Chapter 4
Measurement Scales and Questionnaires
“It is a capital mistake to theorize before one has data. Insensibily one begins to twist facts to suit theories, instead of theories to suit facts”

SIR ARTHUR CONAN DOYLE

Conan Doyle is most famous as the inventor of Sherlock Holmes, but he had a varied career as a writer, journalist and public figure.
CHAPTER 4. Measurement Scales and Questionnaires

CONTENTS

- THE MEASUREMENT SCALES
- SCALING TECHNIQUES
- THE QUESTIONNAIRE
- BASIC RULES FOR QUESTIONNAIRE ELABORATION
CHAPTER OBJECTIVES

After reading this chapter, you should be able to:

☆ Understand the difference between the different types of measurement scales.
☆ Understand the possible scaling techniques
☆ Understand the concepts of reliability and validity of questionnaires
☆ Know basic rules on how to elaborate a questionnaire.
What is “Measurement”?:

- Assigning numbers or other symbols to characteristics or attributes of objects according to pre-specified rules.

- We do not measure the object, but its characteristics or attributes.

- E.g. customer satisfaction

- The properties of the attribute determine which levels of measurement are possible.

  E.g. Gender
• What are “Scales of measurement”?:

- Scaling implies creating a continuum on which the objects that are being measured are placed.

E.g. customer satisfaction
MEASUREMENT SCALES

• **Four main types of measurement scales:**

1. Nominal Scales
2. Ordinal Scales
3. Interval Scales
4. Ratio Scales

**Important:** You must be aware of what kind of statistical analysis is possible with each scale type.
1. Nominal Scales

- Numbers are assigned arbitrarily (with no order) to categories or individuals…
- Strict one to one correspondence between the numbers and the objects
- **Used for**: identification or/and classification
  - **Identification**: Typically used for identifying respondents, brands, objects… E.g. A person’s ID number
  - **Classification**: E.g. 1 to man, 2 to women
- Only a limited **statistics** possible (frequency counts)
- There is **no ranking**
2. Ordinal Scales

- **Ranking scale**: numbers are assigned to objects on the basis of some **order** and represent a **relative standing** or different position in that order. E.g. “greater than”, “less than” judgments.

- It indicates the **relative position** (more or less of an attribute) **not** the **magnitude** (how much more/less) E.g. Rank your favorite soft drink

- Typically used to measure opinions, perceptions…

- **Statistics**: allow for example centiles, quartile, median, rank-order correlations…
3. Interval Scales

| Sample A |  
|---|---|---|---|---|---|---|---|---|
| **Please rate your taste perceptions by answering the following questions:** |  
| 1) Using a scale on 1-7 (1 = Very Weak 7 = Very Strong) Please rate the strength of each of the following tastes: |  
| a) Sweetness | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  
| b) Bitterness | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  
| c) Saltiness | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  
| d) Sourness | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  
| e) “Chocolateyness” | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  

| Sample B |  
|---|---|---|---|---|---|---|---|
| **Please rate your taste perceptions by answering the following questions:** |  
| 2) Using a scale on 1-7 (1 = Very Weak 7 = Very Strong) Please rate the strength of each of the following tastes: |  
| a) Sweetness | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  
| b) Bitterness | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  
| c) Saltiness | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  
| d) Sourness | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  
| e) “Chocolateyness” | ‘Very weak’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Very Strong’ |  

| 3) Using a scale on 1-7 (1 = Identical 7 = Very Strong) Please rate the similarity in taste between sample A and B. |  
| a) Similarity in taste | ‘Identical’ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ‘Totally Different’ |  

Thank you for your time, please collect your raffle ticket. Debriefing will be from 13:15 - 13:25 on Friday 26th February, in the School Hall. The prize raffle will be drawn at the end of a full debrief.
3. Interval Scales

-Numerical equal distances in the scale represent equal distances in the attribute or characteristics being measured.

