



Item Analyses Studies

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Item Analyses Studies

- Differential Distractor Functioning (DDF)
- Differential Item Functioning (DIF)



Data

- This study examined differences between students with disabilities and non-disabled students on their responses to items and distractors
- Data from different locations nationwide were obtained from different time points: Pre-NCLB and Post-NCLB
- Pre-NCLB (1997-1998): Data from Stanford Achievement Test (Ninth Edition) Reading Comprehension (RC) and Word Analysis (WA) were obtained from two different states (Sites 1 and 2)
- Post-NCLB (2005-2006): Data were from two states using CRT assessments (Sites 3 and 4)



Data

- In Site 1 there were 278,287 Grade 3 students (7.6% with disabilities) and 244,446 Grade 9 students (9.9% with disabilities)
- In Site 2 there were 6,611 Grade 3 students (6.8% with disabilities), and 5,287 Grade 9 students (9.9% with disabilities)
- In Site 3 there were a total of 101,021 in grade 8, 10,666 (10.6%) have some type of disabilities
- In Site 4 there were 58,174 students in grade 8, 5,274 (9.1%) had some types of disabilities



Results

- Analyses of the pre-NCLB data suggested that for higher grades, many items exhibited DIF
- Items that exhibited DIF were more likely to be located in the second half of the assessment subscales
- After controlling for reading ability, students with disabilities consistently under-performed on items located in the second half
- In lower grades there were fewer items that were shown to exhibit DIF for students with disabilities. This was true for both RC and WA subscales



Grade 9 Reading Comprehension DIF Results

Ability Proxy	Total Number of Items	Number of Items Showing DIF		
		Items 1-27	Items 28-54	All Items
State 1	54	2	11	13
State 2	54	6	17	23

Note. The score on the first 27 items was used as an ability proxy.



Grade 9 Word Analysis DIF Results

Ability Proxy	Total Number of Items	Number of Items Showing DIF		
		Items 1-15	Items 16-30	All Items
State 1	30	2	10	12
State 2	30	6	13	19

Note. The score on the first 27 items was used as an ability proxy.

- Results suggest that a substantial number of items from both the Reading Comprehension (RC) and Word Analysis (WC) subscales exhibit DDF for students with disabilities in grade 9.
- Results also suggest that items showing DDF were more likely to be located in the second half of the assessments rather than the first half of the assessments.
- Results also indicate that DDF was present for grade 9 test items, but not for grade 3 items.



Results, DDF (continued)

- Even when controlling for ability using only the items in the first half of the assessments, more grade 9 items exhibited DDF than grade 3 items
- Students with disabilities were less likely to choose the most common distractor chosen by their non-disabled peers
- Students with disabilities might be more randomly selecting one of the four response options rather than making an “educated guess”



Grade 9 State 2 DDF Results

Ability Proxy	Total Number of Items	Number of Items Showing DDF		
		1 st half Items	2 nd Half Items	All Items
Reading Comp.	54	3	10	13
Word Analysis	30	4	7	11

Note. The score on the first half items was used as an ability proxy.



Post-NCLB Data

- DIF analysis was conducted using three different approaches:
- Maentel-Haenszel: conditioned on the total scores
- Item-Response-Theory (IRT) approach: a 3 parameter model was applied, conditioned on the non-DIF (anchor) items
- The multiple indicator multiple cause (MIMIC) approach conditioned on latent ability factor.



Post NCLB Results

- The amount of DIF showed considerable variation in relation to type of disability
- There was also variation in the amount of DIF identified across the two states.



Number of DIF items in reading comprehension

Site 3	Grade 8		
Form K	MH	MIMIC	IRT
Specific Learning Disability	2	2	2
Behavioral Disability	5	2	7
Educable Mental Retardation	8	6	11
Other Health Disability	2	1	2
Form M			
Specific Learning Disability	2	2	2
Behavioral Disability	6	4	12
Educable Mental Retardation	17	10	14
Other Health Disability	2	2	4



Number of DIF items in reading comprehension

Site 4	Grade 8		
	MH	MIMIC	IRT
Speech Language Disability	2	2	4
Perceptual/Comm. Disability	1	0	0
Emotional Disability	3	1	3
Physical Disability	1	2	4



List of test items in RC identified as DIF

Site 3	Grade 8
Form K	
Specific Learning Disability	15, 49
Behavioral Disability	7,10,21,23,55
Educable Mental Retardation	2,6,7,28,37,46,49,55
Other Health Disability	2,12
Form M	
Specific Learning Disability	3,54
Behavioral Disability	25,27,38,51,54,55
Educable Mental Retardation	1,3,4,5,12,17,19,20,27,31,33,36, 40,42,51,52,54
Other Health Disability	31,54



Number of DIF items in reading comprehension

Site 4	Grade 8
Speech Language Disability	12,99
Perceptual/Comm. Disability	12
Emotional Disability	12,57,95
Physical Disability	1



Conclusions

- Findings of this study provide evidence that in addition to test content other factors may contribute to the performance gap between students with disabilities and their non-disabled peers
- Controlling for these factors that are not related to content being assessed may help test developers provide more accessible and more valid assessments for students with disabilities



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