

A STUDY ON GRID DESIGN:

Can reducing the number of screens improve respondent burden without sacrificing data quality for web-collected income data?

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ANNUAL SOCIAL AND ECONOMIC SUPPLEMENT (ASEC) OVERVIEW

- A supplement to the Current Population Survey (CPS).
- Collected annually in February, March, and April.
 - Uses both in-person and phone interviews.
- Historical time series.
 - Collected since 1947.
- Reports released in September each year.
 - Income.
 - Poverty.
 - Health Insurance.
- Also includes questions on work experience and migration.

ASEC MODERNIZATION OVERVIEW

A multi-year project introducing new technologies, methods, and modes to the survey.

Why modernize?

- Address declining response rates.
- Maintain data quality standards.
- Address rising survey costs.
- Align with enhancements to the CPS.

Key components:

- Introduce an internet self-response (ISR) mode.
- Transition to new operational software.
- Research on the use of administrative records.

TESTING ONE POTENTIAL ISR METHOD: GRIDS

Grid designs:

- Collect multiple pieces of information on the same screen.
- Reduce the number of screens.
- Take less time to answer than an item-by-item series in certain circumstances.

Current recommendations:

- Current Census Bureau recommendations for using grids only apply to forced choice questions.
- More research was needed to determine if grids were a viable means of collecting information on non-forced choice questions.

TWO TESTS OF A GRID DESIGN FOR INCOME REPORTING:

1. CENSUS HOUSEHOLD PANEL (CHP)

- National survey panel conducted by the Census Bureau.
- Randomized test fielded in July 2024 (N=8,900 households).
- Included versions of ASEC questions about earned income and pension and retirement income.
- Respondents randomly assigned to one of two groups for income questions.
 - CONTROL: *item-by-item design*.
 - TREATMENT: *interactive grid*.

TWO TESTS OF A GRID DESIGN FOR INCOME REPORTING:

1. CENSUS HOUSEHOLD PANEL (CHP)

CONTROL GROUP: Item-by-item design.

For example, for pension income:

- What is the easiest way for you to tell us your pension income for 2023?
 - Weekly; Every other week (bi-weekly); Twice a month; Monthly; Yearly.
- What was the amount received every [week, month, etc.]?
- How many [weekly, monthly, etc.] payments did you receive in 2023?
- Then you received [\$\$] altogether from this pension in 2023. Does that sound about right?

TWO TESTS OF A GRID DESIGN FOR INCOME REPORTING:

1. CENSUS HOUSEHOLD PANEL (CHP)

TREATMENT GROUP: Interactive grid design.

For example, for pension income:

B_APENQ6_COMPANY. Enter the amount you received from the Company pension in 2023:

	Enter Amount	Choose Frequency	Number of Payments	Total
Company pension	<input type="text"/>	<input type="text" value="▼"/> <ul style="list-style-type: none">weeklybi-weeklymonthlyyearly	<input type="text"/>	<input type="text" value="0"/>

← →

TWO TESTS OF A GRID DESIGN FOR INCOME REPORTING:

2. COGNITIVE INTERVIEWS

- 30 interviews conducted by RTI International.
- September to November 2024.
- An interactive grid design was used to collect the earnings and income amounts data.

