

CDC Coffee Break: Using Likert Scales in Evaluation Survey Work



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Division for Heart Disease and Stroke Prevention



Welcome to today's Coffee Break presented by the Evaluation and Program Effectiveness Team in the Division for Heart Disease and Stroke Prevention at the Centers for Disease Control and Prevention.

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Topics for Discussion

- ❑ **Likert Scales**
 - Traditional
 - Variations (also known as “Likert-type”)
- ❑ **Odd number of response categories**
- ❑ **Even number of response categories**
- ❑ **Tips**
- ❑ **Resources**

Today, we will discuss traditional Likert scales, variations of these scales—also known as Likert-type scales, odd numbered response categories, and even numbered response categories. At the end of our presentation, we will share some tips and resources for using Likert scales in your work.

Likert Scale

- ❑ **Common in public health evaluation**
- ❑ **Common in survey research**
- ❑ **Definition of Likert scale:**
 - Ordered scale from which respondents choose one option that best aligns with their view
- ❑ **Attitude, belief, and behavior items**

The Likert scale is commonly used in public health evaluation. For example, they can be used when evaluating a partnership, conducting a needs assessment about which policies are most pressing in a community, or assessing the public's knowledge and awareness of a public health campaign.

Similarly, the Likert scale is a valuable and important part of survey research, which is commonly used in public health evaluation.

A Likert scale is an ordered scale from which respondents choose one option that best aligns with their view. It is often used to measure respondents' attitudes by asking the extent to which they agree or disagree with a particular question or statement. A typical scale might be "Strongly disagree, Disagree, Neutral, Agree, Strongly agree."

Likert scales may meet your needs when you have attitude, belief, or behavior items. For example, you would not use a Likert scale to assess attributes, such as age, race, and income, but you may use a Likert scale to assess someone's attitude about a particular topic.

Features of Traditional Likert Scales

- ❑ **Declarative statement**
- ❑ **Ordered continuum of response categories**
 - Strongly disagree–Strongly agree
- ❑ **Balanced number of positive and negative options**
- ❑ **Descriptive label assigned to each category**
- ❑ **Numeric value assigned to category**
 - Example: 5-point traditional Likert scale

| | Strongly Disagree | Disagree | Neither Disagree or Agree | Agree | Strongly Agree |
|-------------------------|-------------------|----------|---------------------------|-------|----------------|
| I like Valentine's Day. | 1 | 2 | 3 | 4 | 5 |

Traditional Likert Scales have some typical features.

First, there is the declarative statement. In honor of Valentine's Day, we have selected Valentine's Day examples. In our example below, the declarative sentence is "I like Valentine's Day." Respondents are asked to indicate their degree of agreement with or endorsement of the statement. Note that the declarative statement expresses a clearly positive or negative opinion, rather than a neutral opinion. This is intentional and designed to solicit more definitive responses.

Second, there is an ordered continuum of response categories. Ordered response options are possible answers for close-ended survey items that are offered to respondents in a specific, meaningful order. In a traditional Likert scale, the Strongly disagree–Strongly agree continuum is always used.

Third, there is a balanced number of positive and negative response options. In our example, there are two negative options and two positive options.

Fourth, all response options have a label, such as "Strongly disagree."

And fifth, numeric values are assigned to each category for the purpose of analysis, but the values may or may not appear on the survey. For example, the number 1 is assigned to the "Strongly disagree" response option in our example.

Just to note, the 5-point Likert scale is the most common scale.

Likert-Type Scales (Variations to the Traditional Style)

- ❑ **Scale has**
 - Ordered continuum of response categories
 - Balanced number of positive and negative options
 - Labels for each category or just the end categories
 - Something other than Strongly disagree–Strongly agree continuum
- ❑ **Possible response categories**
 - Frequency: never, sometimes, often, always
 - Intensity: mild, moderate, severe
 - Quantity: not at all, only a little, some, a lot

Likert-type scales have features that are similar to the traditional Likert scale. For example, a Likert-type scale does have an ordered continuum of response categories and a balanced number of positive and negative options.

