

The Savvy Survey #6c: Constructing Closed-Ended Items for a Questionnaire¹

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Introduction

There are five publications in the Savvy Survey Series that provide an introduction to important aspects of developing items for a questionnaire. In particular, this publication presents an overview of constructing closed-ended items for a questionnaire. Several resources that give in-depth information on developing questionnaires that may be useful during the construction phase include Dillman, Smyth, and Christian (2009) and de Leeuw, Hox, and Dillman (2008).

Remember, the two major question types used in a questionnaire include

- open-ended—a blank answer space provided for a description of explanation, a list of items, numbers, or dates; and
- closed-ended—response choices provided (scale, ordered, unordered, or partial).

Each of these question types has unique characteristics that may be of use within a survey. This publication looks at the characteristics of the closed-ended question.

What Are Closed-Ended Questions?

Closed-ended questions are often used to describe a person's attributes, beliefs, or attitudes (Dillman et al. 2009).

The closed-ended format provides the person taking the survey with a range of response options that he/she can select from to indicate his/her answer.

There are four closed-ended question types (see Figure 1):

- *Scalar/Likert*—responses use a predetermined scale or continuum
- *Ordered*—responses have some identifiable order
- *Unordered*—responses have no identifiable or logical order
- *Partial*—responses include an “Other, (please specify)” option

These four question types can all be used within a single questionnaire.

Regardless of the closed-ended question type selected, it is important to carefully craft the options being provided. To ensure greater confidence in the findings, response options for closed-ended questions should be:

1. Easy to understand

- Avoid using jargon or language that is difficult to understand.

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Closed-ended question (scalar/Likert)
How satisfied or dissatisfied you were with the Urban Gardens program that you attended?
 Please mark [x] the most appropriate response.

- Very satisfied
- Satisfied
- Neither satisfied or dissatisfied
- Dissatisfied
- Very dissatisfied

Closed-ended question (ordered)
How many years have you lived in your home?
 Please mark [x] the most appropriate response.

- Less than 2 years
- 2 to 5 years
- More than 5 years, but less than 10 years
- 10 or more years

Closed-ended question (unordered)
What type of grass does most of your lawn contain?
 Please mark [x] the most appropriate response.

- Bermuda grass
- Bahia grass
- Centipede grass
- Seashore paspalum
- St. Augustine grass
- Zoysia grass
- I do not know

Closed-ended question (partial)
For the lawn you maintain, what property type is it:

- House
- Condo, townhouse or apartment unit
- Mobile home
- Duplex or triplex
- Other (please specify) _____

Figure 1. Examples of closed-ended questions.

- Avoid using “negatives” in the question stem since negative questions can be confusing to those taking the survey.
2. Mutually exclusive answers
 - Ensure that responses don’t overlap.
 3. Exhaustive answers
 - Include a list of all answers that are reasonably possible.
 - In situations where an exhaustive list is not available or practical, the survey designer can choose to use a

- partial closed-ended question with a response option that states *Other (please specify)*.
4. Equal in presenting both the positive and negative sides in the question stem
 - This is especially true when asking *either/or* types of questions.
 - Poor construction: *How much do you agree with the following statement...*
 - Better construction: *How much do you agree or disagree with the following statement...*
 5. Conceptually spaced so that the categories are consistent with measurement intent
 - Unbalanced categories are limited to only certain types of analysis, while balanced categories can be used for more advanced statistical analysis.
 - See Savvy Survey Series #6e for a more detailed discussion on measurement levels and analysis.

It is also possible to group scalar questions that target the same concept in order to create a matrix (see Figure 2). In a matrix, the response categories are typically placed horizontally along the top of the response area, with the targeted items listed vertically down the left-hand side (as shown in Figure 2).

Closed-ended question (scalar matrix)
 Indicate how satisfied or dissatisfied you were with the following features of the Urban Gardens program you recently attended. Place a mark [x] in the appropriate box that best describes your response for EACH item from the Urban Garden workshop.

