

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 **today**
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)

Q1	Q2	Q3	Q4
Over the past one week (7 days), did you or others in your household consume any ...?	Yes	No	Don't know
INCLUDE FOODS AND DRINKS CONSUMED BY ALL PEOPLE IN YOUR HOUSEHOLD, INCLUDING INFANTS AND CHILDREN.			
1. Cereals, Grains and Cereal Products			
2. Maize ufu ngqina (normal flour)*	101		
3. Maize ufu ngqina (fine flour)*	102		
4. Maize ufu ngqina (green flour)*	103		
5. Maize grain (not as ufu)*	104		
6. Green maize*	105		
7. Rice	106		
8. Finger millet (maize)	107		
9. Sorghum (maize)	108		
10. Pearl millet (maize)	109		
11. Bread flour	110		
12. Bread	111		

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 **under-estimation** of consumption
- How to **evaluate** comprehensiveness?

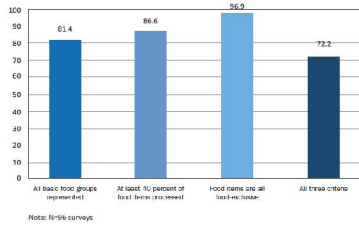
Criteria for comprehensiveness

Smith et al. (2014) set three criteria:

1. Are all **14 food groups** represented?
2. Are **processed foods** include? (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? ("alcohol and tobacco" is not food-exclusive)

Major food groups	
1	Cereals
2	Roots, tubers and plantains
3	Pulses, nuts and seeds
4	Vegetables
5	Fruits
6	Meat, poultry, and offal
7	Fish and seafood
8	Milk and milk products
9	Eggs
10	Oils and fats
11	Sugar, jam, honey, chocolate and sweets
12	Condiments, spices and baking agents
13	Non-alcoholic beverages
14	Alcoholic beverages

Current practice for comprehensiveness % of surveys meeting food list comprehensiveness criteria



Note: 1976 surveys

Source: Smith et al. (2016)

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
- Unlike comprehensiveness, 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
 - Jolliffe (2001), Beegle et al. (2012), Pradhan (2009), Statistical Institute and Planning Institute of Jamaica (1996)
- **Cons**
longer food lists push enumerators and respondents to reduce compliance
 - Deaton and Grosh (2000), Finn and Ranchhod (2015), Statistics Indonesia and World Bank (2014)

Evidence from El Salvador

Jolliffe (2001)

Aggregated 24-item list Detailed 97-item list

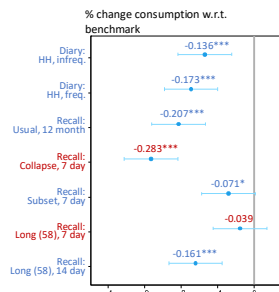
Table 4: Total Household Consumption Percentiles
Comparison of the Short- and Long-Questionnaire Samples

Percentile	Short Questionnaire Consumption (Std. Dev.)		Long Questionnaire Consumption (Std. Dev.)		Difference (percentage)
10 th	98.5	(5.00)	141.0	(11.2)	43%
20 th	137.7	(7.27)	179.0	(10.9)	30%
30 th	172.6	(6.83)	219.8	(11.5)	27%
50 th (median)	245.2	(8.16)	310.8	(20.2)	27%
70 th	352.3	(15.6)	478.7	(34.0)	36%
80 th	452.6	(16.4)	609.0	(34.3)	35%
90 th	619.2	(24.1)	869.0	(63.9)	40%

Evidence from Tanzania

Beegle et al. (2012)

- Comparison of instruments with same recall period, but different food list: long (57 items), or collapsed into 17 coarse aggregates
- 24% drop in average consumption
- Short list only saved 8 min of interview time on average



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

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

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

Recommendations

Specificity

6. Food items that are the object of product-specific government **subsidization** 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

Recommendations

Specificity

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 important that 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.