One difference is that Likert-type scales may have labels for each response option or only the end, anchor categories. In a traditional Likert scale, a label is assigned to each response option. A second difference is that Likert-type scales do not use the traditional Strongly disagree–Strongly agree response continuum. They use other ordered continuum response categories, such as:

- Never, Sometimes, Often, Always, for assessing a frequency
- Mild, Moderate, Severe, for assessing intensity
- Not at all, Only a little, Some, A lot, for assessing quantity

A Likert-type also may or may not use a declarative statement. On the next slide there are three examples to illustrate these differences.

Some examples of “Likert-Type” Scales

| | Never | Sometimes | Often | Always |
|---------------------------------------|-------|-----------|-------|--------|
| I go out to dinner on Valentine's Day | 1 | 2 | 3 | 4 |

| | Never | | | Always |
|---------------------------------------|-------|---|---|--------|
| I go out to dinner on Valentine's Day | 1 | 2 | 3 | 4 |

| | Too Little | About the Right Amount | Too Much |
|--|------------|------------------------|----------|
| The amount of money I spend on Valentine's gifts is... | 1 | 2 | 3 |

As we see in these examples, Likert-type scales do not use the traditional Strongly disagree–Strongly agree response continuum and may or may not use a declarative statement. In addition, a Likert-type scale may only have labels assigned to the end, anchor response options.

We aren't going to spend much time on Likert-type scales during our presentation, but we wanted to bring your attention to them since they are quite prevalent in public health evaluation.

And now I'll turn it over to Jan who is going to walk us through odd numbered and even numbered response categories.



ODD NUMBER OF RESPONSE CATEGORIES

Inevitably when you start creating a questionnaire using a Likert scale or a Likert-type scale, you will ask yourself—what should I use? Odd or even number of responses? I'd like to spend a few minutes looking at this.

First, let's look at odd number of response categories.

Description

- ❑ **All odd-numbered scales have a middle value.**
- ❑ **Middle value often labeled neither disagree or agree, neutral, or undecided.**

| 5-point Traditional Likert Scale | Strongly Disagree | Disagree | Neither Disagree nor Agree | Agree | Strongly Agree |
|---|-------------------|----------|----------------------------|-------|----------------|
| On Valentine's Day, I like receiving fresh flowers as a gift. | 1 | 2 | 3 | 4 | 5 |

With odd-number of response categories, there are a few things to remember.

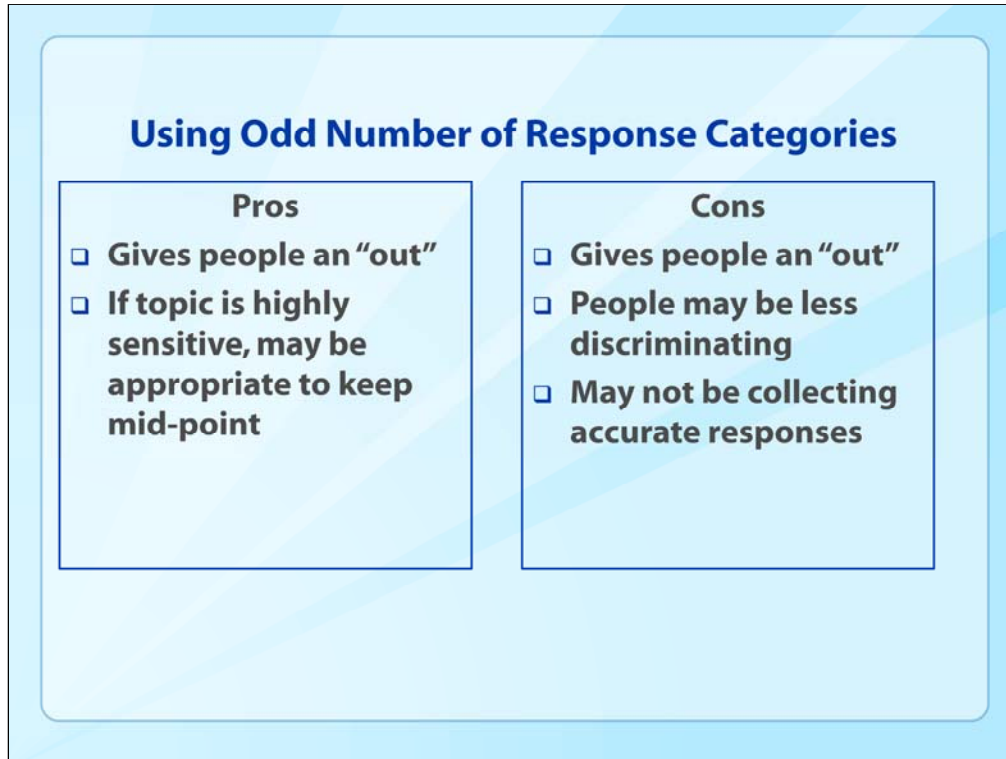
First, all odd-numbered scales have a middle value. The middle value is often labeled Neither disagree or agree, Neutral, or Undecided.

