Measuring Food Consumption: Questionnaire Design

LECTURE 6

Where we are

- Lecture 5 covered the foundational choices that a questionnaire design team must make:
  - whether to record food consumption or acquisition
  - picking between recall or diary approach
  - setting the optimal reference period
- This lecture will go into the details of how to design the food module.

Questionnaire design challenges for food module

1. Acquisition vs. consumption
2. Recall vs. diary and length of reference period
3. List of food items
4. Meal participation
5. Timing of visits
6. Food away from home
7. Non-standard measurement units
3. List of food items

What is the food list?

- **Interview-based surveys** (recall): food items are pre-defined and listed, to help respondents accurately remember which foods were acquired or consumed
- **Diary surveys**: food items may be listed or not, list may be open-ended (respondent can add to it)

Length of the food list

- Designing the food list in all of its details is a daunting task:
  - How many different foods should be included?
  - Should some items be grouped together? Which ones?
  - Should all foods be listed, including “difficult” items like prepared foods?
  - …

- Answers to these questions determine the **length** of the food list, which in turn influences final results (evidence in next slides)
Comprehensiveness vs. specificity

The length of the food list is actually the result of two distinct design choices:
1. **Comprehensiveness**
   - Whether or not all types of foods and beverages that make up the diet of the surveyed population are represented in the food list
2. **Specificity**
   - The degree of detail and disaggregation of the food list

Comprehensiveness

- It is considered good practice that the food list be **as comprehensive as possible**
- By definition, excluding entire categories of foods leads to **underestimation** of consumption
- **How to evaluate comprehensiveness?**

Criteria for comprehensiveness

Smith et al. (2014)

Three useful criteria:
1. Are all 14 food groups represented?
2. Are processed foods included? (importance in diet increases over time, list to be updated regularly)
3. Is there food exclusivity? i.e. are food items listed separately from non-food items? (for ex. “alcohol and tobacco” is not food-exclusive)
Current practice for comprehensiveness
% of surveys meeting food list comprehensiveness criteria

Specificity
- A detailed food list should help respondents remember consumption more completely and accurately; a certain level of detail is also required to obtain accurate nutritional data (difficult to estimate calorie intakes from heterogeneous food aggregates).
- But the food list can be too detailed, and risk increasing respondent and enumerator fatigue.
- Take the case of bananas in Uganda...

Bananas in Uganda
- A total of 95 banana varieties are currently grown in Uganda (IFPRI, 2006).
- Each variety has a local name.
- Specificity involves trade-offs; it is not always true that the more specific the food list, the higher the quality of the data.
Empirical evidence on specificity

Pros

- Highly aggregated food lists are linked to underreporting of consumption

Cons

- Longer food lists push enumerators and respondents to reduce compliance

Evidence from El Salvador

Jolliffe (2001)

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Short Questionnaire</th>
<th>Long Questionnaire</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>10th</td>
<td>98.5 (5.00)</td>
<td>141.0 (11.2)</td>
<td>43%</td>
</tr>
<tr>
<td>20th</td>
<td>127.7 (7.27)</td>
<td>179.0 (14.6)</td>
<td>30%</td>
</tr>
<tr>
<td>30th</td>
<td>172.6 (4.83)</td>
<td>219.8 (11.5)</td>
<td>27%</td>
</tr>
<tr>
<td>40th</td>
<td>204.2 (7.67)</td>
<td>257.2 (16.4)</td>
<td>26%</td>
</tr>
<tr>
<td>Median</td>
<td>245.2 (8.16)</td>
<td>310.8 (20.2)</td>
<td>27%</td>
</tr>
<tr>
<td>60th</td>
<td>295.1 (10.4)</td>
<td>375.6 (29.2)</td>
<td>27%</td>
</tr>
<tr>
<td>70th</td>
<td>352.3 (15.6)</td>
<td>478.7 (34.0)</td>
<td>36%</td>
</tr>
<tr>
<td>80th</td>
<td>452.6 (16.4)</td>
<td>609.0 (34.3)</td>
<td>35%</td>
</tr>
<tr>
<td>90th</td>
<td>619.2 (24.1)</td>
<td>869.0 (63.9)</td>
<td>40%</td>
</tr>
</tbody>
</table>

Comparison of the Short and Long Questionnaire Samples

Evidence from Tanzania

Beegle et al. (2012)

- Comparison of instruments with same recall period, but different food list: long (58 items), or collapsed (11 coarse aggregates)
- 24% drop in average consumption
- Short list only saved 8 min of interview time on average

% change in consumption with respect to benchmark
Recap

- **Comprehensiveness**
  It is required for the production of reliable data. The literature offers some criteria to check that food categories are adequately represented in the food list.

