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Question Design during COVID-19

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Organization of Discussion

1. Overview of Collaborating Center for Question Design and Evaluation Research (CCQDER) program
2. COVID-19 Question Evaluation Studies
 - a. Cognitive Interviews
 - b. Research and Development Survey (RANDS)
3. Lessons Learned and Take-Aways

Overview of CCQDER program

Goals for Question Evaluation

- How do the respondents understand the survey question?
- Do respondents understand the survey question differently?
- Does the question mean the same in all culture and socio-economic groups that it is asked? In the same languages?

Goals for Question Evaluation (cont.)

- To what extent are the data elicited from the question a true representation of what we need to know?
- In what ways is our picture distorted because the questions do not accurately capture the intended construct?
- What important discovery are we not making because we are unaware that our picture is distorted?

CCQDER Program

1. Methodological Research Program

- Study of the question response process in relation to data quality

2. Questionnaire Design Research Lab

- Question development and testing projects

3. Question Evaluation Applications

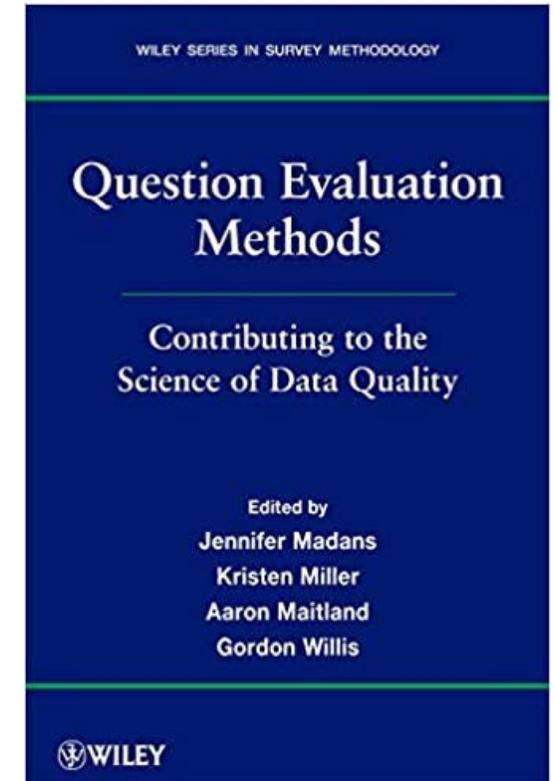
- Q-Bank: Online library of question evaluation findings

Topic Examples from Past CCQDER Cognitive Interviewing Studies

- Vaccine acceptance
- Blood donor screening
- Opioid use, misuse, and disorder
- Disability
- Sexual Identity

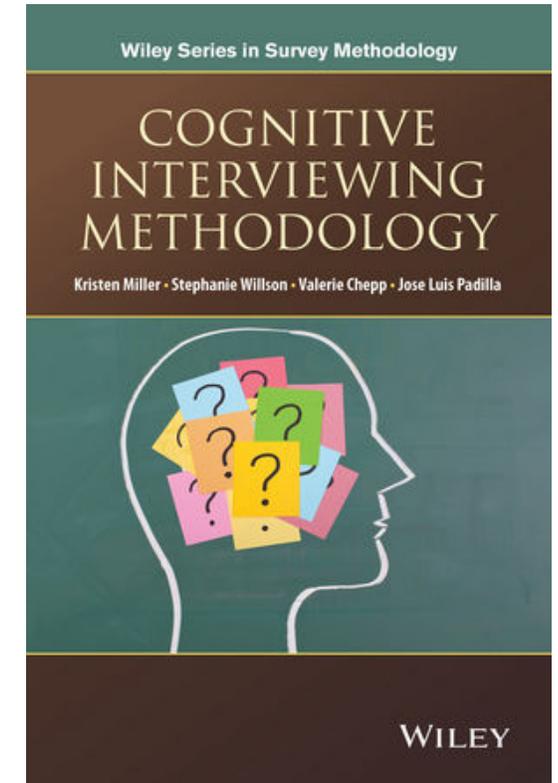
NCHS Evaluation Methods

- Cognitive Interviewing
- Experimental Design and Embedded Probing with the Research and Development Survey (RANDS)
- Ethnographic Methods: In-depth interviewing, Free Lists, Card Sorts
- Focus Groups
- Interviewer Debriefing
- Usability Testing



