistic Regression (LR) (Swaminathan & Rogers, 1990)
- SiBTTEST (Shealy & Stout, 1993)
- Standardized-D (Dorans & Stout, 1993)

Limitations

- Sample size
- Dichotomous Items
- Interaction a proxy for intersectionality?
- Limited Studies

Methodological & Practical Limitations

Methods

- All four methods are sensitive to sample size (Russel et al., 2022; Albano et al., 2024).
- Logistic regression however is more sensitive, thereby producing results that are inconsistent with sample size fluctuation.
- The standardization method “does not account for chance increases in the rate of DIF detection” (Russel et al., 2023; Albano et al., 2024).
- The formation of an intersectional group poses statistical challenges (the likelihood of Type 1 error rates).

What next……

- Broaden current I-DIF approaches to include additional methods such as
  - Item Response Theory Models (IRT)
  - Generalized Linear Mixed Models (GLMMM)
  - Bayesian Approaches

- Sample size guidelines for intersectional groups

- When does adjusting for Type I error rates become necessary and when is it redundant?

- How can test developers and researchers incorporate social justice perspectives such as intersectional identities in test/assessment development?

Conclusion

To fully embody the tenets of QuantCrit, a reimagining of our instruments and procedures is necessary at all levels of educational testing and research work. The integration of intersectionality and DIF research is a step in the right direction and the consideration of intersectional identities in measurement research will provide a comprehensive approach to examining and promoting test fairness.

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Bibliography