	Very Satisfied	Satisfied	Neither Satisfied or Dissatisfied	Dissatisfied	Very Dissatisfied
Location	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Speakers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Topics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2. Example of scalar matrix.

If using a scalar matrix, it is important to limit the items that are included in a single matrix to the number needed for an accurate and reliable measure (so that the burden on respondents is minimized). Respondents can tire over the course of answering a long list to a greater extent than for a short list and, thus, pay comparatively less attention to the items (Kinnell and Dennis 2011). On the other hand, to gain a more accurate picture of attitudes or beliefs, it is a best practice to use a set of 5–8 items into a single matrix for measuring many concepts.

In addition to limiting the number of items in a list, it is also a common practice to limit the number of response categories in the scale. In general, bipolar scales that measure both direction and intensity (e.g., strongly agree to strongly disagree) should have 5 or 7 response options (Dillman, et al. 2009). Similarly, unipolar scales that measure intensity only (e.g., no agreement to complete agreement) typically have 4 or 5 response options.

Depending on how the question stem is worded, there are several possible scales that could be used for rating questions. The scale chosen should be matched carefully with the wording used in the question stem so that a logical set of responses is provided. Some common bipolar scales include

- very satisfied to very dissatisfied,
- high priority to low priority,
- strongly agree to strongly disagree,
- complete success to complete failure, and
- Numerical (e.g., -3 to +3).

Common unipolar scales include

- extremely important to not at all important,
- completely agree to no agreement,
- all of the time to never, and
- numerical (e.g., 1 to 5).

Note that numerical scales should be used carefully, since respondents may actively avoid using mid- and low-values when labeled with zero and negative codes (Sangster et al. 2001). It is possible to reduce or eliminate the effect of numeric labels when all scale points have both word labels and numeric codes or if the numeric scale is being used for items that are seen as “less personal.”

Here are some additional considerations to think about when constructing a scalar matrix:

1. Conceptually grouping items

- Group items that are similar together; this helps increase a person’s recall of relevant information while they are taking the survey.

2. Providing balanced scales and question stems

- In addition to avoiding biased language in the question stem, use an equal number of “positive” and “negative” response options.

- If two positive options are on the scale (*Strongly Agree, Agree*), then two negative options of equal weight must be provided (*Strongly Disagree, Disagree*).

3. Limiting the number of scalar categories to four or five

- Use four categories if opting for no “middle ground” response.
- Use five if wishing to include a neutral response option.
- A “neutral” response is different than *No Opinion* or *Not Applicable*. A neutral response captures a truly neutral stance (one that exists, but is neither positive or negative in nature), while the others are statements that either no opinion actually exists or the item is not applicable to the respondent.

4. Whether it is appropriate to include a non-scalar option like *Not Applicable* or *No Opinion* (see Figure 3)

- This option is not mandatory, but does provide people with an appropriate way to answer the question when no other response is accurate for them.
- If a non-scalar option is included, then it is important to visually separate these non-scalar responses from scalar ones, as seen with the *No Opinion* response option in Figure 3.

Closed-ended question (scalar matrix)

Indicate how favorable or unfavorable you perceive the adding of new county restrictions for each of the following landscape management issues. Place a mark [x] in the appropriate box that best describes your response for EACH item.

	Favorable	Not Favorable or Unfavorable	Unfavorable	No Opinion
Pesticide Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fertilizer Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clippings Disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 3. Example of matrix with non-scalar option.

Guidelines for Creating Closed-Ended Questions

Several guidelines for creating closed-ended items have been suggested by Dillman et al. (2009).

When asking **unordered** closed-ended questions:

1. If asking respondents to rank items, provide respondents with several small groups of target items (5–7) rather than a single, long list.