RESULTS: COMPARING RESPONSE QUALITY IN CHP

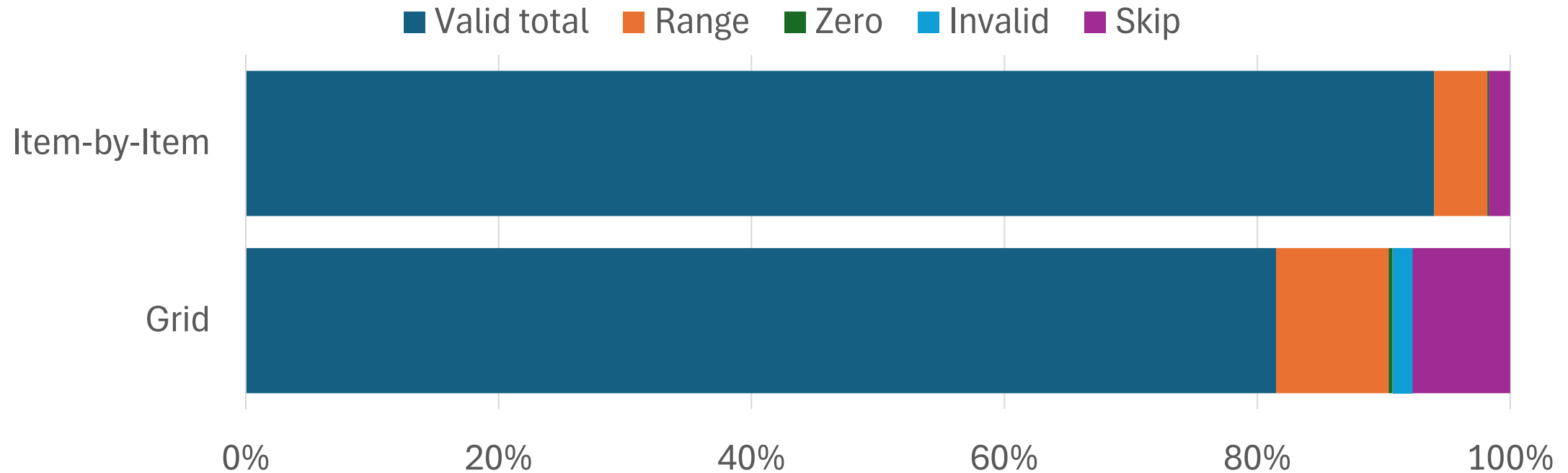
- We focus on descriptive measures that apply to this sample only.
 - We use unweighted data in this analysis, which is preferred for studying survey response error.
 - The estimates cannot generalize to the population.
 - We do not make any statistical inferences; comparative statements are not supported by statistical testing.

RESULTS: COMPARING RESPONSE QUALITY IN CHP

Response quality categories:

1. **Valid total:** Nonzero, numeric income amount.
2. **Range:** Categorical response indicating where income fell within a range.
3. **Zero:** Reported receiving that type of income but responded \$0.
4. **Invalid:** Provided some information, but it was non-numeric.
5. **Skip:** Did not respond to one or more questions; total could not be calculated.

