Sometimes it’s not right or wrong:
Using split ballot testing to evaluate how to best measure health knowledge questions

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Measuring knowledge

- Find out what R knows
- Objective criteria
- There is a correct answer
- Not feelings or beliefs
- Rs will answer
Response choice options make a difference
Open-ended response

In what year was the United Nations founded?

______________________________ (please write in)
Ranges

In what year was the United Nations founded?

☐ in the 1920’s
☐ in the 1930’s
☐ in the 1940’s
☐ in the 1950’s
In what year was the United Nations founded?

- 1850
- 1900
- 1945
- 1969

- 1942
- 1945
- 1947
- 1949

- 1919
- 1945
- 1951
- 1957
Are health knowledge questions different?

- Often complex topics
- Benefits and risks
- Numeracy issues
Some health questions simple

What type of cancer does mammography screen for?

- Colon cancer
- Cervical cancer
- Lung cancer
- Breast cancer

How do most colon cancers start?

- As a tear in the colon
- As a polyp in the colon
- As a result of constipation
- As a hemorrhoid
Some are a little harder

If 100 women with early stage breast cancer are treated with lumpectomy and radiation, about how many will have breast cancer come back in the treated breast in the 10 years after treatment?

THE ANSWER IS...

ABOUT 10
Response option choices

OPEN-ENDED
_________ (write in answer)

RANGES
☐ Fewer than 5
☐ 5-15
☐ 16-30
☐ More than 30

CLOSED-ENDED
Please mark the number that you think is closest to the correct answer.
☐ 3
☐ 10
☐ 21
☐ 34
The Experiment
Purpose

• Will people answer open-ended questions?
• How will using “pick the closest answer” work?
• How will the open-ended responses compare to the closed-ended ones?
Study Design

- Split Ballot design (Spring 2009)
- Recruited from a web ad
- ½ web survey & ½ paper survey
- ½ open-ended questions & ½ closed-ended
- Pre-paid incentive ($10/$20)
- Questions about screening for colon cancer, preferences, facts, experiences
Results

- 338 respondents (89% response rate)
- 32% male
- 57% completed college
- 39% over age 50 (mean=49.3 years)

<table>
<thead>
<tr>
<th></th>
<th>OPEN-ENDED</th>
<th>CLOSED-ENDED</th>
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<tbody>
<tr>
<td>Web</td>
<td>83</td>
<td>85</td>
</tr>
<tr>
<td>Paper</td>
<td>84</td>
<td>86</td>
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<tr>
<td>TOTAL</td>
<td>167</td>
<td>171</td>
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The Questions
Question 1: Closed

You may not know the exact number, but please take your best guess. Out of every 100 people, about how many will get colon cancer some time in their lives? Please mark the number that you think is closest to the correct answer.

- □ 2
- □ 6
- □ 14
- □ 24
- □ 43
Question 1: Open

You may not know the exact number, but please take your best guess. Out of every 100 people, about how many will get colon cancer some time in their lives?

_____________ Write in number of people
Question 1

Out of every 100 people, about how many will get colon cancer some time in their lives?

Closed ended: 86 people choice correct option (50.3%)
Open-ended: 41 people wrote in exact number (25.3%)

BUT WE ASKED FOR THEM TO:
Please mark the number that you think is closest to the correct answer.
Please mark the number that you think is closest to the correct answer.

☐ 2  ☐ 6  ☐ 14  ☐ 24  ☐ 43
Question 1

Out of every 100 people, about how many will get colon cancer some time in their lives?

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Correct Answer*</td>
<td>50.3% (n=86)</td>
<td>52.5% (n=85)</td>
</tr>
</tbody>
</table>

- Correct Answer = 6 (range of 4 – 10)
- no difference in mode of administration
- difference between educational levels but not within them
- missing data: closed-ended – none, open-ended - 4 (out of 166)
Question 2

Out of 100 people over the age of 50, about how many have never been tested even once for colon cancer?

- 18
- 32
- 48
- 58
- 75

You may not know the exact number, but please take your best guess…. Please mark the number that you think is closest to the correct answer.
Question 2

Out of 100 people over the age of 50, about how many have never been tested even once for colon cancer?

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<tbody>
<tr>
<td>Correct Answer*</td>
<td>26.9% (n=46)</td>
<td>19.3% (n=32)</td>
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</table>

- Correct Answer = 32 (range of 26 – 40)
- p=.063
f6 indicate in footnote what the range was for open qesiton that was considered correct. Could the tendency toward the closed response be the result of chance?
fjfowler; 13.05.2009
Question 3

Out of every 100 people, about how many will die of colon cancer?

☐ 3
☐ 8
☐ 15
☐ 24
☐ 30
Question 3

Out of every 100 people, about how many will die of colon cancer?

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</thead>
<tbody>
<tr>
<td>Correct Answer*</td>
<td>57.3% (n=98)</td>
<td>53.0% (n=88)</td>
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- Correct Answer = 3 (range of 0 – 5)
- p=.25
Conclusions

• In the health knowledge context, sometimes there are magnitudes of order in being “wrong”
• The open approach is the best way to find out if a respondent knows the answer, without the contamination of enabling respondents to rule out implausible wrong answers and little chance of guesses being right
• The list of numbers (without ranges) seems to produce very similar results (perhaps with slightly higher scores due to guesses)
• Respondents were willing to answer open-ended question in both paper and web version
Thank you