Let's keep the Valentine's example that Anne used at the start of this presentation. In this example, the mid-point is labeled "Neither disagree or agree."

Each respondent may have a different interpretation of the mid-point **even when it is labeled**. In a recent study it was shown that possible interpretations of the mid-point can be: Do not know, Unsure, Do not care, No opinion, Neither, Neutral, Both equal parts of agree and disagree, Undecided, Not applicable, or Unwilling to answer.

As you can tell from this long list, the mid-point can be confusing to respondents which may introduce measurement error, which is when a survey question is ambiguous or unclear.

Let's look at the advantages and disadvantages of having a mid-point.



On the one hand—Pros

- Gives people an “out,” which can be appealing to respondents
- If topic is highly sensitive, may be appropriate to keep mid-point

On the other hand—Cons

- Gives people an “out.” Having a mid-point can be seen as an easy option to take when a respondent is unsure, so it is questionable whether it is a true neutral option.
- People may be less discriminating and not take the time to weigh the merit of each response category.
- You may not be collecting accurate responses knowing that respondents can assign their own meaning to the mid-point.

Let’s hold onto these ideas and we’ll revisit them when we look at pros and cons for even numbered responses.

Does It Matter If It Is a 5-Point or 7-Point Likert scale?

| 5-point | Strongly Disagree | Disagree | Neither Disagree nor Agree | Agree | Strongly Agree |
|---|-------------------|----------|----------------------------|-------|----------------|
| On Valentine's Day, I like receiving fresh flowers as a gift. | 1 | 2 | 3 | 4 | 5 |

| 7-point | Strongly Disagree | Disagree | Somewhat Disagree | Neither Disagree nor Agree | Somewhat Agree | Agree | Strongly Agree |
|---|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| On Valentine's Day, I like receiving fresh flowers as a gift. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Tips

- Consider method of administration
- Pick categories meaningful to respondents

Now let's look at the number of response categories for odd-numbered scales. If you are wondering which you should use a 5-point or a 7-point scale, the answer is there isn't an optimal number of response categories, no one right way.

However, deciding between a 5-point scale over a 7-point scale can be informed by two considerations:

- **Keep in mind how you are administering questionnaire.** If it's over the telephone, it could be difficult to keep all of the response categories straight, so fewer options might be better. If you are administering the questionnaire as a hard copy or something that people can read, say over the internet, then people can see all of the options and having more options may be okay.
- The number of response categories needs to be **meaningful to the respondents**. In this hypothetical example looking at receiving fresh flowers, it probably doesn't really matter how many response categories are available. However, if you are interested in teasing out how employees feel about offering healthy food options in the cafeteria you may want to see where people fall along the continuum to determine if people really feel strongly about the issue or not.

EVEN NUMBER OF RESPONSE CATEGORIES

Let's turn to even numbered response categories. This is where the middle option of "Neither agree nor disagree" is removed. This is sometimes called a "forced choice" method since the neutral option is not available.

