Measurement Errors in Self-Reports of Consumer Expenditures: Are Errors Attributable to Respondents or Expenditures?

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Correlates of Recall Error

- We know a host of factors affect recall …
  - Event (e.g., frequency, elapsed time, salience, distinctiveness)
  - Respondent (e.g., age, education, gender)
  - Survey design (e.g., mode, question wording)

- … but what is their relative importance?
Two Extremes of Measurement Error

All Variance On Respondent Level

Good respondent  Bad respondent

All Variance On Expenditure Level

Average respondent  Average respondent
Research Questions

1. How much variance in measurement error is on the expenditure versus respondent level?

2. What respondent and expenditure characteristics are associated with measurement error?

3. How much of the variance in measurement error is accounted for by these respondent and expenditure characteristics?
Consumer Expenditure Records Study

- Designed to investigate self-reports of U.S. Consumer Expenditure Quarterly Interview Survey

- 115 respondents completed two CAPI interviews
  - Convenience sample from two sites (DC, NC)
  - Interview 1: Self-reports of consumer expenditures
  - Interview 2: Comparison of records with self-reports

- Analytic sample:
  - 104 respondents
  - 939 expenditures
  - Mean of 9.0 expenditures per respondent (SD = 8.2), with maximum of 34 expenditures
Measures

- **Dependent variable: Measurement Error**
  - Records are gold standard
  - Percent difference between record and self-report

- **Independent variables**

  **Respondent**
  - Gender
  - Age
  - Employment
  - Income
  - Education
  - Location (DC, NC)

  **Expenditure**
  - Type (housing, phone, utilities, appliance, furniture, clothing, misc.)
  - Amount
  - Time since expenditure
Analytic Approach

- Multi-level models
  - Level 1: Expenditure
  - Level 2: Respondent

- Sequential models
  1. Random intercept model
  2. Include respondent characteristics
  3. Include expenditure characteristics

- Test for cross-level interactions
Variance in Random Intercept Model

Intercept variance (i.e., variance on respondent level)

Residual variance (i.e., variance on expenditure level)
## Respondent Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>$\beta$</th>
<th>$Z$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>4.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Age (years)</td>
<td>-0.2</td>
<td>-1.3</td>
</tr>
<tr>
<td>Employed (not employed)</td>
<td>9.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Low income (high)</td>
<td>8.5</td>
<td>1.4</td>
</tr>
<tr>
<td>Medium income (high)</td>
<td>0.8</td>
<td>0.2</td>
</tr>
<tr>
<td>HS or less (college)</td>
<td>-1.5</td>
<td>-0.3</td>
</tr>
<tr>
<td>Some college (college)</td>
<td>-1.4</td>
<td>-0.3</td>
</tr>
<tr>
<td>DC (NC)</td>
<td>-16.0</td>
<td>-2.5</td>
</tr>
</tbody>
</table>

Parameters are from a multi-level model predicting measurement error (percent difference between record and self-report). Reference category is in parentheses. Model includes random intercept and expenditure characteristics.
### Expenditure Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>$\beta$</th>
<th>$Z$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone (housing)</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Utilities (housing)</strong></td>
<td><strong>20.4</strong></td>
<td><strong>2.4</strong></td>
</tr>
<tr>
<td>Appliance (housing)</td>
<td>-4.5</td>
<td>-0.5</td>
</tr>
<tr>
<td><strong>Furniture (housing)</strong></td>
<td><strong>17.6</strong></td>
<td>1.8</td>
</tr>
<tr>
<td>Clothing (housing)</td>
<td>14.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Misc. (housing)</td>
<td>3.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Amount (dollars)</td>
<td>-.0038</td>
<td>-0.7</td>
</tr>
<tr>
<td>2 months ago (current/last)</td>
<td>-5.0</td>
<td>-1.2</td>
</tr>
<tr>
<td>3 months ago (current/last)</td>
<td>-2.3</td>
<td>-0.5</td>
</tr>
</tbody>
</table>

Parameters are from a multi-level model predicting measurement error (percent difference between record and self-report).

Reference category is in parentheses.

Model includes random intercept and respondent characteristics.
Limitations

- Small-scale study based on convenience sample

- Unknown whether results apply to topics other than expenditures

- We explained little variance on expenditure level (4%)
Summary

- **Key Findings**
  - 93% of variance is on expenditure level: we are close to the extreme of all variance due to expenditures
  - Greater measurement error among employed & NC respondents
  - Utilities, furniture, clothing had greater measurement error

- **Implications**
  - Academics: research on expenditure characteristics
  - Survey practitioners: administrative records, question design
The findings and conclusions in this presentation are those of the authors and do not necessarily reflect official views of the U.S. Bureau of Labor Statistics.