E.g. consumer attitudes, preference…

-Classify, assign values or scores, and rank

-But: we cannot compare the absolute magnitude of numbers because the zero point is established arbitrarily. E.g. Colgate as “2” and as “4” could not be compared.

-Statistics include: mean, standard deviation, correlations…
4. Ratio Scales

- Have an absolute zero: allows comparisons of absolute magnitude of the numbers.
  E.g. age (in years), height (in cms), weight (in kgs), money (in €)...

- It possesses all properties of the nominal, ordinal and interval and an absolute zero point.

- Therefore: we can identify, classify, rank, and compare intervals or differences. (4 is twice as much as 2).

- Statistics: all statistical techniques can be applied and therefore ratio scales should be used whenever possible.
• Four main types of measurement scales:

**Nominal Scale**
Which of the following drinks do you like? (Please check all that apply)

_____Coke     _____Pepsi     _____Fanta     _____Seven-up     _____Acuarius

**Ordinal Scale**
Please rank the following drinks according to your likings, being 1 the most preferred drink and 5 the least preferred one.

_____Coke     _____Pepsi     _____Fanta     _____Seven-up     _____Acuarius

**Interval Scale**
Please in your opinion, indicate your level of liking for each of the following drinks (1=a lot; 5=nothing)

<table>
<thead>
<tr>
<th></th>
<th>Coke</th>
<th>Pepsi</th>
<th>Fanta</th>
<th>Seven-up</th>
<th>Acuarius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Ratio Scale**
In the last month, how many 330ml cans of the following drinks have you consumed?

_____Coke     _____Pepsi     _____Fanta     _____Seven-up     _____Acuarius
MEASUREMENT SCALES

- **Ratio**: Absolute zero
- **Interval**: Distance is meaningful
- **Ordinal**: Attributes can be ordered
- **Nominal**: Attributes are only named; weakest
SCALING TECHNIQUES

Scaling Techniques

Comparative (non-metric) scales
- Paired Comparison
- Rank Order
- Constant Sum
- Q-sort and other procedures

Continuous Rating Scales

Non-Comparative (metric) scales

Itemized Rating Scales
- Likert
- Semantic Differential
- Stapel
### Comparative (non-metric) Scaling Techniques

<table>
<thead>
<tr>
<th>Types</th>
<th>Description</th>
<th>Example</th>
<th>Data obtained</th>
<th>Advisable when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paired comparison</td>
<td>A respondent is presented with 2 objects and is asked to select one on the basis of a given criterion</td>
<td>E.g. Likes Signal more than Colgate</td>
<td>Ordinal</td>
<td>The objects are physical products</td>
</tr>
<tr>
<td>Rank order</td>
<td>Respondents are presented with several objects simultaneously and asked to rank them on the basis of a given criterion</td>
<td>E.g. Brands of soft drinks according to overall preference</td>
<td>Ordinal</td>
<td>Measuring preferences for brands and attributes</td>
</tr>
<tr>
<td>Constant sum</td>
<td>Consumers allocate a constant sum of units (points, Euros...) among a set of stimulus objects on the basis of a given criterion</td>
<td>E.g. Please allocate 100 points in total to the following attributes of a hotel (cleanliness, comfort, light, price) so that the points reflect the importance of the attribute for you.</td>
<td>Ordinal. (Sometimes treated as metric but with lack of generalizability)</td>
<td>Measuring preferences for attributes</td>
</tr>
<tr>
<td>Q-sort</td>
<td>Uses rank order procedures to sort objects based on similarity with respect to a given criterion.</td>
<td>E.g. Assign 60 objects in two different piles according to weight.</td>
<td>Discriminating among a large number of objects quickly</td>
<td></td>
</tr>
</tbody>
</table>
Non comparative (metric) scaling techniques

Continuous Scales
- Respondents rate objects placing a mark at the appropriate position on a line that goes from one extreme of the criterion to the other.

