Strategies for Writing Multiple Choice Items

Writing high-quality multiple choice items is time-consuming and labor intensive!

To be successful at assessing what students know, understand, and are able to do, multiple choice items must be well-aligned with course learning objectives and with evidence-based practices for writing items and designing assessments (quizzes, tests, exams, etc.).

The guidelines for item stems and response options on the pages that follow are designed to help minimize assessment error (validity and reliability) related to how the multiple choice item is written. Additionally, the guidelines aim to minimize contested answers. Students are less likely to question incorrect answers when the item is well-written. Before you begin drafting your assessment, consider the questions below:

- **Purpose:** How will this assessment aid your ability to know what your students know, understand, and are able to do?
- **Alignment:** How will this assessment aid your ability to know what your students know, understand, and are able to do?
- **Validity:** Does the assessment measure what it's supposed to measure relative to the course learning objectives?
- **Reliability:** Does the assessment consistently estimate what students know, understand and are able to do relative the course learning objectives?

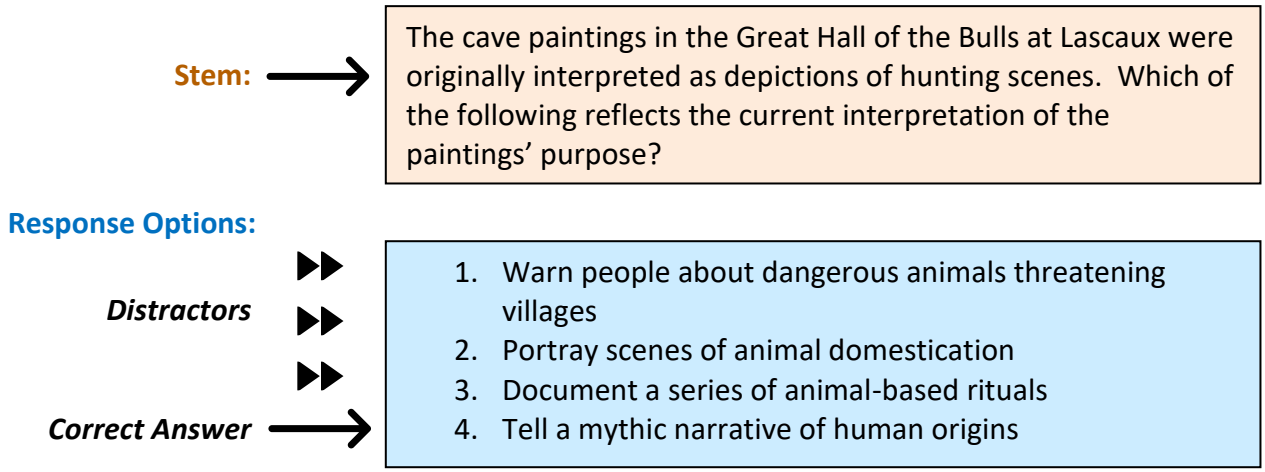
The Anatomy of Multiple Choice Items

Vocabulary for describing multiple choice assessments varies across the literature. For the sake of consistency, our resources use the vocabulary used most consistently in resources and research aligned with evidence-based practices.

- Multiple Choice Assessments—Quizzes, tests, midterm and final exams, etc.
- Multiple Choice Items—A combination of the question stem and the response options
- Stems—The text preceding the response options, e.g., the question that can be answered with one of the response options (a, b, c, d).
- Response options—the correct answer and the distractors (plausible incorrect answers)

The next session illustrates a multiple choice item, identifying a stem and response options that include distractors and a correct answer.

Structure of a Multiple Choice Item



Strategies for Writing Item Stems

1. **Write the stem as a question.** The question-and-answer format works better than an incomplete sentence because it is the normal way we communicate when we ask for information, and it doesn't involve short-term memory issues with having to reconstruct an incomplete sentence for each option.
2. **Make the stem as clear as possible so students know exactly what is being asked.** Include only the information that is necessary. Don't use excessive verbiage.
3. **Place directions accompanying text or graphics above the text or graphic**. Typically, the text or graphic comes before the question. Any directions or instructions included in the item should be unambiguous and offer clear guidance for the student.
4. **Put the main or central idea of what you want to ask in the stem, not in the response options.** The options may be longer than the stem, but the stem should contain all of what you want to ask, and the response options should only be the answers (i.e., not words that should be in the questions).
5. **Word the question positively**. Avoid negatives such as not or except. Using negatives can be confusing to students. Using not requires students to keep reconstructing the response options in their minds, trying to figure out what is not correct as well as what is correct. Often, students will read right through the not.
6. **Make sure that the stem doesn't offer a clue (cue) that will help students choose the correct answer.** For example, if you use child in the question and children for one or two of the response

options, you will be giving a clue that the options with children are probably not the correct answer. Clueing can happen within an item and between items.

7. **Don't make the item opinion based.** That is, don't ask, "In your opinion" as this would make any response option a possibly correct answer.
8. **Don't write trick questions.** The purpose of the assessment is not to trick students or measure how students deal with a trick question.

