Evidence-Based Survey Design Principles

Presented at:
- ISPI Atlanta Chapter
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- Noon - 1 pm (ET)

Presented by:
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Evidence-Based Survey Design Principles

1. Include a midpoint or not?
2. Put Strongly Agree on the left or right side of the scale?
3. Use radio buttons or sliders?
4. Use positive statements only or negative ones too?
5. How to handle ceiling effects?
Our Topics

1. Various survey response scales
2. Include or exclude a midpoint in the Likert scale?
3. Use ascending or descending order of Likert scale response options?
4. Extreme Makeover - Survey Edition
Closed-ended survey items with appropriate response scales
Anatomy of Closed-Ended Survey Items

1. Question
   Response scale
2. Question
   Response scale
3. Question
   Response scale
Survey items for:

- Capturing facts?
- Measuring perceived quality/value?
Survey items for:

- Capturing facts?
- Measuring perceived quality/value?

A

How many times have you used this device?

- Never  
- 1-2 times  
- 3-5 times  
- More than 5 times

B

How useful was the job aid provided to you?

- Not at all  
- A little bit  
- Somewhat  
- Quite a bit  
- Very much
Survey items to capture facts

When did you complete the program?
- Fall 2018
- Spring 2019
- Summer 2019
- Fall 2019
- Spring 2020

Did you use the help desk to get assistance?
- Yes
- No

Think about the census (2020census.gov)
Survey items to measure perceived quality/value

How would you rate the quality of the workshop?
○ Excellent ○ Very Good ○ Good ○ Fair ○ Mediocre ○ Poor

The content presentation was interesting.
○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree
Statements vs. Questions

S1. I have a good relationship with my supervisor.
○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree

Q1. Do you have a good relationship with your supervisor?
○ Not at all ○ A little bit ○ Somewhat ○ Pretty much ○ Very much
Statements vs. Questions

S1. I have a good relationship with my supervisor.
○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree

Q1. Do you have a good relationship with your supervisor?
○ Not at all ○ A little bit ○ Somewhat ○ Pretty much ○ Very much
Various rating scales

- Discrete rating scales
- Continuous rating scales
- Numerical rating scales
- Verbal descriptor scales
Discrete rating scales

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree
Continuous rating scales

Strongly disagree                      Strongly agree
Web-based sliders

0%
Not confident at all

100%
Very confident
Web-based sliders - continuous scale

54.56%
Web-based sliders - discrete scale

An 11-point scale?
Numerical rating scales

1. Very dissatisfied
2.
3.
4.
5. Very satisfied
Verbal descriptor scales

Not at all  A little bit  Somewhat  Pretty much  Very much
Verbal descriptor scales

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree
If you need to present an average score of multiple survey items

- Use the same response scale
- Use a response scale that likely produces interval data
  - Numeric descriptor scale
  - Verbal descriptor like 5 pt Likert scale
Various rating scales

- Discrete rating scales
- Continuous rating scales
- Numerical rating scales
- Verbal descriptor scales
Include or exclude a midpoint in the Likert scale?
What is a midpoint supposed to mean?
Research by Kulas & Stachowski (2009)

- 82 adults (college students)
- Midpoint = It depends? Uncertain? Average? Not applicable?
Research by Kulas & Stachowski (2009)

- 82 adults (college students)
- Midpoint = It depends? Uncertain? Average? Not applicable?

It depends
When asked a question on the scale below, how do you interpret the middle response?