Cognitive Interviewing at NCHS

- First cognitive laboratory, 1980s
- Scientific study
 - Systematic analysis
 - Data quality
 - Maintenance of data
 - Transparency
 - Documentation
- Cognitive interviewing as validation
- Research and Development Survey (RANDS)
 - Mixed Method



Analytic Goals of Cognitive Interviewing Studies

- Cognitive Testing: Conducting interviews to “look for problems”
- Construct Validity Study: Identifying the constructs captured by individual questions by identifying the specific **phenomena that account for respondents’ answers**
- Comparability Study: Determining whether constructs are **consistently captured across salient respondent groups**

Research and Development Survey (RANDS)

- Mixed Method
 - Cognitive Interviewing + Web Panel Survey Data
 - How much error? In what demographic groups?
- Embedded Construct and Error Probes
 - “When answering the last question, were you thinking about X, Y or Z?”
- Experimental Design
 - Tests different versions of questions

COVID-19 Question Evaluation Studies

Context of COVID-19 Pandemic

- Normal life dramatically changing
- Conflicting understandings of the virus
- New vocabulary (social distance, quarantine, mask mandates)
- Need for fast data collection
- New questions
- Old questions become new with new context

COVID-19 Question Evaluation Studies

Cognitive Interviews



COVID-19 Cognitive Interviewing Study Methodology

- Qualitative, in-depth, 1-hour interviews
- Conducted virtually (Zoom)
- Administer survey question, follow-up probing
- Interviews took place between Sept. and Nov. of 2020
- 50 completed
- Purposive sample design
 - Never been tested
 - Tested negative
 - Tested positive

Sample Composition: Demographics (n = 50)

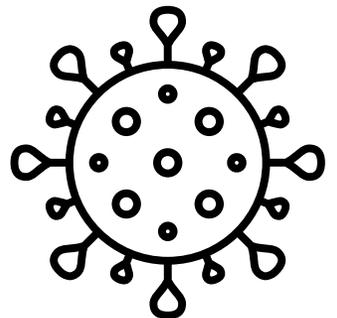
Gender	Number
Women	30
Men	18
Non-identified	2
Race/Ethnicity	
Hispanic	3
Non-Hispanic (NH)	47
NH-black	21
NH-white	24
NH-Asian	2
NH-Native American/Alaska Native	1
Missing	2

Sample Composition: Demographics (cont.)

Age in Years	Number
18 - 30	12
31 - 40	10
41 - 50	11
51 - 60	4
Over 60	13
Education	
High school diploma or less	8
Some college, no degree	11
2- or 4-year college degree	18
Post graduate degree	13

Question Topics

- COVID-19 related work and health insurance interruption
- Access to health care, including telehealth (telemedicine)
- Symptoms
- COVID-19 Testing
 - Type of test
 - Results
 - Quarantine before or after testing
- Psycho-social effects of pandemic



Key Findings

1. Pandemic frames question intent
2. Fitting new phenomenon into existing frameworks
3. Evolving timeline of the pandemic
4. New vocabulary or new meanings for existing vocabulary

1. Pandemic Frames Question Intent

- Even for those that were not meant to be related to COVID-19

Pandemic Frames Question Intent Example

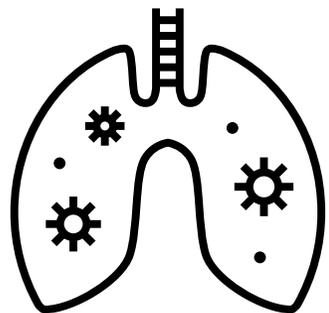
Which of the following symptoms have you had at any point in time since March 1, 2020?

- Fever or chills
- Cough
- Shortness of breath
- Sore throat
- Headache
- Muscle or body aches
- Runny nose
- Fatigue or excessive sleepiness
- Diarrhea, nausea, or vomiting
- Loss of sense of smell or taste
- Itchy/red eyes
- None of the above

Pandemic Frames Question Intent Example—Effects

- Intent is to capture any and all symptoms
- Many reported only symptoms judged to be caused by COVID-19
- Understood as a prevalence question

“I would have thought that it was asking literally, have I felt those things. But maybe I also would have been self-conscious because, like, I know that [my symptoms are] not [all] COVID-19-related [some are pregnancy related]...I would have thought the question was trying to determine whether or not I might have had COVID-19 and just not known it?”