E.g. How would you rate Selfridges as a department store?
Probably the worst..........................I..................................................................................................................Probably the best
0 10 20 30 40 50 60 70 80 90 100
Non comparative (metric) scaling techniques

- **Itemized**: Likert, Semantic Differential, Staple
- **Continuous**

**Itemized rating scales (graphic rating)**
-Scales have a number of brief descriptors associated with each category.
Itemized rating scales (graphic rating)
Likert Scale (or summated-rating scale)

- Various degrees of agreement are assigned scale values.
- A total score for each respondent can be calculated by averaging the scores across items.
- Advantages: easy to construct and administer, easy to understand, suitable for mail, telephone or personal interview.
- Main disadvantage: it takes longer to respond than other scales.

Please, indicate whether you agree or disagree with the following sentences, being 1 “strongly disagree” and 5 “strongly agree”.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>This hotel is comfortable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>This hotel is clean</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>This hotel has a convenient location</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>This hotel offers a good food service</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Itemized rating scales (graphic rating)

Semantic Differential Scale
-Rating scale with end points associated with bipolar words or phrases.
-A total score for each respondent can be calculated by averaging the scores.
-Advantages: flexible and easy to use, and virtual presentation
-Main disadvantage: it takes longer to respond than other scales, not good for telephone.

Please, mark (X) the blank that best indicates how accurately one or the other adjective or phrase describes the characteristics of this hotel.

- Comfortable
- Clean
- Convenient location
- Good food service

Uncomfortable
Dirty
Unconvenient
Bad food service

X hotel A; X hotel B
### Itemized rating scales (graphic rating)

#### Staple scale

- Not very much used.
- Similar to semantic differential
- **Main disadvantage:** maybe difficult to understand by respondents.

Please, evaluate how accurately each word or phrase best describes the characteristics of this hotel. You should select and circle a negative number for phrases you do not think describe the hotel accurately, and a positive number for phrases you think describe the hotel accurately. The more accurately you think the phrases are, the larger the positive number you should choose.

<table>
<thead>
<tr>
<th>Comfortable</th>
<th>Clean</th>
<th>Convenient location</th>
<th>Good food service</th>
</tr>
</thead>
<tbody>
<tr>
<td>+5</td>
<td>+5</td>
<td>+5</td>
<td>+5</td>
</tr>
<tr>
<td>+4</td>
<td>+4</td>
<td>+4</td>
<td>+4</td>
</tr>
<tr>
<td>+3</td>
<td>+3</td>
<td>+3</td>
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<tr>
<td>+2</td>
<td>+2</td>
<td>+2</td>
<td>+2</td>
</tr>
<tr>
<td>+1</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
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<tr>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
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<td>-2</td>
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<td>-2</td>
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<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td>-4</td>
<td>-4</td>
<td>-4</td>
<td>-4</td>
</tr>
<tr>
<td>-5</td>
<td>-5</td>
<td>-5</td>
<td>-5</td>
</tr>
</tbody>
</table>
Other considerations in designing Itemized Rating Scales

1. Number of Scale positions
2. Balanced or unbalanced scales
3. Odd or even number of categories
4. Forced or non-forced choice
5. Verbal description
6. Physical form of the scale
SCALING TECHNIQUES

1. Number of Scale positions

**How many response categories? (5 minimum)**

Things to take into account:

- The nature of the object itself.
- The mode of data collection.
- How the data will be analyzed and used: the size of the correlation coefficient is influenced by the number of scale categories.

2. Balanced or unbalanced scales

**Equal number of positive and negative categories?**

Unbalanced scales: response categories unequal in number.
Balanced scales: response categories equal in number.
(If the distribution of responses is likely to be skewed, unbalanced scales may be used to reduce the effect)
3. **Odd or even number of categories**

   **Middle position is neutral or impartial**
   
   Even number: forces the response

4. **Forced or non-forced choice**

   Forced: a “no opinion” item eg. “do not know” or “not applicable” is not provided.
   
   When? Some of the respondents may not have knowledge about the issue.
   