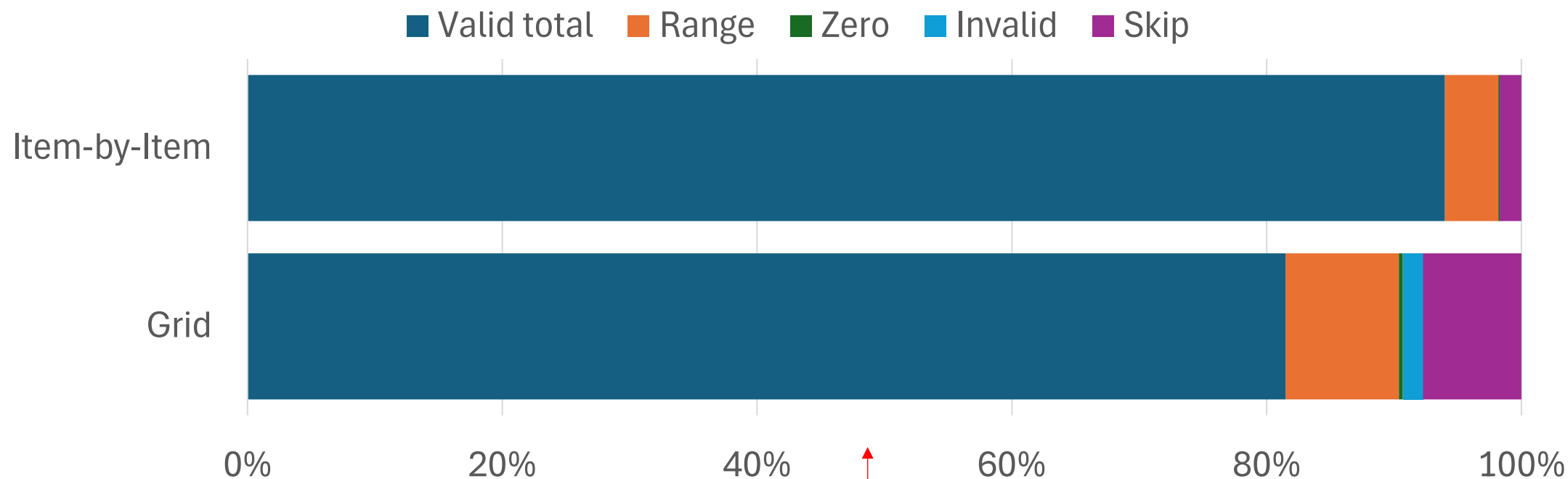
RESPONSE QUALITY: EARNED INCOME



Source: Census Household Panel (CHP), July 2024. (Project No. P-7527238; Disclosure Review Board (DRB) approval number: CBDRB-FY26-SEHSD003-026).

Note: If a respondent provided an invalid response to one of the component questions and skipped the other question, we classify their response as invalid. The control instrument restricted write-in options to numeric values, so there are no invalid responses for the control group.

RESPONSE QUALITY: EARNED INCOME

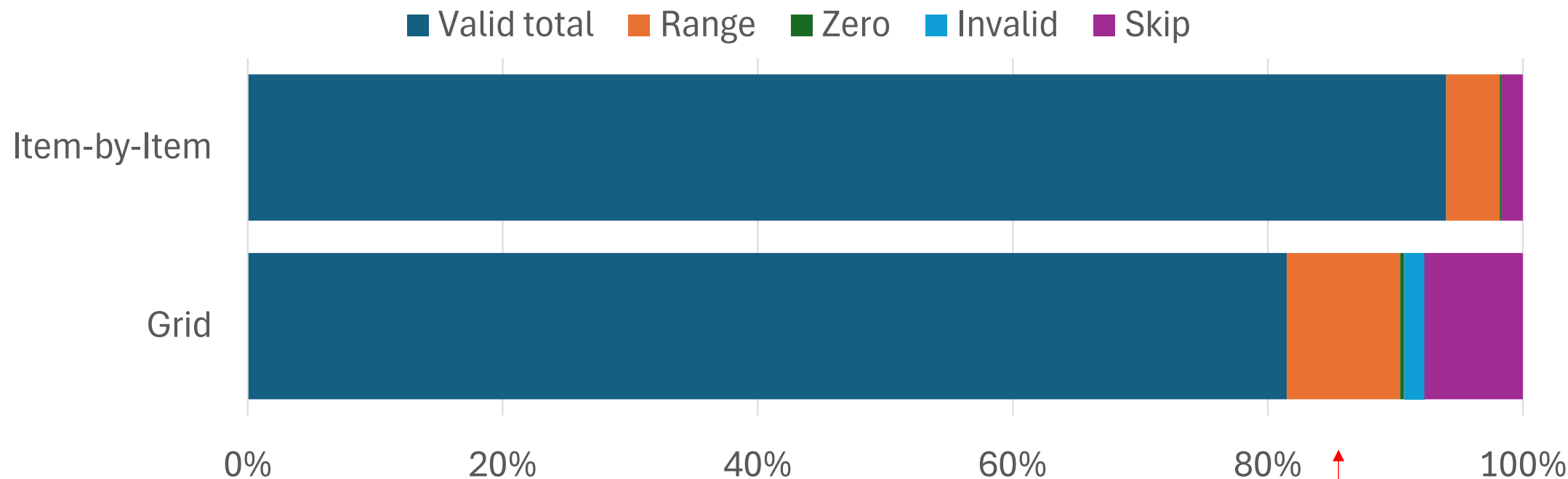


Respondents who received the grid format were less likely to report a **valid numeric total** (81.4% of treatment vs. 94.0% of control).

Source: Census Household Panel (CHP), July 2024. (Project No. P-7527238; Disclosure Review Board (DRB) approval number: CBDRB-FY26-SEHSD003-026).