2. Fitting New Experiences into Existing Frameworks

- New organizational structures for healthcare delivery and new types of healthcare workers

Fitting New Experiences into Existing Frameworks

Example

Has a doctor or other health professional ever told you that you had or likely had Coronavirus or COVID-19?

Yes

No

Fitting New Experiences into Existing Frameworks

Example—Effects

Who Counts?

- Some healthcare workers excluded
 - Contact tracers
 - Staff at drive-up testing sites (“It was just the testing site I went to. I am not sure if they are doctors or not.”)



3. Evolving Timeline

- Knowledge and experiences have undergone changes over the course of the pandemic
- Judgments must be made on which timeframe to consider

Evolving Timeline Example 1

Did you seek medical care for Coronavirus or COVID-19?

Yes

No

Evolving Timeline Example 2

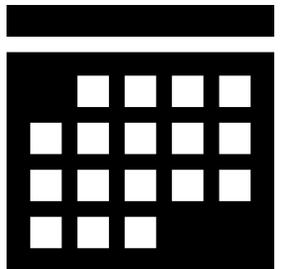
Do you suspect that you have ever had the Coronavirus or COVID-19?

- Yes
- No

Evolving Timeline Example 1 & 2—Effects

Answers are Contingent on Timeline

- They may have sought medical care, but at the time they did not think it was for COVID-19—until they tested positive
- They may have originally suspected they had COVID-19—until they tested negative
- Do they answer based on their understandings prior to or after testing?



Evolving Timeline Example 1 & 2—Effects (cont.)

False Negative Examples for “Seek Medical Care”

- “I thought it was just like a cold, or a flu, or a stomach virus or something. I did not know about all the symptoms of coronavirus.”
- “When I went to seek medical care, I wasn’t feeling well, but I assumed it was cold and sinus. I didn’t go thinking I had COVID-19.”

False Negative Example for “Ever Suspect”

- “Now I don’t, because I tested negative for it. I mean I thought I did [have COVID-19], but I tested negative for it. So, obviously I didn’t.”

4. New Vocabulary or New Meanings for Existing Vocabulary

- New vocabulary
 - Telemedicine
 - Social distancing
- New meanings for existing vocabulary
 - Pandemic
 - COVID-19 Testing
 - Employment status
 - Quarantine

New Vocabulary or New Meanings for Existing Vocabulary Example

Have you isolated or quarantined yourself because of the Coronavirus?

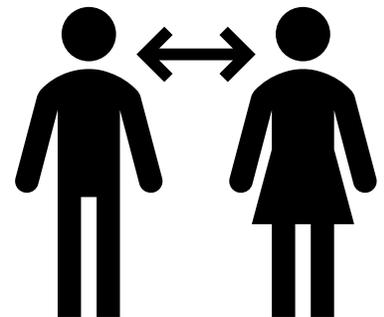
Yes

No

New Vocabulary or New Meanings for Existing Vocabulary Example—Effects

Quarantine

- Familiar word, but has taken on new meaning
 - Strict medical definition
 - Definitions correspond to new norms of pandemic-appropriate behavior
 - mask wearing
 - hand washing
 - staying home when possible
 - social distancing



New Vocabulary or New Meanings for Existing Vocabulary Example—Effects (cont.)

False Positives

- “I was isolated or quarantined because of the fact that we asked everyone to not come into the office and work remotely as we figure this out.”
- “Me and my husband, as things completely shut down, we stayed in our house. We didn’t go out anywhere unless we unfortunately had to get some groceries or some important stuff. For the most part we wore face coverings and stayed inside.”
- “Only leaving the house when necessary, consistently washing my hands and making sure I’m clean, and wearing a face mask when I do exit the house.”

COVID-19 Question Evaluation Studies

Research and Development Survey (RANDS)



What is RANDS?

- Research and Development Survey
- Ongoing, periodic set of commercial panel surveys conducted by Gallup and NORC on behalf of the National Center for Health Statistics (NCHS)
- Designed for methodological purposes
 - Measurement error: supplement survey and questionnaire evaluation efforts
 - Estimation: explore ways to integrate data from commercial survey panels with high-quality data collections

What are panel surveys?