4. Meal participation

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**

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

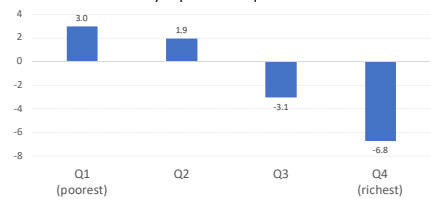
Evidence on the impact of partakers

- 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)

Accounting for partakers reduces inequality

Gibson and Rozelle (2002)

% difference per capita kcal intake after accounting for partakers, by expenditure quartile



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

Afghanistan 2007

SECTION 15: FOOD CONSUMPTION IN LAST 7 DAYS

15.1 How many household members were resident and ate at least dinner regularly in the household during the last 7 days?

people

15.2 How many meals were eaten by guests from the household cooking pot in the last 7 days? (Put 0 if no guests ate in the house in the last 7 days.)

person-meals

Mongolia 2007/08

Did any visitor stay here with your household for the last month?

Number

(Specify number of visitors)

How many days?

person/day

(Number of visitors multiple by days stayed here)

On average, how many people were present in the last 7 days? In this section children are defined as less than 16 years.

Household Members				Visitors			
Male adults	Female adults	Male children	Female children	Male adults	Female adults	Male children	Female children

Uganda 2009/10

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Iraq 2012 household members

Table 1: meals taken within the household housing unit

INDIVIDUAL CODE: 01

INSTRUCTIONS: Every day and for each individual tick "X" in the column corresponding to the meal taken by an individual outside the household housing unit: 1 - breakfast, 2 - lunch or 3 - dinner

INDIVIDUAL CODE	MEMBER NAME	1206		1207		1208		1209		1210		1211				
		DAY #1		DAY #2		DAY #3		DAY #4		DAY #5		DAY #6		DAY #7		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
		BREAKFAST														
		LUNCH														
		DINNER														

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Iraq 2012 non-members

Table 2: Number of participants other than the household members in meals within the household

EACH DAY WRITE THE NUMBER OF PEOPLE THAT SHARED EVERY MEAL. DO NOT INCLUDE HOUSEHOLD MEMBERS

DAY NUMBER	1212			1213			1214			1215			1216			1217			1218		
	DAY #1	DAY #2	DAY #3	DAY #1	DAY #2	DAY #3	DAY #1	DAY #2	DAY #3	DAY #1	DAY #2	DAY #3	DAY #1	DAY #2	DAY #3	DAY #1	DAY #2	DAY #3	DAY #1	DAY #2	DAY #3
TYPE OF MEAL	BREAKFAST																				
	LUNCH																				
	DINNER																				

Number of individuals other than household members sharing meals within the household expenditure.

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Heterogeneity of approaches

Smith et al. (2014: 32)

Table 7: Collection of data on food given to non-household members (Percent of surveys)

Data are collected on the presence and/or household meal consumption of non-household members during the recall period	15
Data collected on the number of visitors in the household	11
Data collected on visitors' length of stay	5
Data collected on the number of meals consumed by visitors/guests	10
Data collected by type of meal (breakfast, lunch, dinner)	7
Data collected on the age of visitors/guests	/
Data collected on the sex of visitors/guests	6

Note: N=100 surveys.

A typology of approaches

FAO and WB (2018: 55)

- 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.

Recommendations

FAO and WB (2018: 55-56)

1. The addition of an **individual household member-based meal module** should be considered for all surveys that do not yet have it.
2. The **'meal partakers' approach** should be favored (*i.e.* module should collect information on meal partakers for each meal event during reference period, not just on individuals 'usually' sharing in the household's food resources)
3. If the entire individual household member-based meal module cannot be added, survey design teams should consider adding questions to a proxy respondent, that center on the **number of meals** 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

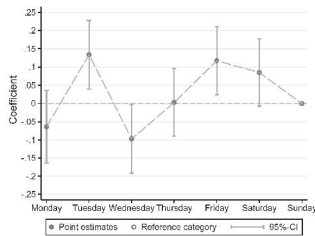
Afghanistan Poverty Assessment (2010)

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

Quarter	Season	Poverty rate (%)
1	Fall-harvest 2007	23
2	Winter 2007/08	32
3	Spring 2008	44
4	Summer 2008	46
Annual		36

The case of Mongolia – I/III

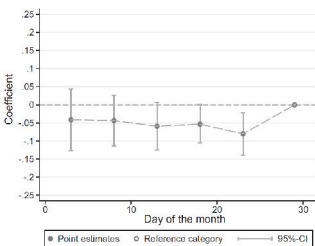
Troubat and Grunberger (2017: 136)



- **Weekday effects**
- 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 case of Mongolia – II/III