- **Specificity**
  There is a widely acknowledged trade-off involving the level of detail of the food list, but the optimal balance depends on the local context. The literature offers some general rules that guide the compromise.

Recommendations – 1/4

**Comprehensiveness**

1. All major food groups should be represented
2. There should be adequate representation of processed foods (including prepared meals), when these are part of the population's diet
3. List should be kept up to date, to take into account changing dietary habits

Recommendations – 2/4

**Specificity**

4. It is useful to build the food list based on national food composition tables, to ease later matching between consumption data and nutritional information
5. Food items other than prepared dishes should not span multiple food groups (e.g., “eggs or milk products”), as this would impede accurate computation of nutrient intakes
6. Food items that are the object of product-specific government subsidy programs must be listed separately (to allow for repricing).

7. Foods that are fortified, or have the potential to be (e.g. iodized salt, fortified flour or cooking oil) should be listed separately.

8. Micronutrient (e.g. vitamin-A or iron) rich foods should be listed individually.

9. After a reasonable number of items to be listed for each food group has been selected, a residual category (e.g. “other fruit”, “other vegetables”) may be added if relevant; it is best if such categories remain marginal, as they do not allow the collection of data on quantities or the computation of nutrient intakes.

10. Adoption of a food classification system can help in meeting all previous criteria. For many of the basic purposes of household consumption and expenditure surveys, the recommended standard of classification is COICOP.
Meal participation

- **Partakers**: people who participate in the household’s meals
- Number of partakers and **household size** may differ:
  - People other than household members may take part in meals (employees, guests, visitors...)
  - Household members may be absent for meals

Why it matters

- “The adequacy of the consumption of the household’s food can be divided into two issues: how much food is being consumed and who is consuming it.” (Fiedler and Mwangi, 2016: 47)
- **Per capita** measures of food consumption should be based on the number of people sharing meals

\[
\text{per capita consumption} = \frac{\text{household total consumption}}{\text{household size} - \text{absent members} + \text{additional partakers}}
\]

Evidence on the impact of partakers

- Accounting for partakers reduces inequality of consumption
- Bouis, Haddad, and Kennedy (1992) and Bouis (1994) show that the difference between mean calorie intakes of the poorest and richest quartiles is much lower when partakers are accounted for (Kenya and the Philippines)
- Gibson and Rozelle (2002) finds similar evidence (Papua New Guinea)
Current practice

- Assessment of 81 recent surveys by Fiedler and Mwangi (2016)
- Most commonly, surveys do not collect information on meal partakers
- When they do, approaches are heterogeneous
- Lack of research to tell us what works

Some examples
Heterogeneity of approaches
Smith et al. (2014: 32)

A typology of approaches
FAO and WB (2018: 55-56)

A. Food consumer: count the number of people usually partaking to household’s meals, and divide total household consumption by this number.
Limitation: Counting heads of partakers is not precise. The method has difficulties to account for situations in which people do participate only at some meals per day, e.g. employees.

B. Meal partakers: requires an exact accounting of the number of meals taken by household members and non-household members over the same reference period as that for which food data is collected.
Limitation: difficult to implement.

Recommendation # 1
FAO and WB (2018: 55-56)

Information should be collected on the number of meals and the number of individuals (household and non-household members) who participated in each meal.
The addition of an individual household member-based meal module should be considered for all surveys that do not yet have it.
Recommendation # 2
FAO and WB (2018: 55-56)

The ‘meal partakers’ approach should be favored. In practice, a module should collect information on meal partakers for each meal event during reference period. This is different from recording how individuals ‘usually’ share the household’s food resources. The former is precise, the latter is more vague.

Recommendation # 3
FAO and WB (2018: 55-56)

If the entire individual household member-based meal module cannot be added, survey design teams should consider adding questions to a proxy respondent. The aim is to capture the number of meals were taken at home by household members and others, during the reference period.

5. Timing of visits
## Temporal fluctuations

- Fluctuations in consumption and expenditure within the year are common.
- Variation between months, also called seasonality:
  - Agricultural season(s), cyclical food production cycles, festivals and holidays.
- But there is also cyclical variation within months and weeks:
  - Payday for wage workers, market day, transfer day for households receiving cash transfers, Friday, Saturday, Sunday (depending on culture) consumption may differ from usual.

## Seasonality matters

- Survey objective is usually to mirror typical consumption throughout the year.
- If variables of interest fluctuate during the year, the timing of the interview is not neutral.
- Seasonality and higher-frequency fluctuations usually involve:
  1. Quantities of food acquired and consumed.
  2. Dietary patterns.
  3. Food prices.
- These variations are common, although their extent depends on the country.

## The case of Afghanistan

**Afghanistan Poverty Assessment (2010)**

Data by quarter revealed massive variation in poverty, due to seasonality and food price shocks.