- Group of potential survey respondents maintained by private companies (e.g., Gallup, NORC, IPSOS)
- Panelists can be recruited passively using a non-probability sample (opt-in) or actively based on statistical sampling (recruited)
- Limitations compared to in-person household surveys
 - Lower sample size
 - Non-response bias
 - Coverage bias

RANDS during COVID-19 Methodology

- Special iteration of RANDS to respond quickly to survey needs during the pandemic
 - Question development and evaluation
 - Public release of a limited set of coronavirus-related estimates (<https://www.cdc.gov/nchs/covid19/rands.htm>)
- Conducted using NORC's AmeriSpeak Panel, as well as a supplementary sample using the opt-in Dynata Panel (in the first two rounds)
- To date, three rounds of RANDS during COVID-19 have been conducted
 1. June 2020, n=6,800 AmeriSpeak + 6,220 opt-in
 2. August 2020, n=5,981 AmeriSpeak + 5,502 opt-in
 3. May – June 2021 (Currently being fielded)

Using Panel Surveys for Question Evaluation Allows NCHS to...

- Directly compare similar questions
- Statistically analyze subgroup differences

Comparing Similar Questions using RANDS during COVID-19

- When deciding between two approaches to asking about a topic, it is useful to be able to administer both and compare them head-to-head
 - Often referred to as a “split ballot” or “split questionnaire” experiment
- The RANDS program provides an opportunity to conduct these experiments in a timely manner.
- For example: COVID-19 Testing
 - Qualitative data from the first round of RANDS during COVID-19 and the cognitive interviews indicated some mis-interpretation of what it meant to “be tested for COVID-19”
 - Some people appeared to include things like temperature checks...

RANDS during COVID-19 Round 2: Versions of COVID-19 Testing Question

Version 1

“Have you ever been tested for Coronavirus or COVID-19?”

Version 2

“Have you ever had a test to determine if you were infected with Coronavirus or COVID-19 at the time of the test?”

AND

“Have you ever had an antibody test to determine if you had Coronavirus or COVID-19 in the past?”

- No difference in the prevalence of testing across the versions
 - Version 1: 22.2%
 - Version 2: 22.3 %

RANDS during COVID-19 Round 2: COVID-19 Testing Probe

- All respondents who indicated that they had received a test were administered a close-ended probe:

What kind of Coronavirus test did you receive? (Select all that apply)

1. A cotton swab up the nose
2. A cotton swab through the mouth and into the throat
3. Saliva spit into a vial
4. A blood test to check for antibodies
5. A temperature check for a fever
6. Assessment of physical symptoms, for example, cough, chills, and aches
7. Some other way, please specify

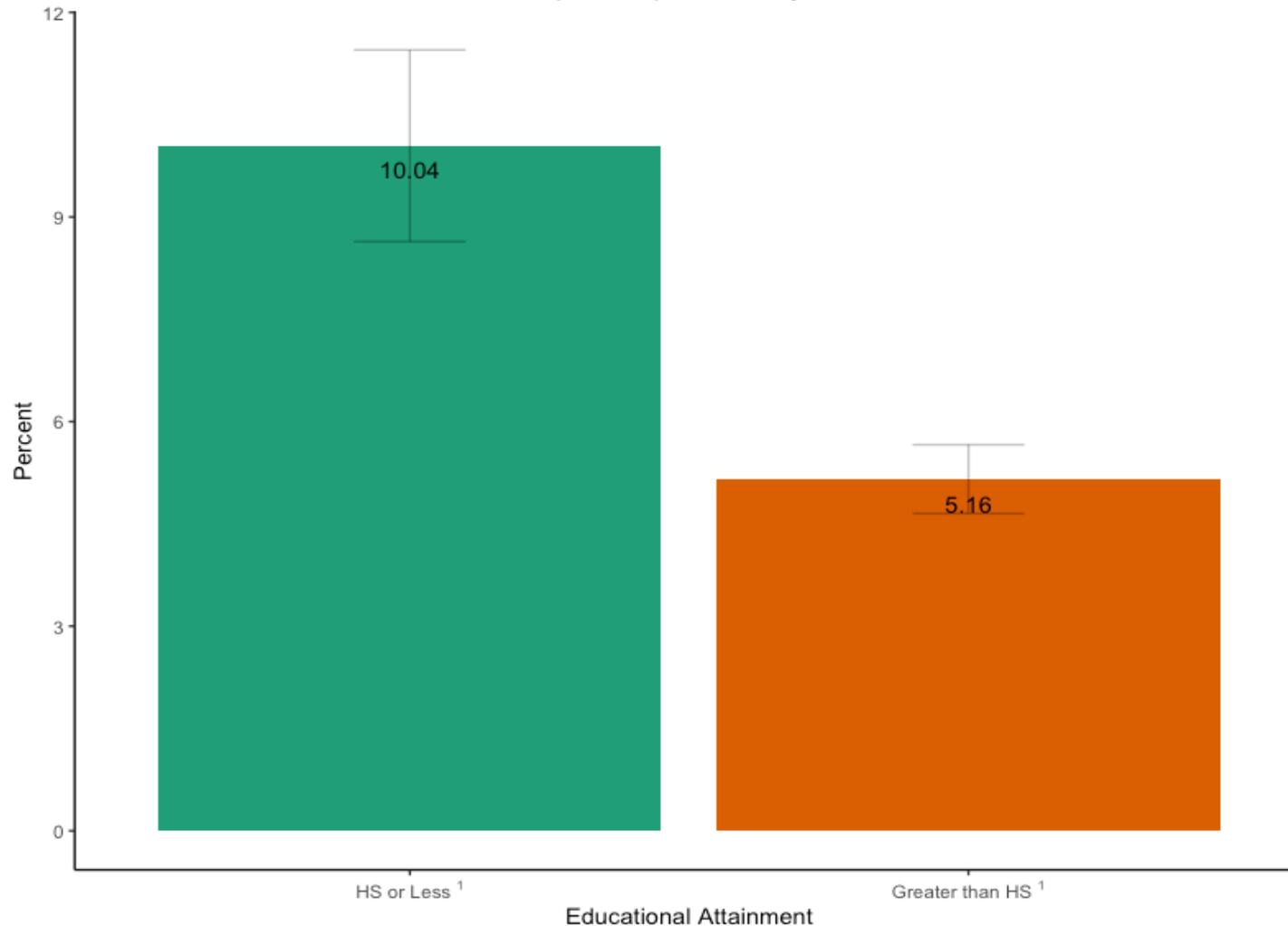
RANDS during COVID-19 Round 2: Test Probe Results