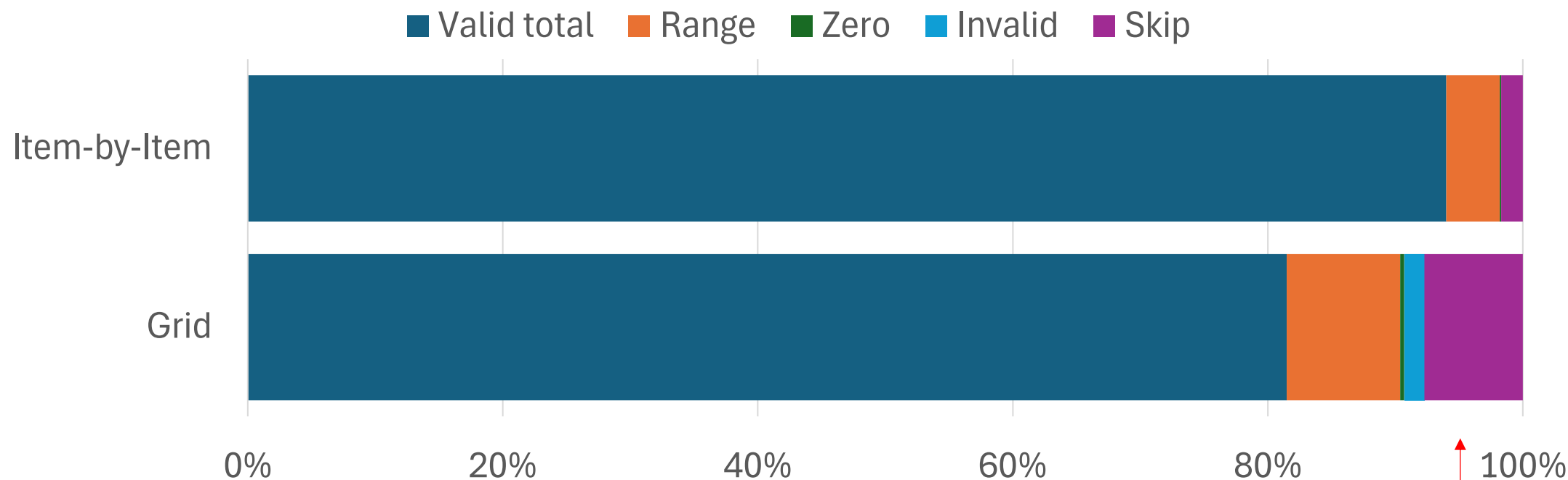
Note: If a respondent provided an invalid response to one of the component questions and skipped the other question, we classify their response as invalid. The control instrument restricted write-in options to numeric values, so there are no invalid responses for the control group.

RESPONSE QUALITY: EARNED INCOME



Many respondents in the grid group did not report a numeric total but went on to **report a range** for earned income.