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Season</th>
<th>Poverty rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fall harvest 2007</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>Winter 2007/08</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>Spring 2008</td>
<td>44</td>
</tr>
<tr>
<td>4</td>
<td>Summer 2008</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>36</td>
</tr>
</tbody>
</table>
The **weekday effect** in Mongolia – I/III

Troubat and Grunberger (2017: 136)

- Graph shows % change in kcal intake, compared to a reference day (Sunday)
- Higher consumption on Tuesdays and Fridays
- “Even if all weekdays are well represented in the MSES, these results point to a general advice in survey fieldwork organization to distribute enumeration equally between weekdays.”

The **day-of-the-month effect** in Mongolia – II/III

Troubat and Grunberger (2017: 136)

- Usually there are variations in consumption due to regular payment of income or any other kind of incoming payments
- Lowest between 25th and 28th of the month, but small difference

The **seasonal effect** in Mongolia – III/III

Troubat and Grunberger (2017: 136)

- Peak in December
- It might be associated to celebration of the Independence Day, 29th of December, or New Year.
- Lowest in June.
Failing to account for seasonality

A survey carried out at one single time in the year may be:
1. Unrepresentative of typical consumption across the year
2. Not comparable internationally (what if country A conducts survey in lean season, and country B in harvest season?)
3. Not comparable within the same country over time (what if a major event correlated with consumption patterns moves in or out of the survey period? Think of Ramadan, or harvest periods delayed by weather events)

Accounting for seasonality

• In theory, increasing recall periods would help to approach "usual consumption"
• But longer recall periods come with another problem: measurement error (see lecture 5)
• In practice, seasonality is accounted for by spreading interviews over time in various ways

Common approaches to data collection

Smith et al. (2014)

A. Repeated visits to the same households throughout the year. Households are interviewed repeatedly throughout the year (typically 2-4 times, in different seasons)
B. Multiple interview rounds distributed by survey subsets. The sample is split into subsets (usually 12), which are surveyed over 12 months. Subsamples are nationally representative by quarter
C. A single interview round, taking place over no more than a few months. This approach fails to account for seasonality
Pros and cons of common approaches

A. Repeated visits
   ▲ Pros: seasonal variation captured for all individual households; useful when survey objectives include collecting data on agricultural activities
   ▼ Cons: highest cost, logistical challenges, respondent burden, sample size

B. Survey subsets
   ▲ Pros: cheaper, easier to organize, lower respondent burden than A
   ▼ Cons: seasonal variation captured only on average

C. Single round
   ▲ Pros: easiest
   ▼ Cons: seasonal variation not captured, therefore measurement error

Recommendations

FAO and World Bank (2018: 52-53)

Two options to consider, in order of preference:
1. Spread the sample over 12 months of fieldwork
2. Conduct two visits per household (e.g. lean period + harvest period)

Whatever the solution chosen:
- Ensure enumeration is equally spread throughout the days of the week and the month
- Be mindful of changes in timing of holidays, festivals, to ensure comparability between survey waves
Lessons learned

- This lecture has explored three specific choices in the design of the food module:
  1) How to determine the length and degree of detail of the list of food items?
  2) Why and how to account for meal participation?
  3) Why and how to account for seasonality?
- The way the survey design team answers these questions is crucial for minimizing measurement error.

References

Required readings


Suggested readings


Thank you for your attention.
Exercise 1 – Engaging with the literature

- The increased risk of interviewer cheating is among the likely consequences of adopting an overly detailed food module.
- Finn and Ranchhod (2017) study the implications of data fabrication.
- Read the paper and summarize its main methods and findings.

Exercise 2 – Engaging with the literature

- Pradhan (2009) provides empirical evidence on the implications of the level of aggregation of item lists in consumption surveys.
- Read the paper and summarize its experimental setup and findings.
Exercise 3 – Food module, international comparisons

- Go to [http://microdata.worldbank.org/index.php/catalog/lsms](http://microdata.worldbank.org/index.php/catalog/lsms) and download the questionnaire(s) of 5 surveys of your choice
- In the section related to food expenditure find the total number of food items included in the survey food list (sometimes the information can be found in the final report)
- Based upon the recommendations in Smith et al. (2014) (section 3.4 and 3.5) comment on your findings.

Exercise 4 – Meal participation

- Examine the following examples of meal partaker modules from recent household consumption and expenditure survey questionnaires.
- For each example, determine whether the ‘food consumer’ or ‘meal partakers’ approach can be implemented to compute a measure of per capita food consumption.

Example 1
Example 2

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
</tr>
<tr>
<td>Value 4</td>
<td>Value 5</td>
<td>Value 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Diagram of a table or chart related to Example 2.