- No difference in prevalence of the two out-of-scope interpretations across the two question versions
 - Version 1: 6%
 - Version 2: 7%

Subgroup Analysis using RANDS during COVID-19

- Important to understand whether different groups of people respond to questions differently
 - If so, can lead to uneven distribution of measurement error
- Cognitive interviewing allows for some subgroup analysis, but using a survey like RANDS allows for statistical analysis
- Certain subgroups that we tend to always focus on (education, age, race/ethnicity, gender), but wide range of variables available on panel surveys gives us more flexibility when needed
 - For example, geographic region and urban/rural when evaluating the COVID-19 testing data

Unweighted Percent of Respondents Who Tested for COVID-19 & Used Out-Of-Scope Interpretation by Educational Attainment

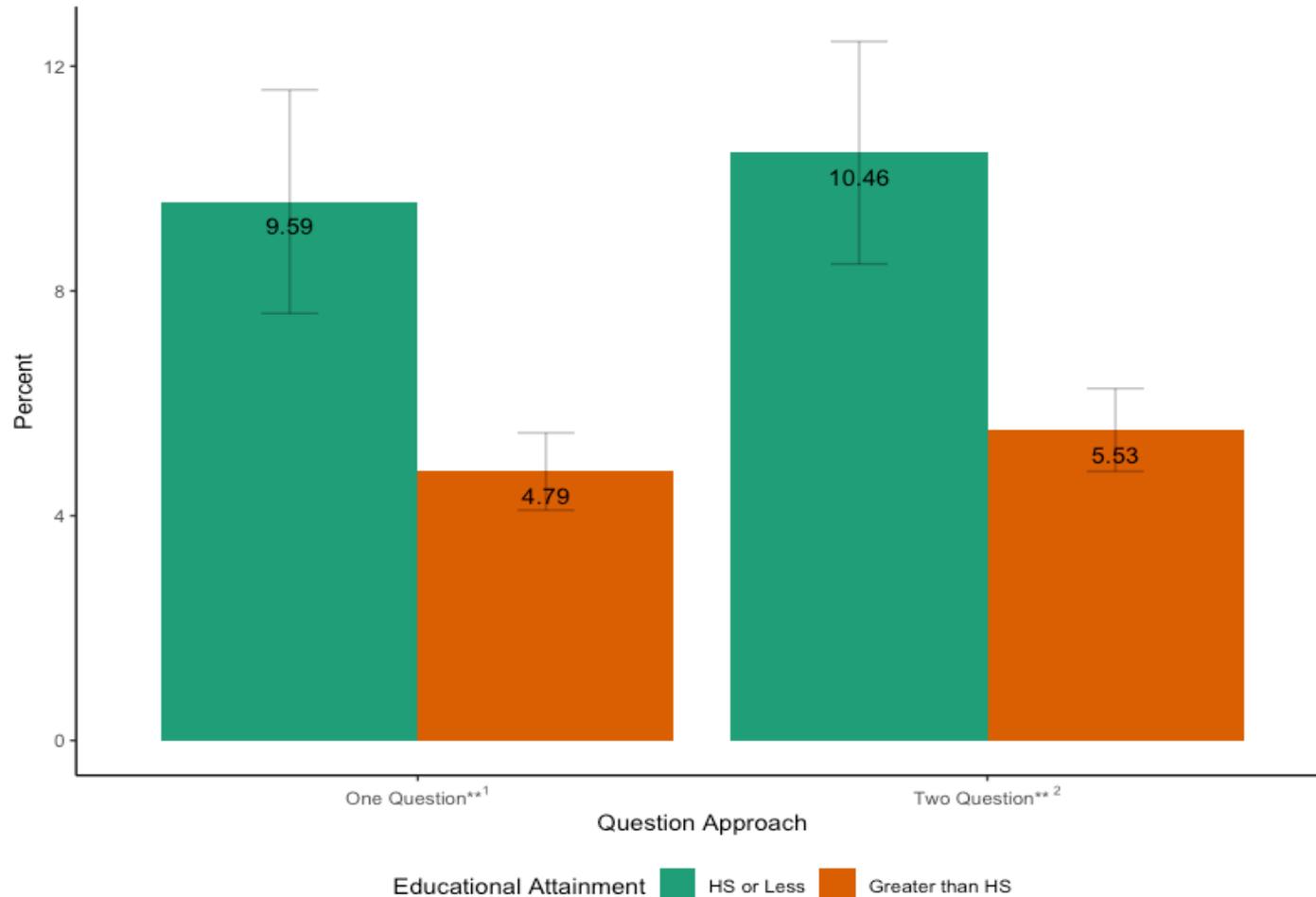


1. Significant differences between educational attainment groups, $\chi^2(1, 2540) = 16.48$, $p < 0.001$

NOTES: Percentages shown are of the total number of respondents who answered that they were tested for COVID-19 and received the probe question, $n = 2,378$. Error bars show one standard error of the mean. Results are preliminary; a full report is forthcoming and will be available on NCHS' Q-Bank.

SOURCE: National Center for Health Statistics, RANDS during COVID-19 Round 2, 2020

Unweighted Percent of Respondents Who Tested for COVID-19 & Used Out-Of-Scope Interpretation by Question Approach and Educational Attainment



1. Significant difference between education groups within the respondents who received the one-question version, $\chi^2(1, 1262) = 8.21, p = 0.006$.