2. Avoid bias from unequal comparisons by avoiding adjectives that might impact how the respondent views the choices.

- Initial version: *Which of the following has the greatest impact on the success of a county Extension program?*
 - amazing Extension staff
 - volunteers
 - participants

Check-All-That-Apply
Indicate all the Florida grasses that you've had experience maintaining
 Please check [✓] all that apply.

- Bermuda grass
- Bahia grass
- Centipede grass
- Seashore paspalum
- St. Augustine grass
- Zoysia grass

Forced-Choice
Using the list below, indicate which of the Florida grasses you've had experience maintaining.
 Please mark [x] the appropriate answer (Yes or No) for each grass type.

	YES	NO
Bermuda	<input type="checkbox"/>	<input type="checkbox"/>
Bahia grass	<input type="checkbox"/>	<input type="checkbox"/>
Centipede grass	<input type="checkbox"/>	<input type="checkbox"/>
Seashore paspalum	<input type="checkbox"/>	<input type="checkbox"/>
St. Augustine grass	<input type="checkbox"/>	<input type="checkbox"/>
Zoysia grass	<input type="checkbox"/>	<input type="checkbox"/>

Figure 4. Comparison between forced-choice questions and check-all-that-apply question formats.

- Improved revision: *Which of the following has the greatest impact on the success of a county Extension program?*
 - Extension staff
 - Volunteers
 - Participants

3. Use forced-choice questions by either asking for the best answer or Yes/No (see Figure 4) instead of check-all-that-apply (Smyth et al. 2006).

4. Consider using differently shaped answer spaces (i.e., circles versus squares) to help respondents distinguish between single- and multiple-answer questions.

- This guideline becomes moot when using an online mode, as it is a standard feature within most online survey platforms (i.e., Qualtrics).

When asking **ordered** closed-ended questions, be sure to:

1. If using a scale, choose an appropriate scale length

- 5 or 7 response options for bipolar scales
- 4 or 5 response options for unipolar scales

2. Choose direct or construct-specific labels to improve understanding and avoid confusion.

- If you ask about the importance of a topic, use a response scale that also uses “importance” language.
- Initial version: *strongly agree* to *strongly disagree*
- Improved revision: *not at all important* to *very important*

3. Provide scales that approximate the actual distribution of the variable characteristic in the population of interest

- For example, when using income categories (*Less than \$15,000, \$15,000 to \$29,999, \$30,000 to \$44,999, \$45,000 to \$59,999, \$60,000 and above*), the middle category should contain the median income for the population of interest.
- Note the use of the *median income*, not the average, since income is a variable that is known to be easily impacted by only a few very high responses. In variables such as these, it is better to select the middle (median) number as opposed to the average (mean).

4. Provide balanced scales where categories are relatively equal distances apart conceptually.

- Again, use equal positives and negative options with similar weights: If (*Strongly Agree, Agree*), then (*Strongly Disagree, Disagree*)
- Also, attempt to make the weight of categories conceptually equal (e.g., for the income category example above, each category has approximately the same weight, about \$15,000, except for the last category).

5. Consider how verbally labeling and visually displaying all response categories may influence answers.

- Visual spacing can impact responses
- Use equal spacing between items to limit bias

6. Align response options vertically in one column or horizontally in one row.

Limitations of Closed-Ended Questions

Though quite useful, closed-ended questions do have some limitations. Closed-ended questions can provide respondents with answers they may not have considered otherwise, while at the same time, not offering an answer that accurately captures their true answer. By lacking the desired answer, the respondent can become frustrated in the survey process. This limitation points to the value of pre-testing every instrument prior to using it for actual data collection (see Savvy Survey Series #8 for further information on pre-testing questionnaires).

In Summary

Developing a high-quality questionnaire is a critical step for collecting useful data for assessing program needs and evaluating the outcomes of programs. The items that are used to collect information must be carefully constructed so that those taking the survey have the ability to answer as easily and accurately as possible. This publication provided an overview of the guidelines for constructing and using closed-ended questions in a questionnaire. The next publication will continue with this topic by examining how to construct indices for a questionnaire.

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