RESPONSE QUALITY: EARNED INCOME

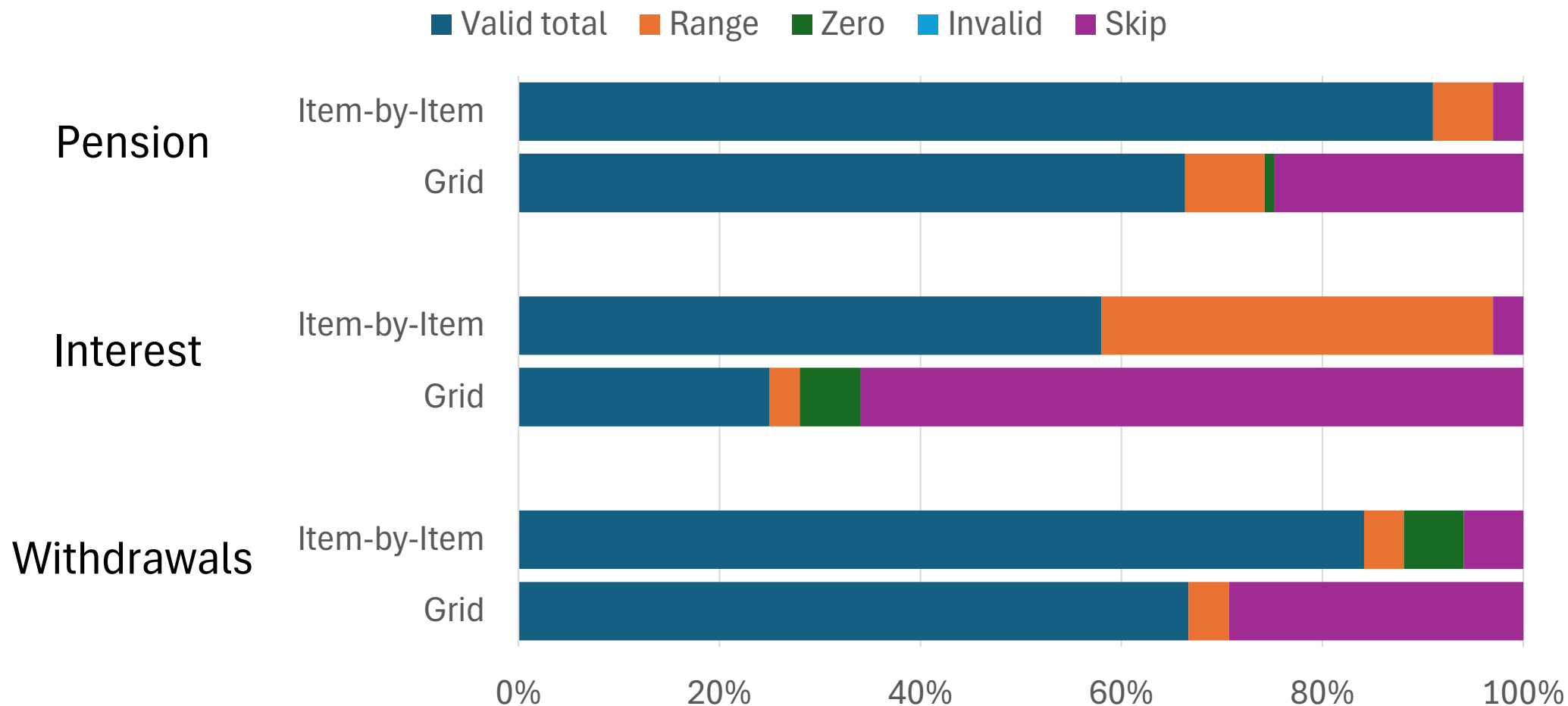


But, the grid design still resulted in more respondents **skipping** earned income question(s) (7.7% vs. 1.7%).

Source: Census Household Panel (CHP), July 2024. (Project No. P-7527238; Disclosure Review Board (DRB) approval number: CBDRB-FY26-SEHSD003-026).

