

Global Versus Decomposed Questions: How Does Decomposing a Global Utilities Expense Question Impact Data Quality and Respondent Burden?

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Motivation

- Some survey questions measure complex concepts or require technical information to help the respondent answer
- Features to communicate complexity, reduce measurement error and improve data quality include:
 - Definitions
 - Examples
 - Modifiers to cue respondents on the threshold for report
 - Did you do ANY work for pay, EVEN FOR AS LITTLE AS ONE HOUR?
- But, in web surveys, these features can overwhelm the screen

Global vs. Decomposed Questions

Global

In 2024, what was your total household income before taxes?

Decomposed

What amount did [you/person] receive in wages, salary, commissions, bonuses, or tips in 2024?

What amount did [you/person] receive in interest or dividends in 2024?

What amount did [you/person] receive in Social Security in 2024?

Global Utilities Question

How much did this household pay for electricity, gas, basic telephone service, and other utilities in November?

Other common examples of utilities include water, heating oil and wood, trash or recycling, and mobile telephone service (excluding data, applications, games, and ringtones.) Do not include cable TV or internet.

Decomposed Version – Two Steps

1. Enter Types of Utilities

Which of the following types of utilities does your household pay?
Select all that apply.

☒ Electricity

☒ Natural gas

☒ Water and sewer

☐ Basic or mobile telephone service

☐ Heating oil or wood

☐ Trash and recycling

2. Enter Amounts Paid in November

Please enter how much this household paid for each of the following types of utilities in November.

Electricity \$.00

Natural gas \$.00

Water and sewer \$.00

Census Bureau Research Panel

- Nonprobability sample of ~30,000
- Recruited from Census Household Pulse Survey (HPS) respondents who agreed to be contacted about future survey opportunities
- Fielded December 3-15, 2024, in English only
- Invitations sent only via email with the last invite being sent on December 6th
- Collected 9,900 responses

Experimental Design

- Participants were randomly assigned to three groups. (Third treatment not shown here)
 - N ~3,000 for the global version
 - N ~3,000 for the decomposed version
- Up to 4 debriefing questions were asked following the utilities item(s)
 - Global group received up to 4
 - Decomposed group received up to 3

Debriefing Question – Global Only

Which of the following types of utilities did you include in your response of \$[answer]?

1. Electricity
2. Natural gas
3. Water and sewer
4. Basic or mobile telephone service
5. Heating oil or wood
6. Trash and recycling
7. Internet
8. Cable or satellite TV
9. Other (specify)

Instructions on the global question text tell respondents to exclude these items

Research Questions

Data Quality:

1. Does the global or decomposed version have higher item missingness?
2. Are there more types of utilities reported in the global or decomposed questions?
3. What types of utilities are reported in the global question expense amount?