   Risk: quick way to get through the questionnaire/ may distort results
5. Verbal description

Scale categories may have:
- verbal, numerical or even pictorial descriptions.
- descriptors only at the extremes or on all part
- Strong or weak anchors (e.g. extremely agree). Risk: strong anchors may incline respondents to avoid the far ends and produce peak distributions but weak anchors may produce flat distributions.

6. Physical form of the scale

Vertical, horizontal, boxes, lines, continuums, happy faces…
Multi-item rating scales:

Object that cannot be directly observed

If it cannot be directly observed:

How can we be sure that we are measuring the variable correctly?

Statistics:

- **Reliability** \((\alpha \text{ Cronbach, internal consistency, test-retest...})\)
- **Validity** \((\text{Content, Construct, Nomological...})\)
Reliability:
- Consistency
- Ability to obtain similar scores for the same object, trait, ... across time, evaluators, ...
- "Extent to which measures are free from random error"
- $\alpha$ Cronbach: 0-1 (cut-off value of 0.7).

Ways to measure reliability:
- Test-retest
- Alternative forms
- Internal consistency
- Coefficient Alpha ($\alpha$)
- Split-half reliability
Reliability:
- "Extent to which measures are free from random error”
- $\alpha$ Cronbach: 0-1 (cut-off value of 0.7).

<table>
<thead>
<tr>
<th>Alfa de Cronbach</th>
<th>N. de ítems</th>
<th>Factor 1</th>
<th>KMO</th>
<th>Prueba de Barllett</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,936</td>
<td>4</td>
<td>% varianza: 84,175</td>
<td>0,825</td>
<td>$\chi^2$ aprox. 671,517 gl. 6 Sig. .000</td>
</tr>
</tbody>
</table>

ESCALA INICIAL PROPUESTA DE “SATISFACCIÓN”

| S1. Nuestra elección de trabajar con este grupo de investigación fue una decisión acertada. | 0,769 |
| S2. Estamos satisfechos con las capacidades de este grupo de investigación. | 0,893 |
| S3. En general, la relación con ellos ha sido satisfactoria. | 0,838 |
| S4. Creemos que hicimos lo correcto cuando decidimos trabajar con este grupo de investigación. | 0,867 |
A Scale has Validity when:

- It accurately assesses what it was intended to assess.

Types of validity:

<table>
<thead>
<tr>
<th>Validity</th>
<th>Content</th>
<th>Construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criterion</td>
<td>-Convergent</td>
<td>-Discriminant</td>
</tr>
<tr>
<td></td>
<td>-Predictive</td>
<td>-Nomological</td>
</tr>
</tbody>
</table>

SCALING TECHNIQUES
Validity:

★ **Content validity**
- Subjective evaluation.
- Do scale items cover the entire domain of the construct?
- Review theoretical backgrounds to check the construct or variable includes all **dimensions**.

★ **Criterion validity**
- Relationships with other constructs that should theoretically exist are evident.
  - **Concurrent**: data on the scale and on the criterion are taken at the same time.
  - **Predictive**: data on the scale is collected at one time, and data on the criterion variables is collected at future times. (e.g. Attitude towards soft drinks)
Validity:

★ Construct validity

- **Convergent validity**
  Extent to which the scale correlates positively with other measures of the same construct.

- **Discriminant validity**
  Extent to which the scale does not correlate with other construct from which it is not supposed to correlate.

- **Nomological validity**
  Correlations between constructs as predicted by the theory
SCALING TECHNIQUES

Definition and study of the dimensions of the construct based on theory

Items and scaling techniques selection

CONTENT VALIDITY (Dimensionality)

Design of the population and sample

Field work (Pilot study)

Purify scale

Fieldwork

RELIABILITY

CONSTRUCT VALIDITY
• Convergent validity
• Discriminant validity

NOMOLOGICAL VALIDITY
• Concurrent validity
• Predictive validity

FINAL SCALE

How many dimensions?

How many items? Scale type and design?

