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Item Writing

CBAS-R: Item Writing Guidelines

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Abstract

Item writing guidelines are presented and discussed in the context of the Computer Based Assessment-Reading (CBAS-R). Specifically, the editing and formatting styles that are appropriate for CBAS-R are provided. There is ample attention given to writing options for multiple-choice items and the argument for how many choices is presented. Based on meta-analysis and previous research, three answer choices per item is appropriate for assessments, however it is undetermined whether this format should be taken on by CBAS-R. Cognitive development of students may also be a topic to consider when writing items for students.

Keywords: measurement, assessment, items
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CBAS-R: Item Writing Guidelines

The purpose of this technical report was to review the literature for item writing guidelines that are typically used in developing assessments. It was necessary to also review the literature on multiple-choice item writing as it affects the difficulty of each item and how students perform on an assessment. Once the literature was reviewed, the guidelines were applied to CBAS-R to examine relevance and utility. The last section of this technical review provides specific formatting procedures for creating CBAS-R items.

Guidelines

The following guidelines pertain to the CBAS team and are adapted from Haladyna, Downing and Rodriguez (2002):

- **Formatting**: The items should be formatted vertically, not horizontally. There is no empirical evidence to show that this is a better format, but authors proposed that it is easier to read.

- **Style**: Items must be edited, including checking for correct grammar, punctuation, and spelling. Item writers should minimize the amount of reading in each item stem. The second part of this guideline may be infeasible for CBAS items, such as comprehension passages.

- **Writing the stem**: In the stem, directions must be clear and include the central idea. Additionally, simple vocabulary should be used and the stem should be worded positively. CBAS-R item writers purposefully violate “simple vocabulary” at times when hard items are created.

- **Writing the choices**: Items should be written with 3-options with only one correct choice. The location of the correct answer should be varied across items and choices should be placed in logical or numerical order. Logical/numerical order is important because
randomly placed options result in higher discrimination, but may not measure the achievement measure as intended; unnecessary obstacles arise when options are not in logical order. Answer choices should be independent of one another and the length of each choice should be relatively similar. Finally, distracters should be plausible distracters and may incorporate typical student errors.

**Multiple-Choice Item Format**

There are seven valid multiple-choice formats (Haladyna et al., 2002). Only those that can be applied to CBAS are discussed.

- **Conventional Multiple-Choice:** This multiple choice format is recommended by all textbooks and test publishers. The stem may be formatted as a sentence or a question. There is no difference in discrimination between the two formats.

- **Complex Multiple-Choice:** Fewer textbook and test publishers endorsed this item type. An example from Haladyna et al. (2002) follows:

  1) Which of the following are fruits? 1 & 2; 2 & 3; 1 & 3; 1, 2, & 3

  This should be avoided in CBAS-R, as there is limited support in the literature. There needs to be further research on item-writing theories, rather than just “useful advice” (Haladyna et al., 2002) on how to write items as provided by the Taxonomy of Item-Writing Guidelines.

**Optimal Options per Item.** Research regarding the number of multiple-choice options that should be developed for assessments is limited. Early research demonstrated that changing the number of options per item affected item difficulty, but not item discrimination when original items were changed from one format to another (Rodríguez, 2005). Furthermore, there has been
ample evidence that writing more than three distracters per item is difficult and is not worth the time it takes to develop them. Functional distracters are difficult to develop, maybe even after only two are created (Rodriguez, 2005). Specifically, many distracters are not “plausible,” as is a stated guideline for item writing (Rodriguez, 2005). Only two thirds of items have one or two plausible distracters (Haladyna and Downing, 1993). Also, Haladyna and Downing (1993) found that on a 200-item test with five options, none of the items had four functioning distracters.

Though no one theory exists regarding the number of multiple-choice options, three options have been found to be superior (Rodriguez, 2005) or at least as good as four and five option items when item discrimination and internal consistency are considered (Rogers and Harley, 1999). Three option items allow for more items on the test because shorter items should theoretically take less time (Rodriguez, 2005; Rogers and Harley, 1999; Haladyna and Downing, 1993). Thus, more information can be gathered about an individual (Rodriguez, 2005).

Some research has examined the impact of deleting item options. Rodriguez (2005) conducted a meta-analysis of studies that removed item options from the test. The first finding was that there were significant changes in mean item difficulty when options were decreased from five to two options. There was minimal change in mean item difficulty when options decreased from four to three. Item discrimination was also reduced across tests when options were reduced significantly; again, when reducing from four to three, item discrimination changed very little. Reliability coefficients were also examined when options were decreased per item. These findings varied across studies and tests.

**Deleting Options: Methodology.** Rodriguez (2005) found studies in which investigators deleted options randomly or deleted those options that were not functioning. Randomly deleted
options resulted in reduced reliability whereas systematically deleting options resulted in no change in reliability (Rodriguez, 2005).

**Developmental Considerations.** The number of choices per item should be considered in light of the age of the student taking the assessment. Working memory and sustained attention may impact a student’s performance more so than the actual item itself. However, there is limited research in this area to guide item writers in what is appropriate for particular age levels.

**CBAS-R 2 Guidelines.** The following guidelines pertain to the CBAS2 team.

1) Formatting: The following guidelines were implemented for item formatting:
   a) One indentation to the right
   b) Size 36 font, Century Gothic, Bold
      i) The font size can be made smaller for items with more content; however they should be as large as possible but still fit into the dimensions of the screen.
   c) One space between the answer choice identifier (Ex: a., b., c., d.) and the answer choice itself.

2) Length: Items should be held at a maximum length of 75 words in the stem.

3) Content: Effort should be made so that the item cannot be answered using background knowledge alone.
References