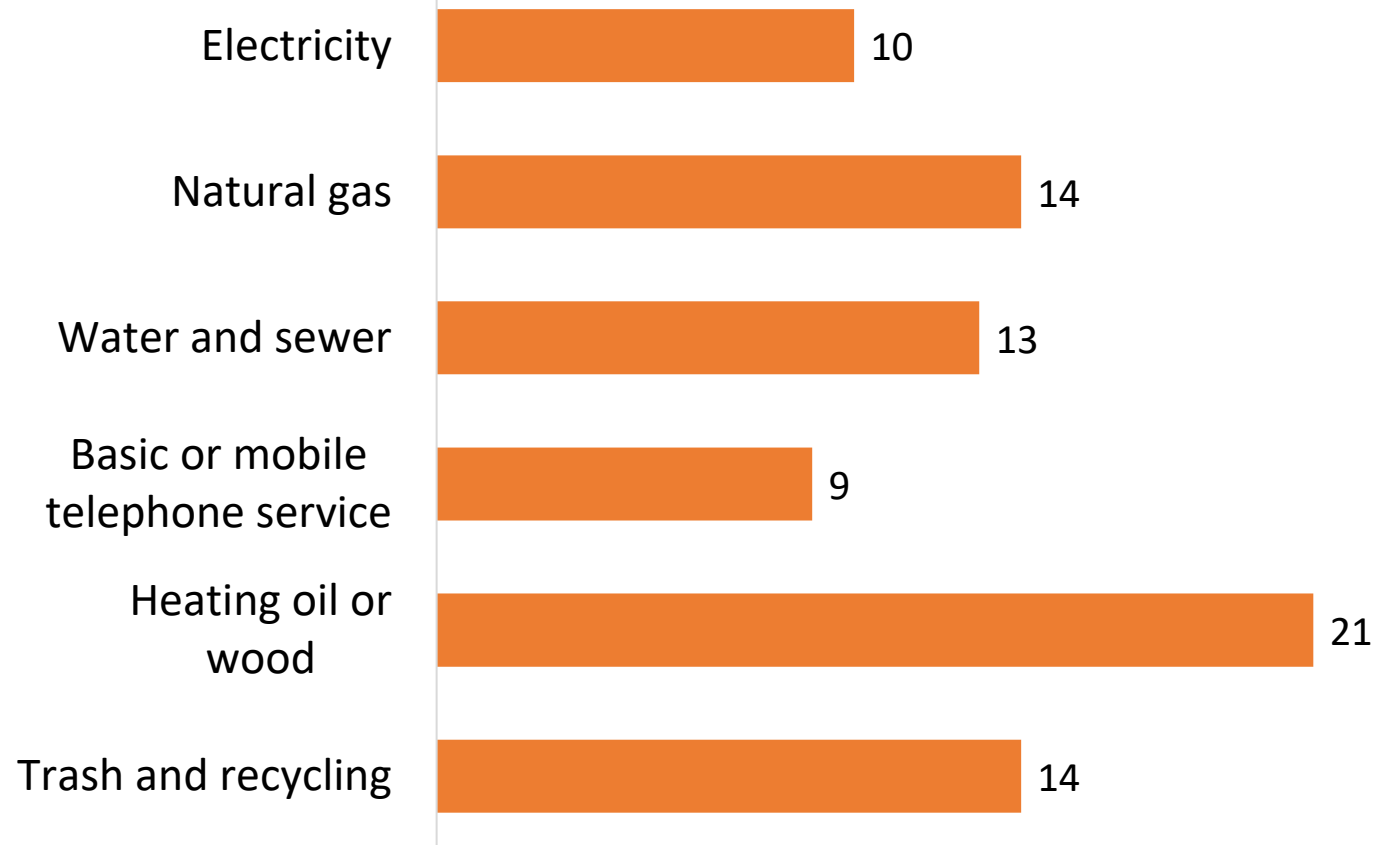
Burden:

4. How does the time to complete differ between the global and decomposed versions?

Item Missingness

% Missingness on...	Global	Decomposed
Type of utilities	-	1
Utility expense amounts	2	9