- Strongly disagree
- Disagree
- Neither
- Agree
- Strongly agree

Answer: __________________________________________
Midpoint as a dumping ground

- So, should you exclude a midpoint?
Research by Johns (2005)

3,881 respondents (UK)

Likert items measured economic left-right attitudes

Four versions (modes) using 4-point and 5-point Likert scales with and without a “No opinion” option
<table>
<thead>
<tr>
<th></th>
<th>Mode A (n=960)</th>
<th>Mode B (n=1005)</th>
<th>Mode C (n=923)</th>
<th>Mode D (n=993)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Opinion</td>
<td>No Opinion</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5-point Likert scale (with “Neither”) – Mode C

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>12%</td>
</tr>
<tr>
<td>Agree</td>
<td>30%</td>
</tr>
<tr>
<td>Neither agree</td>
<td>25%</td>
</tr>
<tr>
<td>Disagree</td>
<td>27%</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>6%</td>
</tr>
</tbody>
</table>
4-point Likert scale (without “Neither”) – Mode D

- Strongly agree: 14%
- Agree: 39%
- Neither agree or disagree: 40%
- Disagree: 8%
- Strongly disagree: 0%
Where would “Neither” go?

<table>
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<tr>
<th>Response</th>
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</tr>
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<tbody>
<tr>
<td>Strongly agree</td>
<td>14%</td>
</tr>
<tr>
<td>Agree</td>
<td>39%</td>
</tr>
<tr>
<td>Neither agree or disagree</td>
<td>?</td>
</tr>
<tr>
<td>Disagree</td>
<td>40%</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>8%</td>
</tr>
</tbody>
</table>
Where did “Neither” go?
5-point Likert scale + “No opinion” – Mode A

- Strongly agree: 13%
- Agree: 28%
- Neither agree or disagree: 21%
- Disagree: 25%
- Strongly disagree: 10%
- No opinion: 3%
4-point Likert scale + “No opinion” – Mode B
Where would “Neither” go?
Where would “Neither” go?
4-point Likert scale (with “No opinion”) – Mode B
4-point Likert scale (without “No opinion”) – Mode D
Where would “No opinion” go?
Where would “No opinion” go?
5-point Likert scale + “No opinion” – Mode A
4-point Likert scale (without “No opinion”) – Mode D

- Strongly agree: 14%
- Agree: 39%
- Neither agree or disagree: 40%
- Disagree: 8%
- Strongly disagree: 3%
- No opinion: 13%
Where did “Neither” and “No opinion” go?
Where did “Neither” and “No opinion” go?
4-point Likert scale
= Forced-choice scale

Allow to differentiate “Neutral” opinion and “no opinion” or “I don’t know”
Allow to differentiate “Neutral” opinion and “no opinion” or “I don’t know”
Research-based suggestions

- Use when respondents are familiar with the topic
  - Include MIDPOINT

- Use when you need an interval scale for statistical analysis
Research-based suggestions

- Use when respondents are familiar with the topic
  - include MIDPOINT
- Use when you need an interval scale for statistical analysis
  - include MIDPOINT
- Use when respondents are unfamiliar or uncomfortable
  - exclude MIDPOINT
- Tendency to use midpoint as a dumping ground
  - exclude MIDPOINT
Research-based suggestions

Use when respondents are familiar with the topic

Use when you need an interval scale for statistical analysis

include MIDPOINT

Add
“I don’t know” or “Not applicable”

Use when respondents are unfamiliar or uncomfortable

exclude MIDPOINT

Tendency to use midpoint as a dumping ground
Ascending order or descending order of response options
Response order

Ascending Order
Strongly Disagree - Disagree - Neutral - Agree - Strongly Agree

Descending Order
Strongly Agree - Agree - Neutral - Disagree - Strongly Disagree
Response order

Ascending Order
Strongly Disagree - Disagree - Neutral - Agree - Strongly Agree

Descending Order
Strongly Agree - Agree - Neutral - Disagree - Strongly Disagree
Research shows

- *Friedman et al. (1994)*
- Asked 208 college students to rate their attitudes towards college
- Randomly assigned to one of the two questionnaires (w/different response orders)
- 10 item paper survey using a 5 point Likert-scale
- Students’ average rating from the descending order scale was significantly more positive than the one from the ascending order scale.
Research shows

- Maeda (2015)
- Web Survey of 1,653 US Adults
- Randomly assigned to one of the questionnaires with different response orders
- 15 item Power of Foods Scale
- There was a significant difference between the ascending and descending groups
- The descending ordered group’s mean shifted 3.3% higher
Research shows