Description

- All even-numbered scales do not have a middle value
- Balanced response categories

| 4-point | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|-------------------|----------|-------|----------------|
| On Valentine's Day, I like receiving fresh flowers as a gift. | 1 | 2 | 3 | 4 |

| 7-point | Strongly Disagree | Disagree | Somewhat Disagree | Somewhat Agree | Agree | Strongly Agree |
|---|-------------------|----------|-------------------|----------------|-------|----------------|
| On Valentine's Day, I like receiving fresh flowers as a gift. | 1 | 2 | 3 | 4 | 5 | 6 |

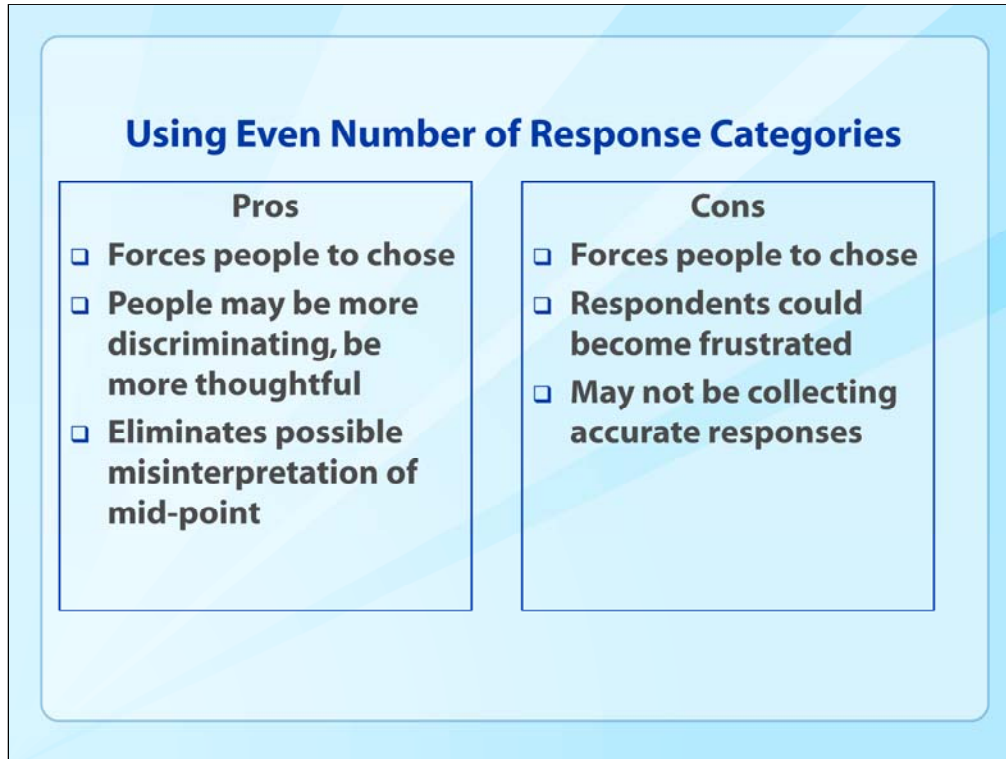
Tips

- Consider method of administration
- Pick categories meaningful to respondents

Just as we saw for odd numbered response categories, even numbered ones can be expanded or contracted. On this slide we have a 4-point and a 6-point example.

Just as we saw for odd response categories, the same considerations apply:

- Method of administration
- Meaningful categories to respondents



If we look at the advantages and disadvantages of removing the mid-point, you will need to determine what makes most sense in your particular situation.

Advantages

- Forces people to chose
- People may be more discriminating and more thoughtful
- Eliminates possible misinterpretation of mid-point

Disadvantages

- Forces people to chose
- Respondents could become frustrated
- May not be collecting accurate responses

Odd or Even? Which Is best?

