

## Reducing measurement error

... by writing better questionnaires

## Layers of complexity

### **Overall structure**

Interview as conversation

### **Component questions**

1. Wording of query and response choices.
2. Order of questions & response choices.

## Conversation

Principles that structure the exchange of information between people in a conversation

- a. speakers should not say things they believe to be false (*truthful*)
- b. speakers should make comments that are relevant to the purposes of the conversation (*relevant*)
- c. speakers should make their contributions as informative as possible (*informative*)
- d. speakers should express themselves as clearly as possible (*clarity*)

Meanings depend upon what has been said before, and mutual understandings (*contextual*)

## Conversation

*Truthful, relevant, informative, clarity, contextual*

- Make it easy to answer truthfully (e.g., stretch response categories)
- Group related questions
- Provide instructions where relevant
- Recognize trade-offs between making it easy and making it boring
- Reliability checks can be built in with different wording and in different parts of the questionnaire

## Conversation

Only ask “relevant” questions

Why ask a question?

- You want to know the answer
- Contributes to flow (screening questions)
- You want respondent to think about the answer

## Introduction (contact protocol)

Convince that participation is useful, allay concerns about confidentiality

- Organization or agency conducting the study
- Relationship with potential respondent
- Objectives and their significance to respondent
- Basis for sample selection
- No right or wrong answers
- If interviewer, state name
- Time estimate OR return instructions

I \_\_\_\_\_ calling from Customer Insights Research, a national market research firm, on behalf of a team of researchers from North Carolina State University who are studying the impact of gypsy moths and evaluating public programs to control this insect pest. Last year, there was an outbreak of gypsy moths in your area, and I would like to ask a few questions about how this affected your household. We obtained your number from a random list of phone numbers for your area. We will use everyone's responses to this survey to estimate the total impact of gypsy moths; your individual responses will be completely confidential. Of course, you do not have to participate, but we would really appreciate your help. It will take about 10 minutes to answer my questions.

1. Are you willing to participate in the survey?  Yes  No (If no, attempt to schedule, or terminate.)

2. Are you 18 years or older?  Yes  No (If no, ask to speak with adult, attempt to schedule with adult, or thank and terminate - T&T.)

3. What community do you live in? \_\_\_\_\_ (this could be a town, township, neighborhood, borough, village, development, or any other designation for local area)

3a. What is your zip code?

4. Do you live in a single family home? (This includes any type of structure with just one household)

YES [SKIP TO 5]  NO  DK  REF

4a. What type of building do you live in? [READ]

Duplex (two homes in same structure)

Apartment building

Other

DK

## Initial questions

- Related to subject matter
- Applicable to everyone
- Relatively easy to answer
- Stimulate interest

without offending, threatening, confusing, or boring the respondent

Behaviors or attributes, rather than attitudes or beliefs



## 2009 North Carolina Hunting and Inland Fishing Survey

This survey deals with wildlife and inland fisheries management in North Carolina. We need your input to help set goals and decide how to handle rising costs of management. *You do not have to consider yourself a serious hunter or angler in order to fill out this survey. We are interested in everyone's responses.*

1. Do you consider yourself (check one)
  - Primarily an angler
  - Primarily a hunter
  - Both a hunter and an angler
  - Not an angler or a hunter
  
2. How satisfied are you with the way the Wildlife Resources Commission manages **wildlife** in North Carolina? (check one)
  - Very Satisfied
  - Satisfied
  - Neutral
  - Unsatisfied
  - Very Unsatisfied
  - Unsure

### START HERE

1. Do you own woodlands in Duplin, Halifax, Northampton, Robeson, Sampson, and Warren counties in North Carolina or in Brunswick County, Virginia? Please answer by crossing in the box (  )

1 Yes → Please go to Question 2

2 No → Cross all that apply to you:

- 1 I sold my woodland
- 2 I cleared my woodland
- 3 I never owned woodland
- 4 Other: \_\_\_\_\_

Please return this survey in the enclosed stamped envelope. Thank you!

