

Extending Differential Person and Item Functioning to Aid in the Maintenance of Exposed Exams

Lisa S. O'Leary, Ph.D.
Russell W. Smith, Ph.D.

Alpine Testing Solutions



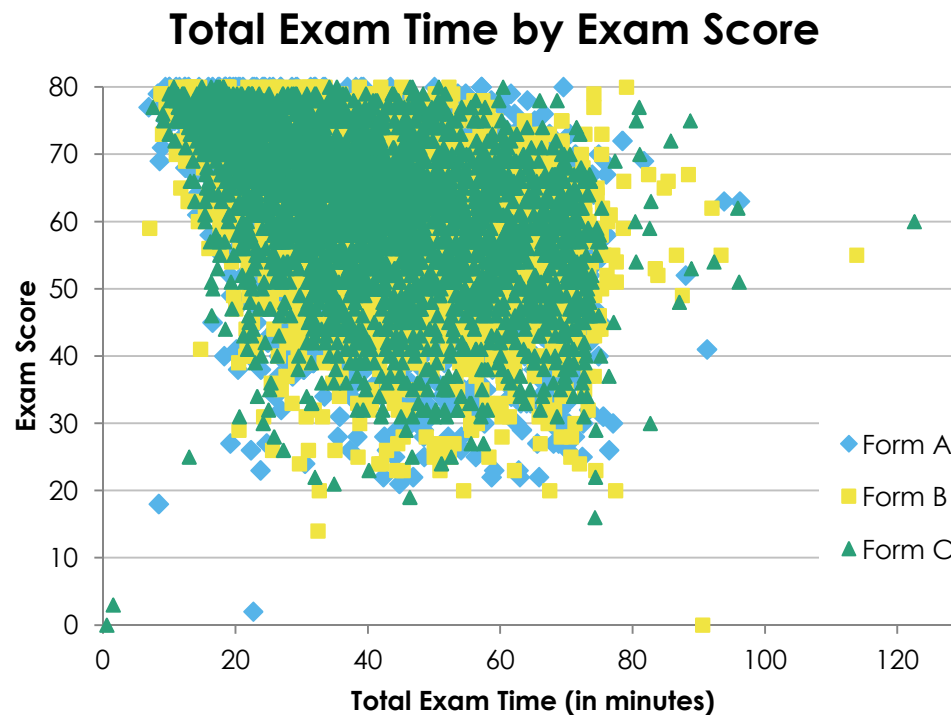
Goals

- Address rampant test fraud in IT certification
- Minimize the costs of piracy
- Maximize the measurement integrity and validity
- Deter future test fraud

Well-articulated data forensic procedures are “a very effective way to **communicate** to candidates **that cheaters leave behind irregular patterns of responses**, and that even if they are sufficiently clever to successfully cheat on the exam, **they will be unearthed by sophisticated statistical procedures** being run in the background” (Wollack & Fremer, 2013, p. 11)

Data

- 8,350 administrations of large-scale IT cert. exam
- 641 total items (227 scored, 414 unscored)
- Substantial item exposure issues