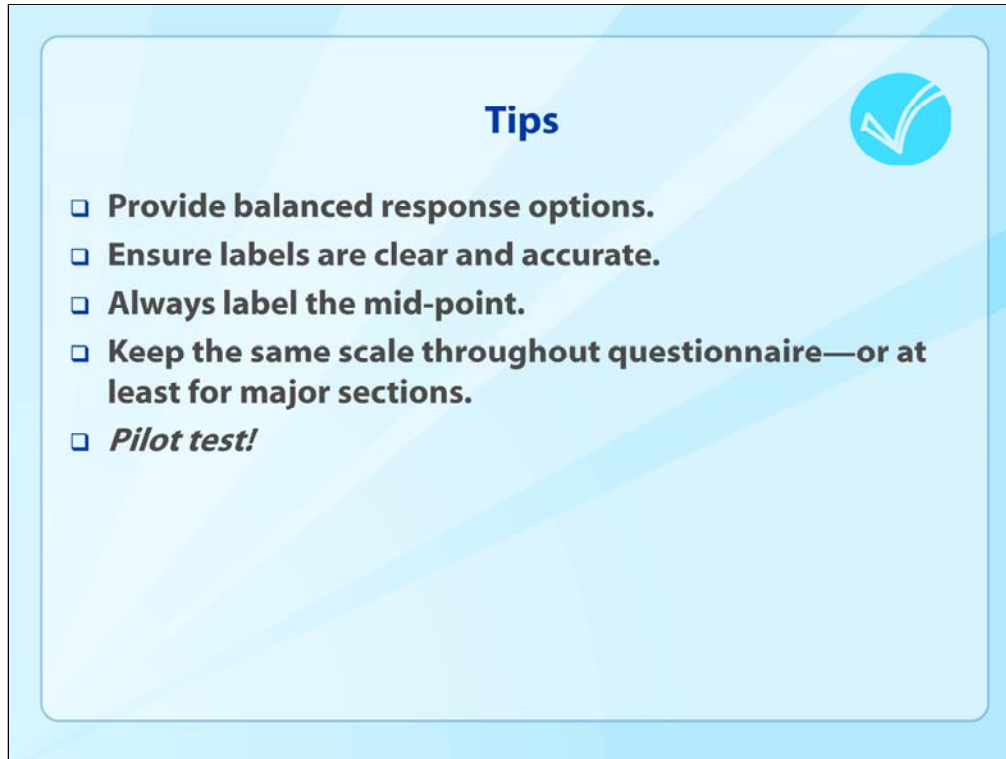
- ❑ **No definite rule**
- ❑ **Depends on:**
 - What is your purpose?
 - What is the topic of your questionnaire?
 - What are you asking in each specific question?
 - Who are your respondents?



Now that we've looked at odd and even, you may be wondering, "Well, what should I do when I'm ready to design a questionnaire?"

Which one is best even or odd? This question has been debated for decades. Ever since Rensis Likert published his work in 1932, there has been debate about this topic, and there is no definite rule. It has been shown that when comparing between a 4-point and 5-point Likert scale, the overall difference in the response is negligible. However, your decision to go with odd or even can be informed by several factors:

- First is **your purpose**. What do you intend to answer by creating your survey?
- Next, what is the **topic of the questionnaire**? If there isn't a lot of controversy around your topic, you could probably use an even numbered scale (no mid-point).
- **What are you asking** in each specific question?
- Then ask yourself, What do you know about **your respondents**? Are they likely to get frustrated by having or not having the mid-point? You don't want such as high skip rate or refusal rate that your results are invalid.



Tips

- ❑ **Provide balanced response options.**
- ❑ **Ensure labels are clear and accurate.**
- ❑ **Always label the mid-point.**
- ❑ **Keep the same scale throughout questionnaire—or at least for major sections.**
- ❑ ***Pilot test!***

On these next two slides, there are a few tips as you move forward in your survey work.

First, for both odd and even Likert scales, always **provide balanced response options** (two positive and two negative or three positive and three negative).

Second, **labels need to be as clear and accurate**. Commonly used labels such as “often” or “sometimes” can result in inaccurate responses. As these terms can be interpreted differently from person to person, culture to culture. Respondents may find it difficult to differentiate between “Very good” and “Good.” By using “Good” and “Excellent,” you may improve your data.

