Best Practices for the Electronic Implementation of Clinical Outcome Assessment Response Scale Options

Response Scales

This document describes commonly used response scales in Clinical Outcome Assessments (COAs). The target audience are those developing COA instruments and those implementing COA instruments on an electronic format in clinical studies. Following the description of each response scale, considerations for implementation of these response scales on electronic platforms are provided. When selecting a mode of electronic implementation, the mode should support all of the response scales that would be utilized in the study. The considerations documented apply to interactive voice response (IVR), handheld, tablet, and web-based implementations. These considerations do not apply to nominal response options (e.g., checklists, dichotomous responses). Generally, this document recommends that each response scale is rendered the same on a given device/platform; for example, the font type and the orientation of the items (i.e., landscape or portrait) should be consistent throughout the assessment.

1. Verbal Response Scales

1.1   Adjectival Scale

Description
Adjectival scales provide subjects with discrete, ordered, uni-directional, verbal descriptors intended to describe a gradation of the dimension (e.g., intensity, frequency) of the construct being measured.

Elements
Adjectival scales consist of an item stem and a uni-directional, verbal response scale.

Example
Over the past 7 days, how tired have you felt?

　　Not at All

　　A Little Bit

　　Moderately

　　Quite a Bit

　　Extremely

1.2   Likert-Type Scale

Description

Likert-type scales are similar to adjectival scales in their use of verbal descriptors, but with one exception; Likert-type scales are bi-directional, whereas adjectival scales are uni-directional. Likert-type scales are most often used to assess agreement, attitude, and probability. Likert-type scales always have an implicit or explcit midpoint. The provision of an odd number of response categories allows raters to choose a middle, or neutral, response. An even number of response categories forces the respondent to commit themselves to one side of the scale or the other. The choice between odd and even response categories depends on the desirability to allow a neutral position.

Elements

Likert-type scales consist of an item stem and a bi-directional, verbal response scale.

Example

Compared to the start of the study, would you describe your depression as:

Much improved

Improved

No change

Worse

Much worse

1.3   Considerations for Electronic Implementation of Verbal Rating Scales

IVR: IVR systems will require the response choices to be presented in aural (spoken) format (e.g., "For 'Not at all' press 1."). It is recommended that the response choice is stated before the entry value (e.g.,"For 'Not at all' press 1" instead of "Press 1 for 'Not at All''') to ensure that the subject hears the entire response. The number and length (words) of the response options for the item should be considered due to the cognitive load, as the subject has to remember the entire item and response scale. The order of the responses options, if the same or similar, should be presented consistently to limit subject burden and confusion. The use of non-interruptible (non-bargeable) items and response scales should be considered, so that the subject must listen to the entire item and response scale before responding. Responses should be repeated and confirmed by the subject, to ensure the response was entered as intended (e.g., "You entered 'Not at all', is that correct?").

Handheld and Tablet: Minimum screen size and minimum font size should be established when including verbal rating scales, considering the length of the item stem and response scale. The entire item should be self contained (i.e., include the entire item and response scale) on one screen. Some response scales may need to be represented as a vertical array due to screen size. It is recommended that each response option be formatted to appear equidistant from the other response options. It is important that only one response choice can be chosen for a given item. When designing the screen, the hit-spot (the area on screen that can be tapped or touched to enter the response) for each response should be the same size, and use the same font size regardless of the amount of text.

Web: Everything stated above for the handheld and tablet platforms applies to web-based platforms. The critical distinction for web-based platforms is that the internet can be accessed by multiple devices (e.g., smartphones, tablets). In order to ensure that the instrument is displayed as intended, it is recommended that the specifications include minimum requirements such as the browsers supported, minimum screen size, whether access is blocked for mobile devices, etc.

2   Visual Analog Scale (VAS)

Description

A visual analogue scale (VAS) consists of a line of a fixed length (typically 10cm), with verbal anchors at the extreme ends, and no descriptors of the intermediate positions on the scale. Respondents are asked to place a mark on the line corresponding to their perceived state. Note: Although the EuroQol Group calls the last item of the EQ-5D a visual analogue scale (EQ-VAS), it is not a true VAS because a true VAS does not have numeric values at points along the scale.