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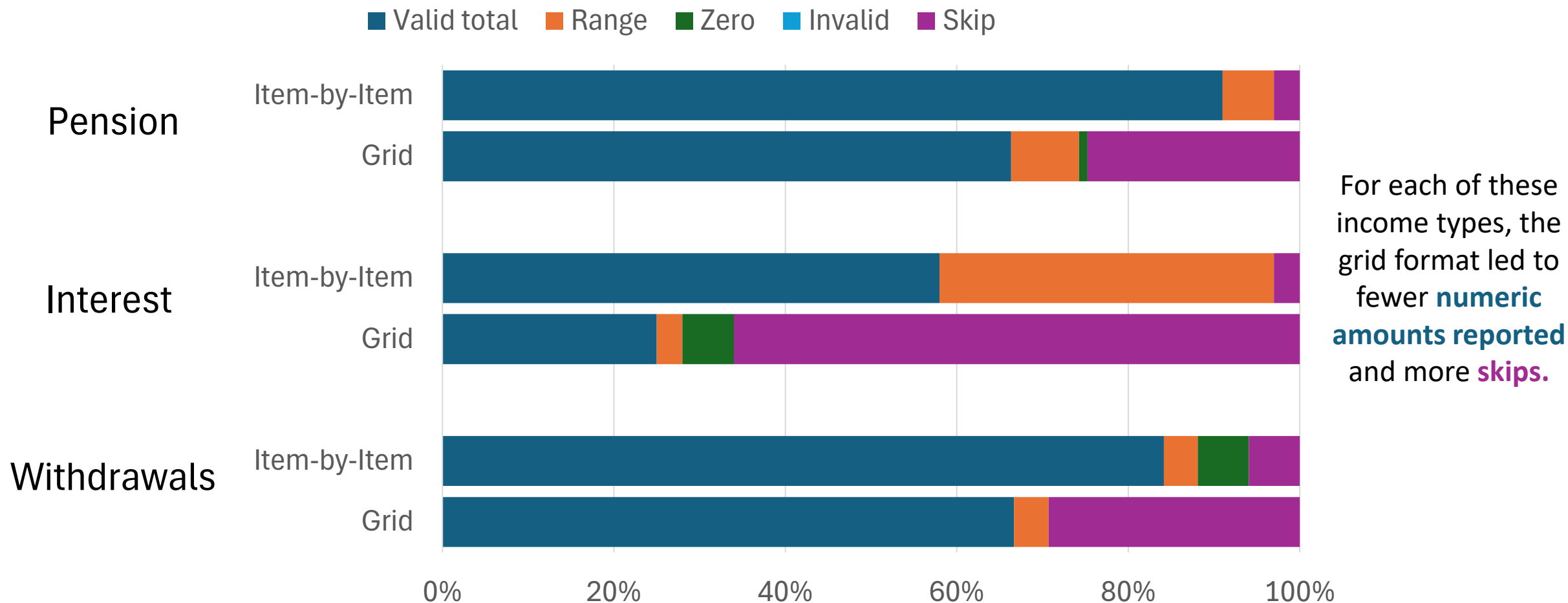
RESPONSE QUALITY: PENSION AND RETIREMENT INCOME



Source: Census Household Panel (CHP), July 2024. (Project No. P-7527238; Disclosure Review Board (DRB) approval number: CBDRB-FY26-SEHSD003-026).

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RESPONSE QUALITY: PENSION AND RETIREMENT INCOME



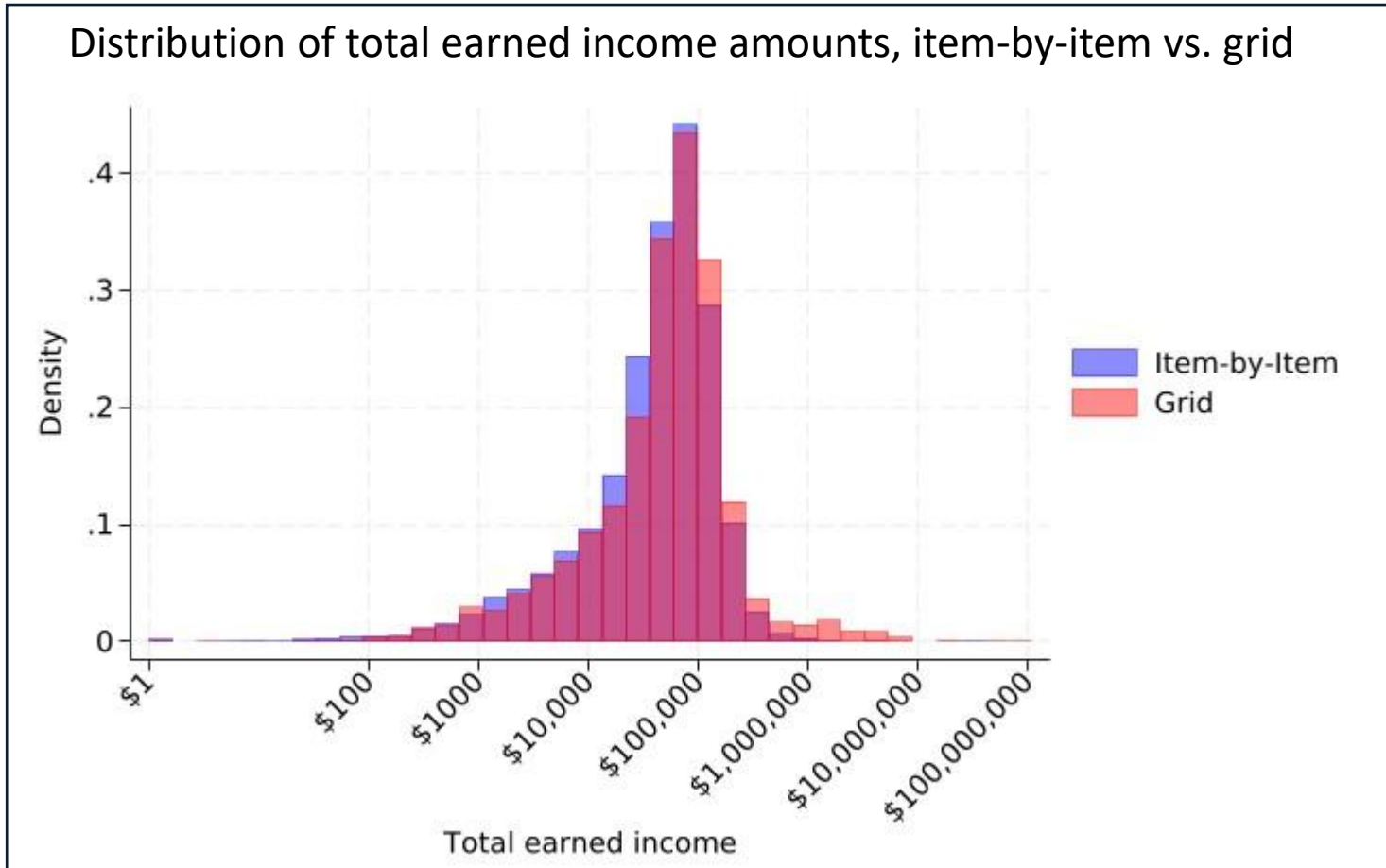
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RESULTS: COMPARING RESPONSE DISTRIBUTION IN CHP