- Hartley and Betts (2010)
- 465 adults in the UK (academic writers, reviewers)
- Randomly assigned to one of the four conditions (different response orders)
- Asked to rate an abstract using one of the four 11-point scales

<table>
<thead>
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<th></th>
<th>Clear</th>
<th>10 9 8 7 6 5 4 3 2 1 0</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Clear</td>
<td>10 9 8 7 6 5 4 3 2 1 0</td>
<td>Unclear</td>
</tr>
<tr>
<td>2.</td>
<td>Clear</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Unclear</td>
</tr>
<tr>
<td>3.</td>
<td>Unclear</td>
<td>10 9 8 7 6 5 4 3 2 1 0</td>
<td>Clear</td>
</tr>
<tr>
<td>4.</td>
<td>Unclear</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Clear</td>
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Which one generated the highest average score?
Research shows

- Hartley and Betts (2010)
- 465 adults in the UK (academic writers, reviewers)
- Randomly assigned to one of the four conditions (different response orders)
- Asked to rate an abstract using one of the four 11-point scales
- #1 scale generated the most positive score

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<tr>
<td>1</td>
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<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Unclear</td>
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</table>

Which one generated the highest average score?
Response bias associated with descending order

- Primacy effect
- Left-side selection bias
- Acquiescence bias (yea-saying bias)
- Social desirability bias
- Satisficing

Descending Order

Strongly Agree - Agree - Neutral - Disagree - Strongly Disagree
Response bias associated with descending order

- Primacy effect
- Left-side selection bias
- Acquiescence bias (yea-saying bias)
- Social desirability bias
- Satisficing

Descending Order

Strongly Agree - Agree - Neutral - Disagree - Strongly Disagree

Inflated survey results

I see this first...

Sure, that sounds good...

I want to say Yes than No...

I don’t want to be mean...

I don’t want to be mean...
Research-based suggestions?

- Use ascending-ordered scales to avoid inflated survey results

  *Strongly Disagree - Disagree - Neutral - Agree - Strongly Agree*

- Use descending-ordered scales (and interpret the data) with caution

  *Strongly Agree - Agree - Neutral - Disagree - Strongly Disagree*
Research-based suggestions?

Nicholls, Orr, Okubo, and Loftus (2006)

Descending response order
Strongly Disagree - Disagree - Neutral - Agree - Strongly Agree

Ascending response order
Strongly Agree - Agree - Neutral - Disagree - Strongly Disagree

average
To generate an average score?

Q1. Do you think you are fairly compensated for the quality of your work?
   Yes - Probably yes - Probably no - No

Q2. I have a good relationship with my coworkers.
   SD - D - N - A - SA

Q3. Do you have resources to do your job well?
   Not enough - Maybe - Enough
To generate an average score?

Q1. I am fairly compensated for the quality of my work.
SD - D - N - A - SA
Q2. I have a good relationship with my coworkers.
SD - D - N - A - SA
Q3. I have resources to do my job well.
SD - D - N - A - SA

Q1. I am fairly compensated for the quality of my work. Not at all - A little bit - Somewhat - Quite a bit - Very much
Q2. I have a good relationship with my coworkers. Not at all - A little bit - Somewhat - Quite a bit - Very much
Q3. I have resources to do my job well. Not at all - A little bit - Somewhat - Quite a bit - Very much
Extreme Makeover – Survey Edition
Resources (you can download the files)

References:
https://drive.google.com/file/d/1mnj7lpUC8Qg1z4LFpHBqCFk3Uv9aG4kt/view?usp=sharing

Extreme Makeover - Survey Edition (Questionnaire):
https://drive.google.com/file/d/1wu22vnPzA1YUVkl9IipfpKtUbdTarsGH/view?usp=sharing

Extreme Makeover - Survey Edition (Answer):
https://drive.google.com/file/d/1WjheKV-2vqlPkyAAIBk4EUFj2Ka0mail/view?usp=sharing
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Chyung et al.’s evidence-based survey design articles