Check with experts

Design the sample

Pre-test: Data collection

Statistical checks: improve scale

Data Collection

Statistical checks: Cronbach $\alpha$, factor analyses…
CHAPTER 4. Measurement Scales and Questionnaires

CONTENTS

- THE MEASUREMENT SCALES
- SCALING TECHNIQUES
- THE QUESTIONNAIRE
- BASIC RULES FOR QUESTIONNAIRE ELABORATION
Questionnaire

Set of written or verbal questions that the respondent should answer.

❖ 3 main objectives:

1. Translate the information needed in a set of questions.
2. Motivating and encouraging for the respondent
3. Minimize response error
BASIC RULES FOR QUESTIONNAIRE ELABORATION

1. Specify information needed
2. Method of administration
3. Content of individual questions
4. Form of response to questions
5. Question wording
6. Question order
7. Form and layout
8. Good introduction or script
9. Reproduce the questionnaire (modify if necessary)
10. Pretest and revise
1. **Specify the information needed**

Questions have to align with hypotheses

2. **Determine methods of administration**

Type of interviewing method will influence

- type of questions, wording, and all further steps.

  E.g.

  ✓ Personal interviews: lengthy, complex…are ok
  ✓ Telephone: short
  ✓ Self administered: detailed
3. Determine content of individual questions

3 main things to consider:

1. No extra questions
2. Avoid double-barrelled questions
3. Topics:
   - they **know** (filter questions e.g. do you know product X?)
   - they **can remember** (associated cues, e.g. which of these brands of perfume do you remember watching last night on TV?)
   - they can **phrase** (providing aids, e.g. maps, descriptions, pictures...)

BASIC RULES FOR QUESTIONNAIRE ELABORATION
4. Determine structure and form of response: question types

☆ Open-ended (unstructured): the answer is open
- For Factual information
  There is a correct answer. E.g. How old are you?
- To uncover motivations, feelings and attitudes.
  Mainly used for exploratory research.
BASIC RULES FOR QUESTIONNAIRE ELABORATION

Example: Un-structured Interview

Personal or Telephone Interviews
What toppings, if any, do you usually add to a pizza other than cheese when ordering a pizza for yourself from Pizza Hut? (Interviewer: Record all mentioned toppings in the space provided below. Make sure you probe for specifics and clarity of responses.)


or

What toppings, if any, do you usually add to a pizza other than cheese when ordering a pizza for yourself from Pizza Hut? (Interviewer: DO NOT read the listed toppings; just record the toppings by checking the box next to the mentioned toppings below. Make sure you probe for specifics and clarity of responses.)

☐ anchovies ☐ bacon ☐ barbecue beef
☐ black olives ☐ extra cheese ☐ green olives
☐ green peppers ☐ ground beef ☐ ham
☐ hot peppers ☐ mushrooms ☐ onions
☐ pepperoni ☐ sausage ☐ some other topping: _______

Self-Administered Survey (Online or Offline)
In the space provided below, please write the types of toppings, if any, that you usually add to a pizza other than cheese when ordering a pizza for yourself from Pizza Hut. (Please indicate as many toppings as apply.)


Source: Hair et al. (2006)
4. Determine structure and form of response: question types

- Closed-ended (structured): respondent chooses answer from a list of possible ones, using fixed scales.
  - Response categories must be exhaustive (all possible responses should be included in the alternative options)
  - Response categories must be mutually exclusive
  - The researcher has to control response order bias. The recommended procedure for dealing with this type of bias is the split-ballot technique, where response options are re-ordered or randomized to create different versions of the survey. E.g. each response category will appear in each position (first, middle, last) about equally across the sample.
4. Determine structure and form of response: question types

☆ Closed-ended (structured)

Three main types:

1. Multiple choice questions

   • Researcher has to avoid order or position bias.