Did numeric income amounts reported differ between the grid and item-by-item instruments?

TOTAL EARNED INCOME: ITEM-BY-ITEM VS. GRID



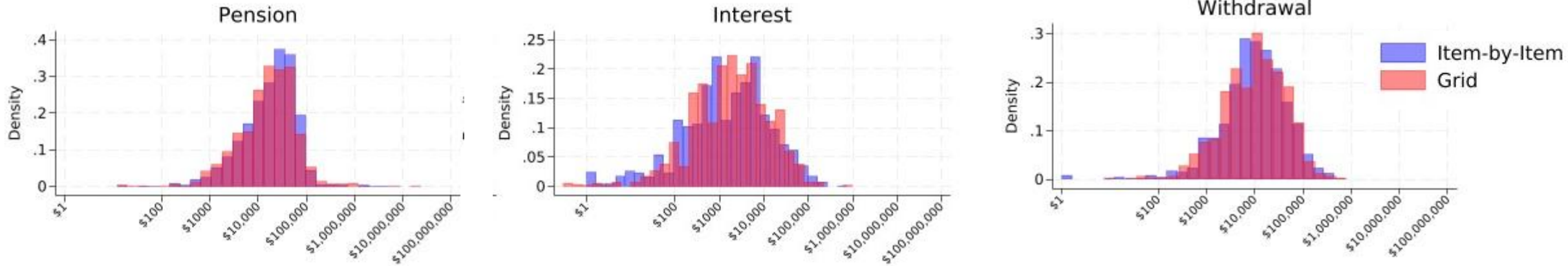
	Item-by-Item	Grid
25 th percentile	\$20,280	\$24,000
Median	\$50,000	\$58,800
75 th percentile	\$90,000	\$104,000

Source: Census Household Panel (CHP), July 2024. (Project No. P-7527238; Disclosure Review Board (DRB) approval number: CBDRB-FY26-SEHSD003-026).

Note: Analytic sample is limited to people for whom the respondent reported a valid nonzero amount for wage, tip, bonus, overtime, and/or commission income. Range responses and responses that could not be efficiently cleaned are excluded. X-axis on log scale.