Strategies for Writing Response Options

1. **Traditionally, four (or more) response options are used, but in most cases, three options will work better.** Typically, the fourth response option (distractor) is the most difficult and time-consuming to write, and, statistically, contributes very little to the information you want from the student's response to the item (Haladyna, 1997, 1999; Rodriguez, 2005). The tradition of using four or five options for multiple-choice items is strong, despite the research evidence suggesting that it is nearly impossible to create selected-response test items with more than about three functional options. (Downing, 2006, p. 292). A study by Haladyna and Downing (1993) shows that three options are typically sufficient, because even in very well-developed tests it is rare that more than three options are statistically functional.
2. **Make sure that only one of the response options is the absolutely correct answer.** Make the other response options (distractors) plausible but incorrect. Students shouldn't be able to easily reject distractors because they obviously lack plausibility. A good strategy is to use typical errors that students make as the distractors.
3. **Ideally, the distractors should be equal in plausibility.** However, it usually becomes increasingly difficult to make each added distractor as plausible as the preceding distractor. As noted above, traditionally, it has been common practice to use three distractors and one correct answer. Since in most cases very little additional information is achieved when adding a third distractor, it is usually adequate to stop after two distractors.
4. **Place the response options in logical or numerical order.** For example, order a sequence of events from first to last, and order numbers from lowest in value to highest.
5. **Ideally, keep the length of response options roughly equal**. Sometimes this is not possible, but no response option should be significantly longer or shorter than the rest of the options because the student may be influenced by the length of the option.
6. **Avoid using the "none of the above" or "all of the above" in response options.** Using these response options conflicts with the guideline to have one absolutely correct answer. Identifying two choices as being correct will clue the student to choose all of the above. If you decide that none of the above or all of the above is needed for a particular item, then use caution and think carefully about the other response you create for that item.

7. **Phrase response options positively as much as possible.** The use of words such as not, except, doesn't, didn't, couldn't, and wouldn't can be less problematic in the response options compared to their use in the stem, and in some instances make sense. If used, ensure that the syntax in the response options is well crafted.
8. **Avoid giving clues to the right answer in the response options.** This clueing can be within the item and between items. Avoid using terms such as always, never, none, totally, absolutely, and completely because they set extreme limits and thus can be a clue that they are less likely (or appear to be more likely) to be the correct answer. Similarly, terms such as often, sometimes, generally, usually, and typically also qualify the correct answer and should be used with caution.
9. **Using a stem that asks for the "best" answer requires careful wording for the distractors** as they all may have a degree of correctness (thus the term best) but the correct answer has to be the best choice. It is helpful to get feedback from a colleague or former students to ensure there is consensus on the best choice.
10. **Don't make a distractor humorous.** Such a distractor can be a serious distraction to the real intent of the outcome you are measuring, and has no place in a test for which the results are taken seriously. Students are likely to eliminate the humorous choice and thus reduce the number of choices.
11. **Don't overlap choices.** This applies primarily to ranges in numerical problems. For example, if choice A is 10-20, then B should not be 20-30 but rather should be 21-30.
12. **Keep the content of the response options as homogeneous and parallel as possible.** For example, if two of the answer choices are phrases that start with a verb and cover similar content, you would need to make the third response option the same in terms of content and structure. If the third response option is a complete sentence, then it would not be parallel. If the third response option addresses different content, then it would not be homogeneous. However, the response options are not limited to the exact same content. For example, three complete-sentence response options could have parallel construction, and they could address three different but related pieces of information. One option could be related to mixtures, another to solutions, and another to compounds, but all three would be complete sentences with similar syntax.

References

Anderson, L.W., & Krathwohl, D. R. (Eds.). (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. New York, NY: Addison Wesley Longman.

Bloom, B.S. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York, NY: David McKay Company.

Carriveau, R. S. (2016). Connecting the Dots: Developing Student Learning Outcomes and Outcomes-Based Assessment. Stylus Publishing, LLC.

Downing, S.M. (2006). Selected-response item formats in test development. In S.M. Downing & T.M. Haladyna (Eds.), Handbook of test development. Mahwah, NJ: Erlbaum.

Haladyna, T.M. (1997). Writing test items to evaluate higher order thinking. Boston, MA: Allyn & Bacon.

Haladyna, T.M. (1999). Developing and validating multiple-choice test items (2nd ed.). Mahwah, NJ: Erlbaum.

Haladyna, T.M., & Downing, S.M. (1993). How many options is enough for a multiple-choice test item? Educational and Psychological Measurement, 53, 999-1010.

Linn, R.L., & Gronlund, N.E. (1995). How to write and use instructional objectives (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Osterlind, S.J. (1998). Constructing test items: Multiple-choice, constructed-response, performance, and other formats. Norwell, MA: Kluwer Academic.

Rodriguez, M.C. (2005). Three options are optimal for multiple-choice items: A meta-analysis of 80 years of research. Educational Measurement: Issues and Practice, 24(2), 3.

Statman, S. (1988). Ask a clear question and get a clear answer: An inquiry into the question/answer and sentence completion formats of multiple-choice items. System, 16(3), 367-376.

Tarrant, M., Ware, J., & Mohammed, A. M. (2009). An assessment of functioning and non-functioning distractors in multiple-choice questions: a descriptive analysis. BMC medical education, 9(1), 40.