   • Disadvantage: need more time than unstructured questions to design, exploratory research may be needed to know the alternatives, bias response.
BASIC RULES FOR QUESTIONNAIRE ELABORATION

Example: Structured Interview

**Personal Interview**

_(HAND RESPONDENT CARD.)_ Please look at this card and tell me the letters that indicate what toppings, if any, you usually add to a pizza other than cheese when ordering a pizza for yourself from Pizza Hut. **(Interviewer: Record all mentioned toppings by circling the letters below, and make sure you probe for any other toppings.)**

[a] anchovies  
[b] bacon  
[c] barbecue beef  
[d] black olives  
[e] extra cheese  
[f] green olives  
[g] green peppers  
[h] ground beef  
[i] ham  
[j] hot peppers  
[k] mushrooms  
[l] onions  
[m] pepperoni  
[n] sausage  
[p] some other topping: ________

**Telephone Interview (Traditional or Computer Assisted)**

I’m going to read you a list of pizza toppings. As I read each one, please tell me whether or not that topping is one that you usually add to a pizza when ordering a pizza for yourself from Pizza Hut. **(Interviewer: Read each topping category slowly and record all mentioned toppings by circling their corresponding letter below, and make sure you probe for any other toppings.)**

[a] anchovies  
[b] bacon  
[c] barbecue beef  
[d] black olives  
[e] extra cheese  
[f] green olives  
[g] ground beef  
[h] ham  
[i] hot peppers  
[j] mushrooms  
[k] onions  
[l] pepperoni  
[m] sausage  
[n] some other topping: ________

**Self-Administered Survey (Online or Offline)**

Among the pizza toppings listed below, what toppings, if any, do you usually add to a pizza other than cheese when ordering a pizza for yourself from Pizza Hut? **(Please check as many boxes as apply.)**

- [ ] anchovies  
- [ ] black olives  
- [ ] green peppers  
- [ ] hot peppers  
- [ ] pepperoni  
- [ ] bacon  
- [ ] extra cheese  
- [ ] ground beef  
- [ ] mushrooms  
- [ ] sausage  
- [ ] barbecue beef  
- [ ] green olives  
- [ ] ham  
- [ ] onions  
- [ ] some other topping: ________

Source: Hair et al. (2006)
BASIC RULES FOR QUESTIONNAIRE ELABORATION

4. Determine structure and form of response: question types

☆ Closed-ended (structured)

Three main types:

2. Dichotomous questions: 2 alternatives.
   • Researcher has to decide whether to include a neutral alternative.
   • Forces response?

3. Scales
5. **Determine question wording**

**Phrasing of the questions:**

- **Define** the issue
- **Use** ordinary **simple words**
  
  “Occasionally, sometimes, regularly, often…”
- **Avoid** leading or **biasing questions**
  
  “Do you agree with the Pediatric Association….”
- **Avoid** implicit alternatives
  
  Do you prefer eating out or at home on holidays?
- **Avoid** assumed consequences
  
  Are you in favor of increasing public prices on education?
- **Avoid** generalizations and estimates
  
  How many times did you go to refill your car at the petrol station last year?
- **Avoid** double-barreled questions
  
  Do you think this hotel is comfortable and clean?
- **Use** positive and negative statements (dual statements)
  
  Recode (or reverse code) negative statements
6. Determine question order

-Opening question
  Interesting (respondents may stop their cooperation)

-Type of information
  “Funnel approach…”

-Effect on subsequent questions
  **Funnel approach**/ Flowerpot approach may reduce the tendency towards question order bias....”

  overall loyalty → customer loyalty towards product → product features

**Flowerpot Approach**
  Specific framework — for integrating sets of question/scale measurements into a logical, smooth-flowing questionnaire

-Difficult or sensitive questions at the end
  increases cooperation
BASIC RULES FOR QUESTIONNAIRE ELABORATION

Source: Hair et al. (2006)

This diagram illustrates the overall flowerpot design of a questionnaire that fits a research survey that has two defined information objectives and calls for an identification base that contains both psychographic and demographic-socioeconomic traits about the respondent.
7. Determine form and layout

It is important for response rate:

-Hints:

-Try to keep it short: The shorter the survey, the larger the response rates
-Split into sections
-Simple and clear instructions
8. Develop a good introduction or script