2. How many acres of woods do you own in these counties?

County	Acres
a. Duplin County, NC	_____
b. Halifax County, NC	_____
c. Northampton County, NC	_____
d. Robeson County, NC	_____
e. Sampson County, NC	_____
f. Warren County, NC	_____
g. Brunswick County, VA	_____

**North Carolina Private Landowner  
Conservation Programs Questionnaire**

**The following questions concern your land ownership in North Carolina. Please answer them to the best of your ability.**

1. How many acres do you OWN, LEASE IN or LEASE OUT in **North Carolina**? (Fill in the blanks)

Number of acres OWNED: \_\_\_\_\_ acres

Number of acres LEASED IN: \_\_\_\_\_ acres

Number of acres LEASED OUT: \_\_\_\_\_ acres

2. Of the land listed in the previous question, what is the acreage for which you are the PRIMARY DECISION MAKER? (Fill in the blank) \_\_\_\_\_ acres

3. Is the land you own used to generate income?

No (if "No", please skip to question 7)

Yes (if "Yes", please continue to question 4)



4. Is the income you generate from your land your primary source of income?  
(Check one)

No

Yes

Unsure

1. Are you willing to participate in the survey?  Yes  No (If no, attempt to schedule, or terminate.)

2. Are you 18 years or older?  Yes  No (If no, ask to speak with adult, attempt to schedule with adult, or thank and terminate - T&T.)

3. What community do you live in? \_\_\_\_\_ (this could be a town, township, neighborhood, borough, village, development, or any other designation for local area)

3a. What is your zip code?

4. Do you live in a single family home? (This includes any type of structure with just one household)

YES [SKIP TO 5]  NO  DK  REF

4a. What type of building do you live in? [READ]

Duplex (two homes in same structure)

Apartment building

Other

DK

REF

5. Have you lived in your home for at least one year (since April of 2007)?

YES

NO/DK/REF [T&T]

6. Do you rent or own your home?

Rent

Own

1.1 Data \_\_\_\_\_ 1.2 Entrevistador \_\_\_\_\_ 1.3 Nome do Entrevistado (1) \_\_\_\_\_

2.1 Dados das famílias

Nome (Começa com mãe e pai; marque entrevistados com *)	Sexo	Filho do casal principal?	Idade Completa (anos)	Se <20, estudou no ano passado?	Estudou até qual série?	Sabe fazer contas?	Fez tratamento médico no último ano?	Qtos dias na rede no ano passado?	Qtos dias no hospital no ano passado?	Sofreu qtas gripes ou pneumonias?
1.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
2.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
3.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
4.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
5.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
6.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
7.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
8.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
9.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
10.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
11.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
12.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
13.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
14.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			
15.	M F	Sim Não		Sim Não		Sim Não	Com. Fora Não			

*Só precisa do primeiro nome ou apelido. "O ano passado" significa agosto 2005 a julho 2006. Se não souber a idade, pergunte se é menos de 16, 16-60, ou mais de 60. No ano passado, quando a escola estava funcionando, estudou? Sabe manter contas a respeito de receitas e despesas (por exemplo, com comércio local). Teve que fazer algum tratamento médico ou fez alguma consulta no ano passado, aqui na comunidade e/ou em outro lugar? Quantos dias no ano passado esteve tão doente que não saiu da rede? Quantos dias ficou internado em um hospital para tratamento médico no ano passado? No ano passado, quantas vezes teve alguma IRA (pneumonia, ou gripe ou resfriado forte, com tosse, dificuldade para respirar, chiado no peito, e dor de garganta)? Escrever 0 se não houve dias na rede, no hospital, ou com IRA.*

# Last questions

On sensitive topics

– By convention, income

Venting question

What constitutes a completed interview?

Make sure last questions are seen last.

## Question construction

All respondents should

- Interpret the same way
- Be able to respond accurately
- Be willing to answer

## Judging questions

- **Reliability -- Do all respondents interpret the question in the same way?**
- **Validity -- Does the question elicit the response we require?**

## Question construction

1. Does the question you have proposed require an answer?
2. To what extent do survey recipients already have an accurate ready-made answer for the question they are being asked to report?
3. Can people accurately recall and report past behaviors?
4. Is the respondent willing to reveal the requested information?
5. Will the respondent feel motivated to answer each question?
6. Is survey information being collected by more than one mode?
7. Is changing a question acceptable to the survey sponsor?