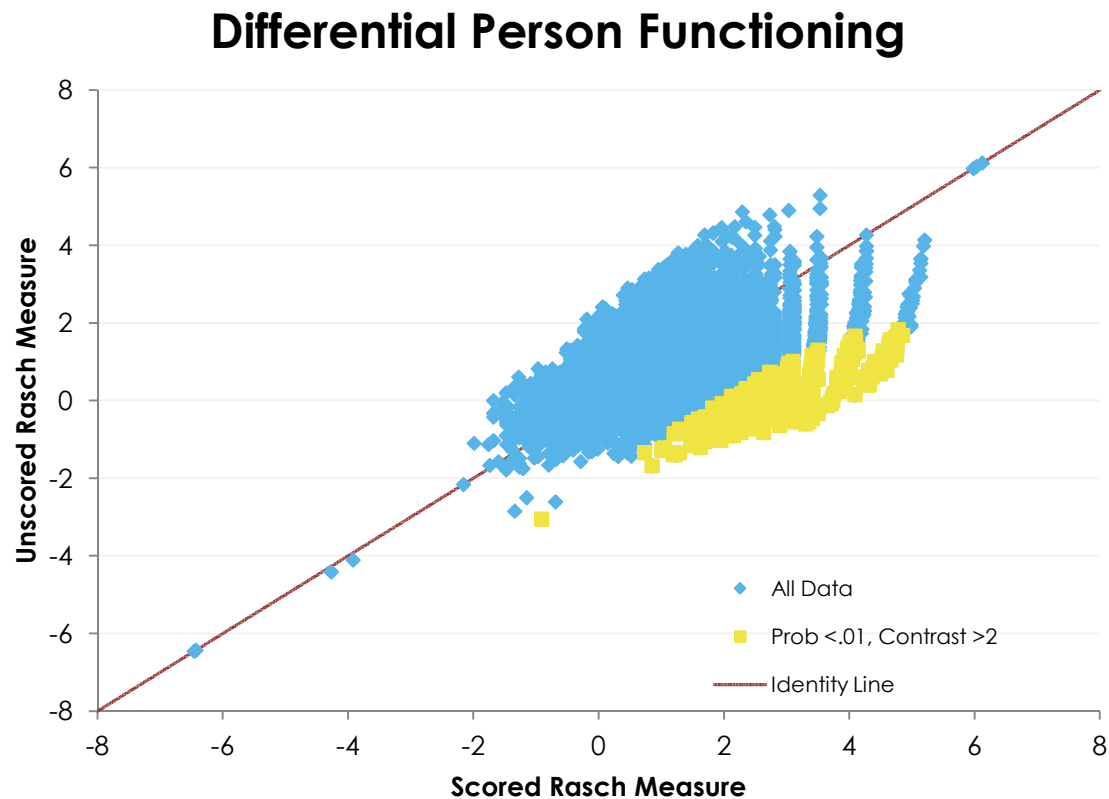


Methods

- Differential person functioning (DPF)
 - Scored (80 items) vs. unscored (20 items)
 - **Assumes that only scored items have been exposed and that unscored items are not yet compromised**
- Differential item functioning (DIF)
 - DPF-flagged vs. non-flagged candidates
 - Evaluate item degradation to inform exam maintenance

Results: DPF

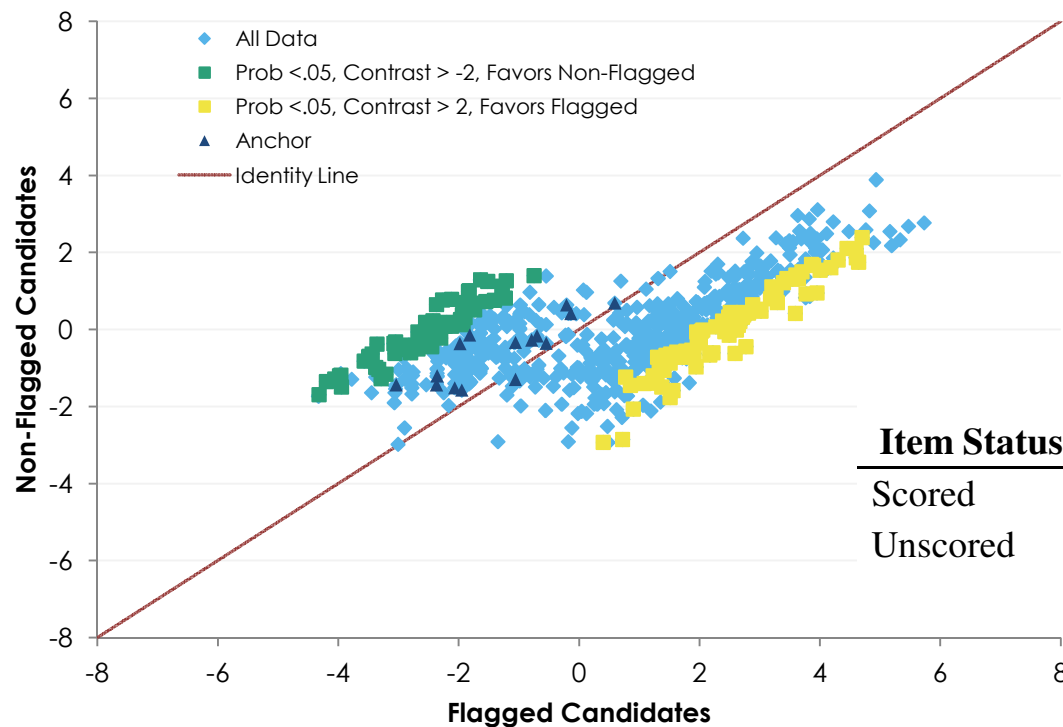
- 531 candidates (6.4%) flagged for DPF



Results: DIF

- 138 items (20.2%) displayed DIF
- 15 scored items without DIF selected as anchor items

Differential Item Functioning



Item Status	Significant DIF		No DIF
	Positive	Negative	
Scored	57	1	169
Unscored	0	80	334

Practical Considerations

- Item bank size
- Bank exposure rate
- Ratio of scored to unscored
- Differential performance of scored and unscored
- Item degradation
- Availability of new content
- Follow-up action

Conclusions

- DPF in conjunction with DIF can be used to:
 - (1) detect when security breaches have occurred;
 - (2) determine the overall extent of item exposure;
 - (3) build cases against suspect candidates;
 - (4) collaborate with other evidence to support the enforcement of sanctions against candidates;
 - (5) highlight specific items with compromised content;
 - (6) evaluate appropriate next steps for particular items and entire item banks

...all while discussing the relevant psychometric and policy issues for each of these areas

Contact Information

- Lisa S. O'Leary, Ph.D.
Psychometrician
lisa.oleary@alpinetesting.com
- Russell W. Smith, Ph.D.
Senior Psychometrician
Director of Psychometric Analysis
Russell.Smith@alpinetesting.com

www.alpinetesting.com