It is important for response rate:

-Cover letter or e-mail message:

-Who you are
-Why you are contacting them
-Your request for their help in providing information
-How long it will take
-Responses will be anonymous (aggregated) or confidential (if this is true)
-Any incentives they may receive for participating
9. **Reproduce the questionnaire**

It is important for response rate:

-**Hints:**

- Try to use high quality paper
- Do not split questions or tables into different pages
- If it is more than one page long, try to present it in a booklet rather than a number of clipped or stapled pages
- Avoid tendency to crowd questions together to make it look shorter. Little blank spaces between questions should be placed as close to the questions as possible.
- The questionnaire should be easy to read and answer.
10. Pre-test questionnaire and revise if necessary

It is important for response rate:

- Conduct a pilot study

- Similar respondents
- Two pre-tests are recommended:
  - Personal interview questionnaire pre-test
  - Second pre-test with the chosen method of administration
- How many people? Minimum of 5 in the interview and 10/30 in the second pretest
- Data collection should never start until the questionnaire has been pretested.
BASIC RULES FOR QUESTIONNAIRE ELABORATION

EXHIBIT 18.13 Example of an Introduction-Screening-Quota Sheet for a Retail Bank Study Using Personal Interviews

INTRODUCTION-Screening-Quota Sheet
For the University Student Banking Opinion Survey

Approach to Randomly Selecting a Student
A. Politely walk up to an individual and introduce yourself.
B. Politely explain to the person that:
   Your Marketing Research class is conducting an interesting class project this semester on students’ banking attitudes and habits and you would like to include their opinions in the study.
   • IF THEY SAY “NO” or “DON’T WANT TO PARTICIPATE,” politely thank them and move on to randomly select another person and repeat steps A and B.
   • IF THEY ARE WILLING TO BE INTERVIEWED, ASK:
Q1. Are you currently a university student this semester?
   If YES, continue with Q2.
   If NO, thank them and DISCONTINUE the survey.
Q2. Have you already participated in this survey?
   If YES, thank them and DISCONTINUE the survey.
   If NO, continue with Q3.
Q3. Thinking about the various banking systems which you may or may not use, please tell me the name of the one bank that you would generally consider as being “YOUR” primary bank.
   (CHECK TO SEE IF THE RESPONDENT’S CHOICE FITS YOUR NEEDED QUOTA OF BANK TYPES BELOW)

<table>
<thead>
<tr>
<th>Quota</th>
<th>Possible “Other” Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>Bank of America</td>
</tr>
<tr>
<td>1 2 3 4 5</td>
<td>Sun Trust Bank</td>
</tr>
<tr>
<td>1 2 3 4 5</td>
<td>Citicorp</td>
</tr>
<tr>
<td>1 2 3 4 5</td>
<td>Capital One</td>
</tr>
<tr>
<td>1 2 3 4 5</td>
<td>First Union</td>
</tr>
<tr>
<td>1 2 3 4 5</td>
<td>Some Other Bank</td>
</tr>
</tbody>
</table>

   • IF THE ANSWER FITS A NEEDED QUOTA AREA,
     (a) cross out one of the respective quota counts, and
     (b) record the answer in Question 1 of the survey and continue with Question 2 of the survey.

   • IF THE ANSWER DOES NOT FIT A NEEDED QUOTA AREA,
     (a) politely thank them and DISCONTINUE the survey, and
     (b) go back and repeat Steps A and B.
### BASIC RULES FOR QUESTIONNAIRE ELABORATION

#### Example of the Question/Scale Format and Rating Card Used in Collecting Raw Data in a Retail Banking Survey

**RATING CARD A**

(IMPORTANCE SCALE FOR Q2)

<table>
<thead>
<tr>
<th>Rating Numbers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6___</td>
<td>Extremely Important Consideration to Me</td>
</tr>
<tr>
<td>5___</td>
<td>Definitely Important Consideration to Me</td>
</tr>
<tr>
<td>4___</td>
<td>Generally Important Consideration to Me</td>
</tr>
<tr>
<td>3___</td>
<td>Somewhat Important Consideration to Me</td>
</tr>
<tr>
<td>2___</td>
<td>Only Slightly Important Consideration to Me</td>
</tr>
<tr>
<td>1___</td>
<td>Not At All Important Consideration to Me</td>
</tr>
</tbody>
</table>

Q2 Let’s begin. I am going to read to you some bank features which may or may not have been important to you in selecting “YOUR” bank.