## Types of questions

1. *Open-ended*: No answer choices are offered. (Best when there are many possible, precise, and not sensitive answers)
2. *Close-ended with ordered response categories (interval and ordinal scales)*: Answer choices are offered and form a continuum which a respondent must place her/himself on (e.g. likert scale; very sensitive to mode)
3. *Close-ended with unordered response categories (nominal scale)*: Answer choices do not form a continuum of choices (often require most cognitive effort)
4. *Partially close-ended*: Respondents have answer choices and can offer their own open-ended answer (usually associated with #3, results can be difficult to interpret).

## Potential problems

- 1. Vaguely worded questions and responses.
- 2. Abbreviations or jargon.
- 3. Too much precision.
- 4. Bias from slanted introduction.
- 5. Bias from unequal comparison.
- 6. Bias from unbalanced response choices.
- 7. Bias from tone of the question.
- 8. Objection to providing information.
- 9. Objectionable statements.
- 10. Questions that are too difficult.
- 11. Doubled-barreled questions.
- 12. Answers are not mutually exclusive.
- 13. Assumes too much knowledge.
- 14. Inaccurate statements.
- 15. Inappropriate time references.

*Good advice, taken literally, often turns out to be bad advice*

## Trade-offs

- Clarity vs. Short & simple
- Short & simple questions vs.  
Number of questions
- Number of questions vs. skip patterns
- White space vs. number of pages

## Avoid

- Leading
- Double-barreled
- Confusing
- Auto-pilot
- Missing

## Literacy

1997 estimates for adults in NC

22% Level 1

30% Level 2

Cannot

- Integrate or synthesize information from complex or lengthy passages containing conditional information, or from long dense text with no headings.
- Perform multiple operations from two or more given numbers or from information on numbers appearing in numerical displays.

## Reading level

Flesch Reading Ease

$$206.835 - (1.015 \times \text{ASL}) - (84.6 \times \text{ASW})$$

Flesch-Kincaid Grade Level

$$(.39 \times \text{ASL}) + (11.8 \times \text{ASW}) - 15.59$$

where:

- ASL = average sentence length (the number of words divided by the number of sentences)
- ASW = average number of syllables per word (the number of syllables divided by the number of words)

## Order effects

Addition and subtraction

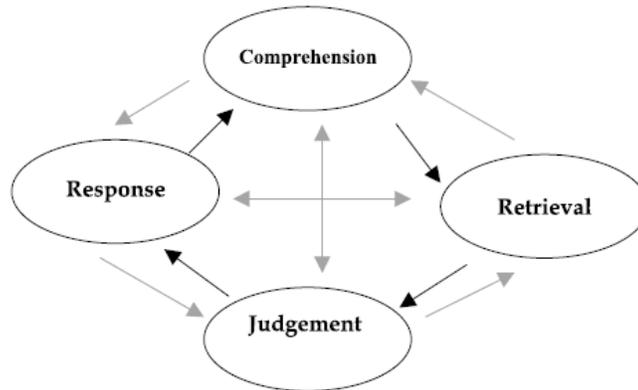
Anchoring

Primacy and recency

Norm of even-handedness

Numbers (larger associated with better)

## Cognitive model of response



## *Comprehension*

What am I being asked to do?

Cognitive

- Where is the question on this page?
- Where are the answer choices?
- In what order do I read this information in front of me?
- Carry-over and back five effects.

Motivational

- What's the question; how hard is it to figure that out?
- Is a question actually stated in plain English?
- How many parts does it have?
- Do I have to go somewhere else to figure out exactly what is being asked?
- How hard is it to find that information?
- Is a question even being stated?

## *Retrieval*

Okay, now I understand the question.

- Can I provide an answer from memory?
- Do I need to check some records? Where are they?
- Easier when prior questions required retrieval of information on same topic.

## *Judging*

Okay, this is a satisfactory answer; it's close enough.

(Or) No, we've got to have this exact ...

- Do units of measurement have to be converted?
- Have I already answered this question?  
(Addition and subtraction effects.)
- Where do I anchor on a scale?
- Judgmental hueristics

## *Reporting*

Where do I provide the answer on this page?

Is it clear where an answer is supposed to go?

“Formatting and editing”