


Practical Applications of Multiple Response Items
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Why are we here?


- We want to move beyond traditional multiple choice items
- We want to learn more about K-type items
- We want to learn more about multiple response items
- We want to learn how to train our SMEs on how to write multiple response items



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Let's begin with a few questions

- Who can define K-type items?
- Who uses K-type items?



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K-type Items

- Historically, they were the only items available to address limitations of multiple choice items
- Defined as
 - Items in which a stem is presented along with a list of options prefaced with a number of a Roman numeral

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Which of the following movies won the Academy Award for Best Picture?

- | | |
|-----------------|----------------------|
| I. Argo | IV. The Departed |
| II. Avatar | V. The Help |
| III. Life of Pi | VI. The Kings Speech |
- a) I, VI
b) II, III, V
c) I, IV, VI
d) I, II, III, IV
e) II, IV, V, IV

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Feedback?



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K-type Items Limitations

- More difficult than other multiple choice items
- Less discriminating than other multiple choice items
- Difficult for exam committee members or SMEs to create

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Welcome multiple response!

- They look exactly like multiple choice items except an examinee can select one or more response options
- Can be thought of as multiple “True/False” questions in one item
- They *can be* easier for SMEs to develop

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Which of the following movies won the Academy Award for Best Picture? *Choose three (3) that apply.*

- a) Argo
- b) Avatar
- c) Life of Pi
- d) The Departed
- e) The Help
- f) The Kings Speech

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CLARB

- Replaced long K-type items with multiple response items
- Same candidate population
- Exact same questions



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What a great idea for a research project!



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Background of Study

- In 2012, CLARB transition from K-type items to MR items
- Data
 - 78 K-type items transitioned to MR items
 - Difficulty
 - Discrimination

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Our Hypotheses

- Hypothesized that MR items would be easier than K-type items
- Hypothesize that MR items would be more discriminating than K-type items

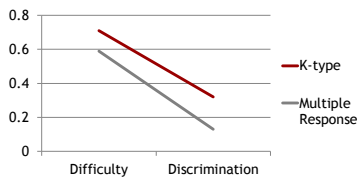


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Results

Item Type	Average Difficulty	Average Discrimination
K-type	0.71	0.32
Multiple Response	0.59	0.13



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Additional Analysis

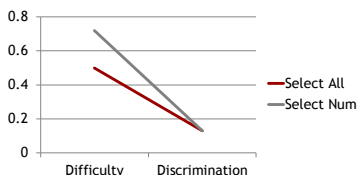
- MR items were also analyzed for differences between two types
 - *Select all that apply*
 - Select a specific number that apply (i.e. *Select 2 that apply* or *Select 4 that apply*)
- Difficulty
- Discrimination

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Results

MR Item Type	Average Difficulty	Average Discrimination
Select All	0.50	0.13
Select a Specific Number	0.72	0.13



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Results

- Independent Means T-test
 - Difficulty
 - Statistically significant difference between “select all” items and “select N” items
 - Select N items were easier
 - Discrimination
 - No difference between “select all” and “select N”

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Limitations of Study

- Small sample size
 - We have only been able to view results through TWO administrations of the exam
- MR items are new to candidates and could create anxiety
- Sample from candidate population could be different

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Conclusions

- Not surprising MR items were more difficult given candidate's inexperience with item type
- MR items are less discriminating, however, they have also been used less and discrimination could improve over time

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Conclusions

- Not all K-type items translated nicely into multiple response items
 - prompted the need for "select all that apply"
 - "select all" items are much harder than "select N"

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Guidelines for MR item development

- A 4-option MR may have 2 keys
- A 5-option MR may have 2-3 keys
- A 6-option MR may have 2-3 keys
- A 7-option MR may have 2-4 keys
- A 8-option MR may have 2-4 keys
- A 9-opiton MR may have 2-5 keys

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More Conclusions

- Multiple response items are *easier* for SMEs to develop



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Future Research

- We *still* believe that MR items will become more discriminating as
 - the candidate population becomes more used to the new exam format
 - the candidate population becomes more used to the item type
 - SMEs become better at developing these item types

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Questions



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