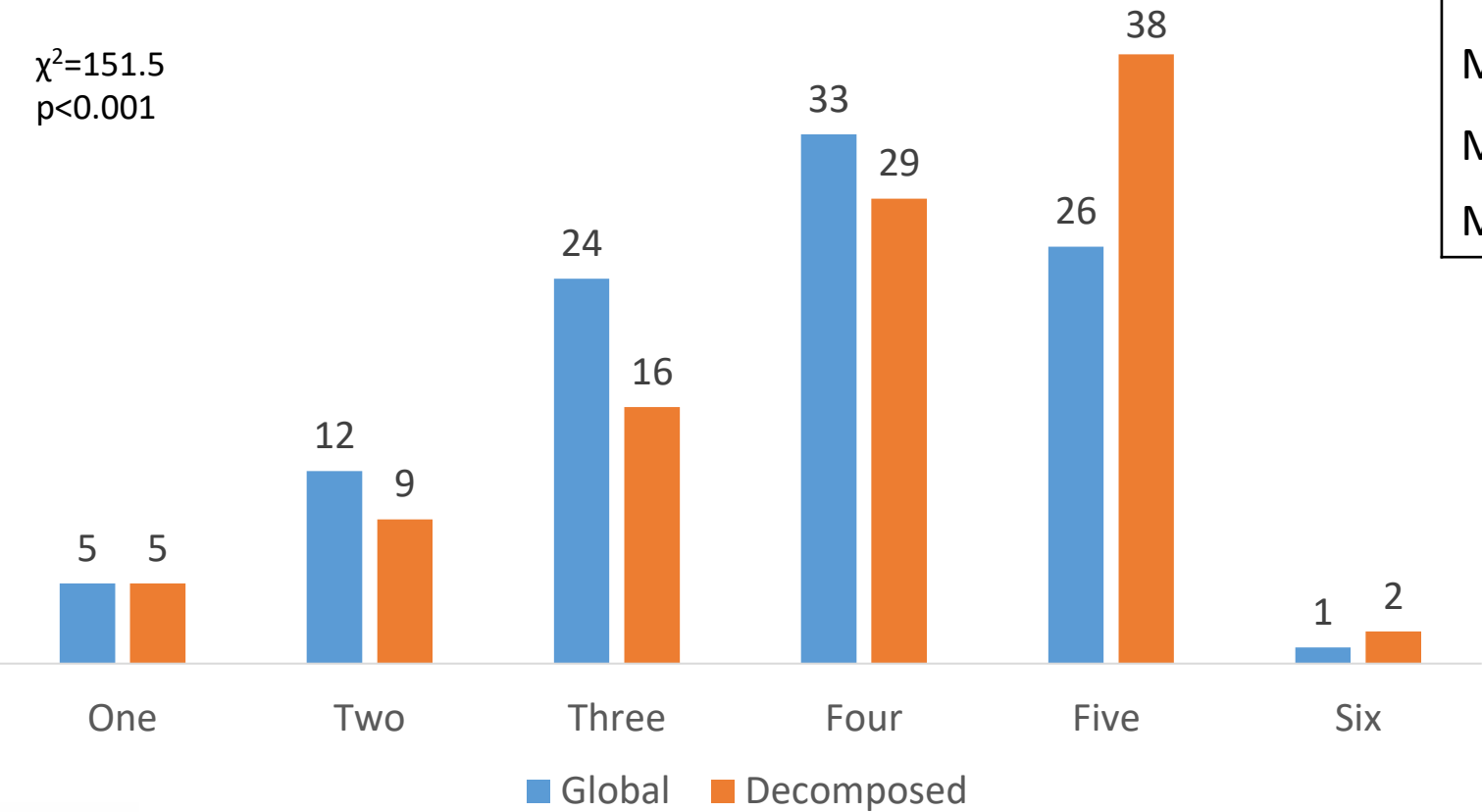
Among respondents who reported paying the utility in the decomposed version, the percent who did not provide an expense amount...