Elements

A VAS consists of an item stem, and a line between two verbal anchors.

Example

Please rate your pain at its worst in the last 24 hours?
No _____ Pain as bad as
Pain   you can imagine

2.1   Considerations for Electronic Implementation of Visual Analog Scales

IVR: The VAS requires subjects to place a mark on the line; thus, it is difficult to implement a true VAS on an IVR platform.

Handheld: For new COA instruments, the VAS is not recommended because the scale itself is problematic. The length of the line on a paper version is measured with a ruler to determine where the line was marked, and in most situations the length of the line or orientation may need to be modified for electronic data collection format.

Tablet: Everything stated above for the handheld applies to the tablet implementation. Depending on the size of the tablet, the length of the line of a VAS may be replicated. However, there are multiple tablet sizes available and providers may need to recommend a minimum screen size, or alter the length of the line.

Web: Everything stated above for the handheld and tablet platforms applies to web-based platforms. The critical distinction for web-based platforms is that the internet can be accessed by multiple devices (e.g., desktops, laptops, smartphones, tablets). In order to ensure that the items are displayed as intended, it is recommended that the specifications include minimum requirements such as the browsers supported, minimum screen size, whether access is blocked for mobile devices, etc. The design of the study should ensure that every time a subject sees the VAS, it is always the same size.

3   Numeric Rating Scale (NRS)

Description
A numeric rating scale consists of numerical degradations representing a continuum of some attribute. An NRS typically includes verbal descriptors at the extreme ends and the intermediate positions of the scale. Respondents are asked to select the number corresponding to their perceived state.

Elements
An NRS consists of an item stem, and numeric degradations (with and without verbal descriptors).

Example
Please rate your pain at its worst in the last 24 hours?

0	1	2	3	4	5	6	7	8	9	10

No   Pain as bad as
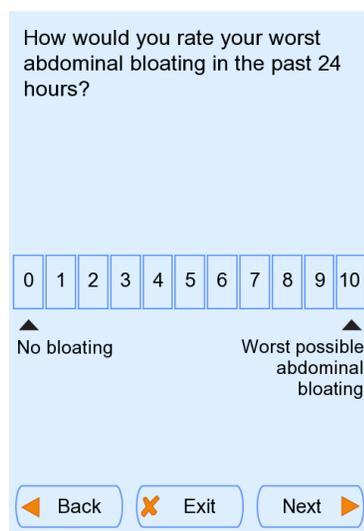Pain   you can imagine

3.1   Considerations for Electronic Implementation

IVR: Implementing an NRS on and IVR platforms requires the item and response choices to be presented in verbal format (e.g., "Please rate your pain on a scale of 0 to 10, with 0 being No Pain, and 10 being the worst possible pain"). The system should collect up to the maximum number of digits of the response choices (e.g., '11', '100') and may require the use of the pound or hash key. Responses should be repeated and confirmed by the subject that they are entered as intended (e.g., We recorded you entered 10, is that correct?). Repeating and confirming the responses may add to the time it takes to complete questionnaire, but ensures data quality on IVR platforms.

Handheld and Tablet: The entire item should be self-contained and fit on one screen. Include an indicator (e.g. a vertical line or an arrow) to mark the verbal anchors at the ends of the scale (see example below). When implementing on various screen sizes, the text may overlap different numbers, so it is important to make it clear that the anchor text refers to the true ends of the scale. A minimum screen size and a minimum font size should be established when implementing numeric rating scales on screen-based devices.

Example of Indicator Mark on an NRS

Web: Everything stated above for the handheld and tablet platforms applies to web-based platforms. The critical distinction for web-based platforms is that the internet can be accessed by multiple devices (e.g., desktops, laptops, smartphones, tablets). In order to ensure that the

items are displayed as intended, it is recommended that the specifications include minimum requirements such as the browsers supported, minimum screen size, whether access is blocked for mobile devices, etc.