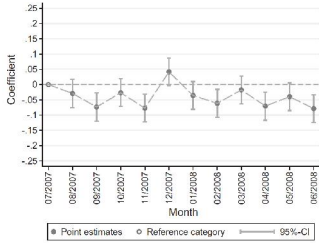
Troubat and Grunberger (2017: 136)



- **Day-of-the-month effects**
- 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 case of Mongolia – III/III

Trubart and Grunberger (2017: 136)



- **Seasonal effects**
- **Peak in December** (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
- The **usual month approach** does not work (see lecture 5)

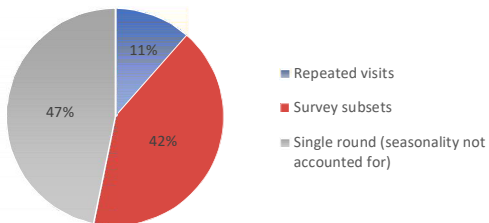
Common approaches to data collection

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

Current practices

Smith et al. (2014)



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, with sample stratified (e.g. quarterly nationally representative subsamples)
2. Conduct two visits per household, where the timing of the visits is scheduled to capture seasonal variations

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 **specific choices** in the design of the food module:
 - How to determine the length and degree of detail of the **list of food items**?
 - Why and how to account for **meal participation**?
 - Why and how to account for **seasonality**?
- The way the survey design team answers these questions is crucial for minimizing **measurement error**.
- Literature helps to balance trade-offs.

References

Required readings

FAO and The World Bank (2018). Food data collection in Household Consumption and Expenditure Surveys. Guidelines for low- and middle-income countries. Rome. Sections 2.2, 2.4, 2.6, 3.2, 3.4, 3.6.

Smith, L. C., Dupriez, O., and Troubat, N. (2014). Assessment of the reliability and relevance of the food data collected in national household consumption and expenditure surveys. International Household Survey Network. Sections 3.4, 3.5, 3.7.

Suggested readings

Beagle, K., De Weertdt, J., Friedman, J., and Gibson, J. (2012). Methods of household consumption measurement through surveys: Experimental results from Tanzania. Journal of Development Economics, 98, 3–18.

Bouis, H., Haddad, L., and Kennedy, E. (1992). Does it matter how we survey demand for food? Evidence from Kenya and the Philippines. Food Policy, 17(5), 349-360.

Finn, A. and Ranchhod, V. (2017). Genuine Fakes: The Prevalence and Implications of Data Fabrication in a Large South African Survey. Published by Oxford University Press on behalf of the World Bank.

Gibson, J., and Rozelle, S. (2002). How elastic is calorie demand? Parametric, nonparametric, and semiparametric results for urban Papua New Guinea. Journal of Development Studies, 38(6), 23-46.

Julliffe, D. (2001). Measuring absolute and relative poverty: the sensitivity of estimated household consumption to survey design. Journal of Economic and Social Measurement, 27(1, 2), 1-23.

Pradhan, M. (2009). Welfare analysis with a proxy consumption measure: evidence from a repeated experiment in Indonesia. Fiscal Studies, 30(3-4), 391-417.

Troubat, N. and Grönberg, K. (2017). Impact of survey design in the estimation of habitual food consumption. The case of the 2007/08 Socio Economic Survey of Mongolia applied to urban households. Food Policy, 72(C): 132-145.

Thank you for your attention

Homework

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 1 – Engaging with the literature

Working Analysis with a Proxy Consumption Measure: Evidence From a Repeated Experiment in Indonesia
 MINERVA PRADHAN
 17. September 2009, 14:44
 10.1016/j.jhealeco.2009.08.002

Abstract
 This paper examines the validity of the proxy consumption measure used in the literature to estimate the true consumption level of individuals. The study is based on a repeated experiment in Indonesia. The experiment consists of two phases. In the first phase, the respondents are asked to report their consumption level. In the second phase, the respondents are asked to report their consumption level using a proxy consumption measure. The results show that the proxy consumption measure is a valid measure of true consumption. The study also finds that the proxy consumption measure is more reliable than the true consumption measure. The study concludes that the proxy consumption measure is a valid measure of true consumption and can be used to estimate the true consumption level of individuals.

- 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 2 – Food module, international comparisons

- Go to <http://microdata.worldbank.org/index.php/catalog/lsm5> 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 3.5) comment on your findings

Exercise 3 – 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.