Number of Utilities Reported

Distribution of respondents who report a count of [X] utilities

$\chi^2=151.5$
 $p<0.001$



	Global	Decomposed
Mean	3.7	4.0
Median	4.0	4.0
Mode	4.0	5.0

Data Quality in the Global Version

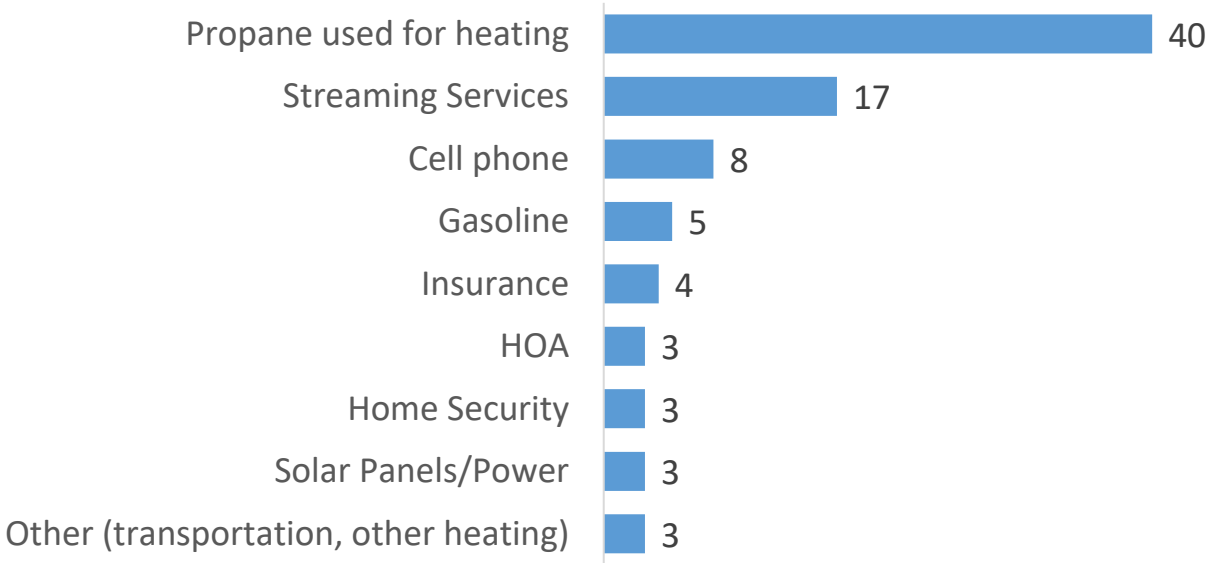
How much did this household pay for electricity, gas, basic telephone service, and other utilities in November?

Other common examples of utilities include water, heating oil and wood, trash or recycling, and mobile telephone service (excluding data plans, applications, games, and ringtones.) **Do not include cable TV or internet.**

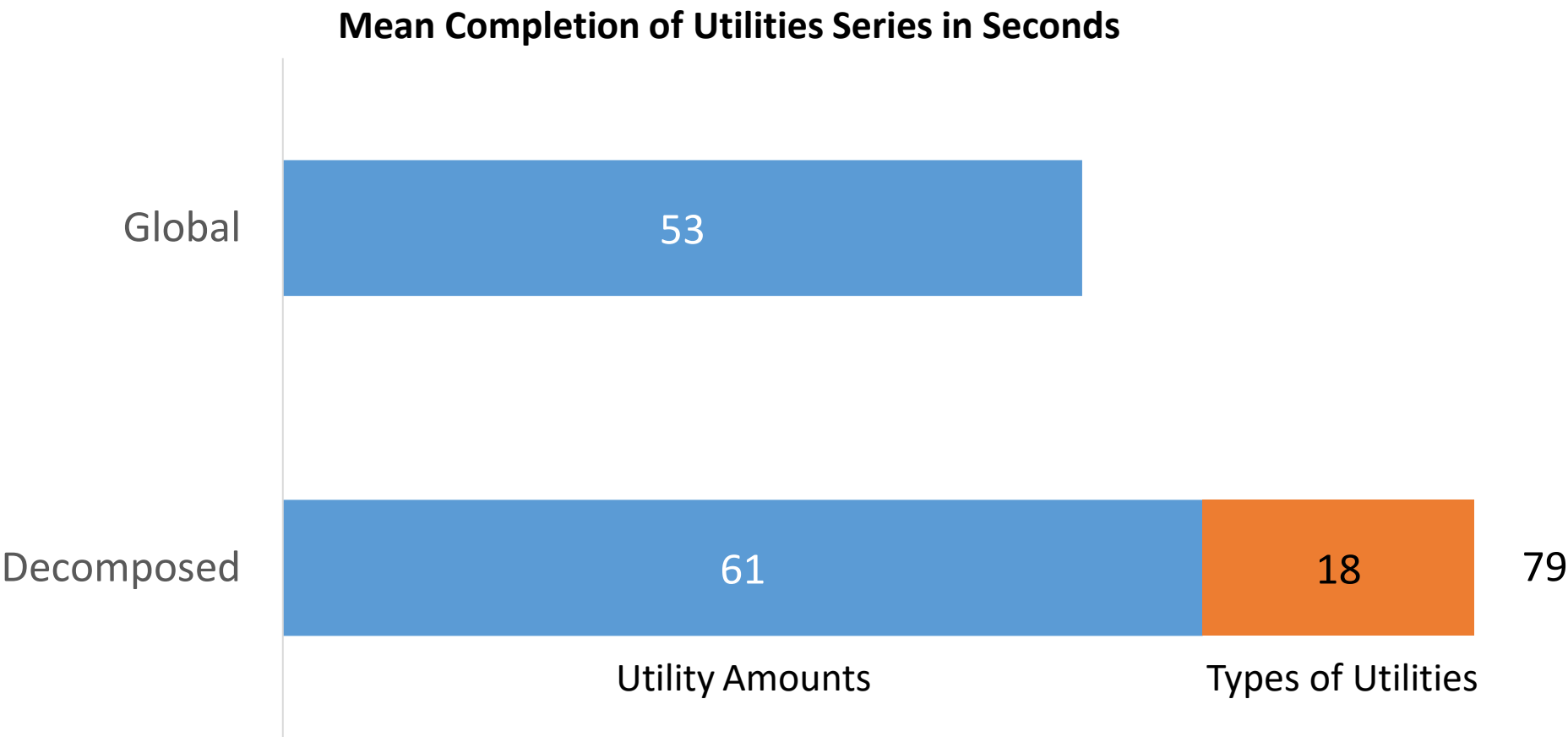
Percent of global respondents who said they included utilities they were instructed to NOT include:

	% Global Respondents
Internet	43
Cable or Satellite TV	15

Among those reporting they included utilities not explicitly shown in the question instructions (n~150), the percent saying they included ____:



Time Spent on Utilities Question(s)



Regression on Time Spent to Complete

	Time to Complete
Decomposed Group	23.5***
Number of utilities reported	7.1***
Mobile (ref. desktop/laptop/tablet)	-6.6***
Male (ref. female)	-2.5
Less than bachelor's degree (ref. bachelor's degree or higher)	1.5
R-squared: 8.9 N=5,000	

Summary of Results

- Global version is **faster** and has **less item missingness** than the decomposed version
- But respondents provided **fewer utilities** in their amounts in the global question than the decomposed and **included amounts they were instructed to exclude.**

Caveats

- Nonprobability panel – motivated respondents who are paying close attention
- Higher item missingness in the decomposed version may have occurred for two reasons:
 - Did not ask about whether they paid utilities as part of HOA/condo fees
 - Reference period (November) was only presented for utility amounts vs. in the utility types question

Final Thoughts

- The decomposed version did a better job of capturing the intended measures, even though it did take a little longer.
- The utilities question topic does lend itself to capturing this information in a decomposed version that is not necessarily generalizable to all question topics.
- Future testing may consider testing a one-step decomposed question to see if it can reduce burden and decrease impact of item missingness:
 1. Use instruction to enter 0 if they did not pay the utility – but this does make it difficult to distinguish a true skip vs. not following directions
 2. Checkbox to allow respondents to report that they do not have the utility

Thank you!

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Debriefing – All Experimental Groups

Which utilities do you pay on a monthly basis?

Select all that apply.

1. Electricity
2. Natural gas
3. Water and sewer
4. Basic or mobile telephone service
5. Heating oil or wood
6. Trash and recycling
7. Internet
8. Cable or satellite TV
9. Other (specify)

Which utilities do you pay on a quarterly or

annual basis? *Select all that apply.*

1. Electricity
2. Natural gas
3. Water and sewer
4. Basic or mobile telephone service
5. Heating oil or wood
6. Trash and recycling
7. Internet
8. Cable or satellite TV
9. Other (specify)

Debriefing: All Experimental Groups

Did you calculate estimated amounts for any of the utilities you pay on a quarterly or annual basis [Global: in your response of \$[amount]/ Decomposed: blank]?

1. Electricity
2. Natural gas
3. Water and sewer
4. Basic or mobile telephone service
5. Heating oil or wood
6. Trash and recycling
7. Internet
8. Cable or satellite TV
9. Other (specify)

4) Adjusting for non-monthly billing

	Global	Decomposed
Percent reporting that they pay at least 1 utility quarterly or annually	36	34
Percent reporting that they estimated a prorated version of at least 1 utility in their responses	21	19
N	2,900	2,700