TOTAL PENSION, INTEREST, AND WITHDRAWAL INCOME: ITEM-BY-ITEM VS. GRID

Distribution of total pension, interest, and withdrawal income amounts, item-by-item vs. grid



	Item-by-Item	Grid
25 th percentile	\$8,088	\$7,200
Median	\$21,600	\$18,000
75 th percentile	\$40,000	\$37,500

	Item-by-Item	Grid
25 th percentile	\$400	\$500
Median	\$1,500	\$2,000
75 th percentile	\$5,720	\$6,600

	Item-by-Item	Grid
25 th percentile	\$4,000	\$4,000
Median	\$10,000	\$10,800
75 th percentile	\$28,000	\$28,000

Source: Census Household Panel (CHP), July 2024. (Project No. P-7527238; Disclosure Review Board (DRB) approval number: CBDRB-FY26-SEHSD003-026).

Note: If a respondent reported receiving more than one type of these income sources (e.g., more than one type of pension or withdrawals from more than one account) only the amount for the first type is reported here. Analytic sample is limited to respondents who reported at least one valid nonzero total for the specified income source; they do not include range responses or responses that could not be efficiently cleaned. X-axis uses a log scale.

TWO VALIDATION ISSUES LED TO OUTLIERS, SKEWING THE DISTRIBUTION OF GRID RESPONSES

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No validation issues:

	Enter Amount	Choose Frequency	Number of Payments	Total
Wages	2500	monthly	12	30000

TWO VALIDATION ISSUES LED TO OUTLIERS, SKEWING THE DISTRIBUTION OF GRID RESPONSES

No validation issues:

	Enter Amount	Choose Frequency	Number of Payments	Total
Wages	2500	monthly	12	30000

Issue 1: Grid did not calculate total because of non-numeric character:

	Enter Amount	Choose Frequency	Number of Payments	Total
Wages	2,500	monthly	12	

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Wages	2,500	monthly	12	

Issue 2: Respondent entered number of payments that did not make sense:

	Enter Amount	Choose Frequency	Number of Payments	Total
Wages	2500	monthly	52	130000

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TWO VALIDATION ISSUES LED TO OUTLIERS, SKEWING THE DISTRIBUTION OF GRID RESPONSES

Total annual wages by response validation issue (grid group only)

	No validation issues	ISSUE 1: Grid did not calculate annual total due to non-numeric character in entry	ISSUE 2: Number of payments did not make sense
25 th percentile	\$22,400	\$33,100	\$42,730
Median	\$55,000	\$92,420	\$96,000
75 th percentile	\$96,000	\$720,000	\$371,800
% outliers	3%	38%	29%
N	3,300	150	200

Source: Census Household Panel (CHP), July 2024. (Project No. P-7527238; Disclosure Review Board (DRB) approval number: CBDRB-FY26-SEHSD003-026).

Note: Some non-numeric entries could not be efficiently converted to numeric and are not included here. An outlier was an observation higher than the 75th percentile plus 1.5 times the interquartile range, or less than the 25th percentile minus 1.5 times the interquartile range.

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COGNITIVE INTERVIEWS

- Findings:
 - Respondent burden associated with answering many of the income questions was quite high.
 - Results reinforced the importance of supporting respondents through validations, restricting entries to reasonable values, and allowing respondents to use estimation for amounts.
- Recommendations:
 - Encourage respondents to estimate.
 - Include validations and confirmations.
 - If moving forward with the grids, use the grid format that allows respondents to report in the period they prefer. Additional changes needed to improve functionality.

CONCLUSIONS

- The grid instrument resulted in lower response quality than stepping respondents through an item-by-item design.
- When responses were not validated correctly, extreme values were more common, suggesting high cognitive burden of the grid setup.
- Findings reinforce importance of validations, confirmations, and encouraging respondents to estimate.

WHAT'S NEXT

- Not moving forward with grid design for income amount questions.
- Next steps:
 - Combine feedback from all sources of evaluation into updated questionnaire.
 - Field test:
 - Multi-mode.
 - A/B design.
 - Early 2027.

THANK YOU!

- For more information about CPS ASEC modernization:

VISIT:

www.census.gov/programs-surveys/cps/about/modernization/asecmodernization.html

EMAIL:

demo.asec.modernization@census.gov