Next, if you do go with odd-numbered response categories, **always label the mid-point**.

Keep the same scale throughout the questionnaire. Don’t bounce around between different scales. If it is necessary to change scales, make certain you have clearly identified the new section.

And finally, **don’t forget to pilot test!** The pilot offers feedback on whether the questions are interpreted in the same way for respondents, whether the response categories mean the same thing to everyone, and whether the response categories are sufficient in number. This feedback will help you improve the accuracy of your data.

Tips (cont.)



Maintain consistent format

Left to right display

| | Strongly Disagree | Disagree | Neither Disagree nor Agree | Agree | Strongly Agree |
|-------------------------|-------------------|----------|----------------------------|-------|----------------|
| I like Valentine's Day. | 1 | 2 | 3 | 4 | 5 |

Top to bottom (with numeric values)

| I like Valentine's Day. | |
|-------------------------|-------------------|
| 1 | Strongly Disagree |
| 2 | Disagree |
| 3 | Agree |
| 4 | Strongly Agree |

Top to bottom (without numeric values)

| I like Valentine's Day. | |
|-------------------------|-------------------|
| | Strongly Disagree |
| | Disagree |
| | Agree |
| | Strongly Agree |

Whichever you select—keep a consistent format throughout.

As was mentioned at the start of this presentation, Likert scales have numeric values assigned to the response categories which allows for statistical analysis. You do have flexibility if you actually include the numbers on the questionnaire—any of the examples we have used could be displayed without the numeric values. I've shown two examples here. But **whichever you select, be sure to keep a consistent format throughout.**

Likert or Likert-Type Scales

- ❑ **Versatile**
- ❑ **Adaptable to pre-post testing (or even retrospective pre-testing)**
- ❑ **Applicable to range of public health efforts**
 - Example: "This training met my needs."
 - Example: "Being a part of this coalition has helped me better serve my clients."
 - Example: "It is essential that our community address sodium content in our school meals."
- ❑ **Alternative way to assess "satisfaction"**

These scales as a data collection approach are:

- Quite versatile.
- Adaptable to pre-post testing (or even retrospective pre-testing). This is when you administer the questionnaire once at "post" and ask respondents to think back to the "pre."
- Applicable to a range of public health efforts.
 - Training example: "This training met my needs."
 - Partnership example: "Being a part of this coalition has helped me better serve my clients."
 - Policy example: "It is essential that our community address sodium content in our schools."
- Provide a way to assess satisfaction without directly asking about satisfaction (which can be overdone). They go beyond "How satisfied are you with this partnership?" and actually use statements about what the partnership achieved.

Likert Scale Resources

- ❑ http://changingminds.org/explanations/research/measurement/likert_scale.htm
- ❑ <http://epm.sagepub.com/content/64/6/956.full.pdf+html>
- ❑ Response categories:
<http://dataguru.org/ref/survey/responseoptions.asp>

On this slide, we have included some resources related to Likert scales specifically.

Survey Data Collection Resources

- ❑ **Losby & Wetmore (2011). Tip sheet on constructing survey questions**
 - www.cdc.gov/DHDSP/programs/nhdsp_program/docs/Constructing_Survey_Questions_Tip_Sheet.pdf
- ❑ **CDC Division of School Health (order response options)**
 - www.cdc.gov/healthyyouth/evaluation/pdf/brief23.pdf
- ❑ **Wisconsin Extension Program Development & Evaluation**
 - [www.uwex.edu/ces/pdande/resources/quicktips/collect.html#collect](http://www.uwex.edu/ces/pdande/resources/quicktips/quicktips/collect.html#collect)
- ❑ **Fowler, F.J., (2008) *Survey Research Methods* (4th Edition). Thousand Oaks, CA: Sage.**

On this slide, we have included some more general resources related to survey design.

Please Stay with Us

- Q&A**
- Short evaluation poll questions**

Thank You

If you have questions, please contact:
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For more information please contact Centers for Disease Control and Prevention

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