Using this rating card (HAND RESPONDENT RATING CARD A), please tell me the number that best describes how important you feel the bank feature was to you in helping select “YOUR” bank.

To what extent was (READ FIRST FEATURE) an important consideration to you in selecting “YOUR” bank?

(INTERVIEWER: MAKE SURE YOU READ AND RECORD THE ANSWER FOR ALL LISTED FEATURES)

<table>
<thead>
<tr>
<th>Rating Number</th>
<th>Features</th>
<th>Rating Number</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>___</td>
<td>Convenience of branch locations</td>
<td>___</td>
<td>Competitive minimum service charges</td>
</tr>
<tr>
<td>___</td>
<td>Flexibility of banking hours</td>
<td>___</td>
<td>Free checking availability</td>
</tr>
<tr>
<td>___</td>
<td>Friendly/courteous bank personnel</td>
<td>___</td>
<td>Interest rates on saving type accounts</td>
</tr>
<tr>
<td>___</td>
<td>No minimum balance requirement</td>
<td>___</td>
<td>Competitive interest rates on loans</td>
</tr>
<tr>
<td>___</td>
<td>Availability of credit card services</td>
<td>___</td>
<td>Credibility of the bank’s reputation</td>
</tr>
<tr>
<td>___</td>
<td>Availability of ATM services</td>
<td>___</td>
<td>Bank’s promotional advertisements</td>
</tr>
</tbody>
</table>

(Upon completion take back RATING CARD A)
### BASIC RULES FOR QUESTIONNAIRE ELABORATION

#### Exhibit 18.15 An Example of an Interviewer’s Call Record Sheet

<table>
<thead>
<tr>
<th>Interviewer Code Number</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10/11</td>
<td>10/13</td>
<td>10/16</td>
<td>10/18</td>
<td>10/19</td>
<td>10/20</td>
<td>10/23</td>
<td></td>
</tr>
<tr>
<td><strong>Total Contact Attempts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of initial attempts</td>
<td>8</td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>12</td>
<td>14</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Number of callbacks</td>
<td>12</td>
<td>10</td>
<td>14</td>
<td>10</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total Number of Noncontacts</strong></td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>No answer</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Reached a recording</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Wrong phone number</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone no longer in service</td>
<td>1</td>
<td></td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Specific person not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other reasons</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total Number of Actual Contacts</strong></td>
<td>4</td>
<td>10</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Number of Completed Interviews</strong></td>
<td>4</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bank of America</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun Trust Bank</td>
<td></td>
<td>2</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citicorp</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital One</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Union</td>
<td></td>
<td>3</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Banks</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Contacts per Completed Interview</strong></td>
<td>1</td>
<td>1.25</td>
<td>1</td>
<td>1.3</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Number of Terminated Interviews</strong></td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>10</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Screening ineligibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refused participation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent break-off</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quota requirement filled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language/hearing problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some other reason</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interviewing hours</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training hours</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel hours</td>
<td>4.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mileage to interviewing center</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Hair et al. (2006)*
CHAPTER 4. Measurement Scales and Questionnaires

CHAPTER OBJECTIVES

After reading this chapter, you should be able to:

★ Understand the difference between the different types of measurement scales.
★ Understand the possible scaling techniques
★ Understand the concepts of reliability and validity of questionnaires
★ Know basic rules on how to elaborate a questionnaire.
CHAPTER 4. Measurement Scales and Questionnaires

REFERENCES


Chapter 4

Measurement Scales and Questionnaires