2. Significant difference between education groups within the respondents who received the two-question version, $\chi^2(1, 1278) = 8.16, p = 0.006$.

NOTES: Percentages shown are of the total number of respondents who answered that they were tested for COVID-19 and received the probe question, within each version of the questionnaire. Error bars show one standard error of the mean. Tests of association using chi square test; P-value $<0.01 = **$. Results are preliminary; a full report is forthcoming and will be available on NCHS' Q-Bank.

SOURCE: National Center for Health Statistics, RANDS during COVID-19 Round 2, 2020

Lessons Learned and Take-Aways

Conclusions

- A good question is
 1. Relevant to the research agenda
 2. Relevant to each potential respondent's experience and knowledge
- The shifting context of the pandemic affects question performance
- Question evaluation studies ensure that intended constructs are captured for all respondent groups

Lessons Learned for Rapid Response

- Integrate data collection with question evaluation
 - To interpret data correctly
 - To improve questions for the next round
- Leverage mixed-methods
- Use post-survey question evaluation

Q-Bank

<https://wwwn.cdc.gov/qbank>

Report: Cognitive Testing Evaluation of Survey Questions on COVID-19

Questions?

- Please submit your questions via the Q&A feature in the Zoom application
- The facilitator will address questions as time allows. Questions not answered may be forwarded to paoquery@cdc.gov

<https://www.cdc.gov/nchs>

<https://www.cdc.gov/nchs/ccqder>

<https://wwwn.cdc.gov/qbank>

<https://www.cdc.gov/nchs/rands>