Near East University

MARKETING RESEARCH

MARK 401

OBSERVATIONAL TECHNIQUES AND SURVEY RESEARCH METHOD

MEASUREMENT AND SCALING

Rana SERDAROGLU
Source:Malhotra and Birks, et al. Chp 10,11,12
Dr. Eric Shiu lecture notes

Know exactly what you want to measure – and then select a survey or observation technique that creates cooperative respondents, willing to think and be honest.

Chapter outline

1. Overview
2. Survey techniques
3. Telephone interviews
4. Personal interviews
5. Mail interviews
6. Electronic surveys
7. A comparative evaluation of survey techniques
8. Observation techniques
9. Observation techniques classified by mode of administration

Chapter outline

10. Measurement and scaling

11. Primary scales of measurement

12. A comparison of scaling techniques

13. Itemised rating scale decisions

14. The development and evaluation of scales

15. Choosing a scaling technique

16.

Figure 10.1 A classification of survey methods
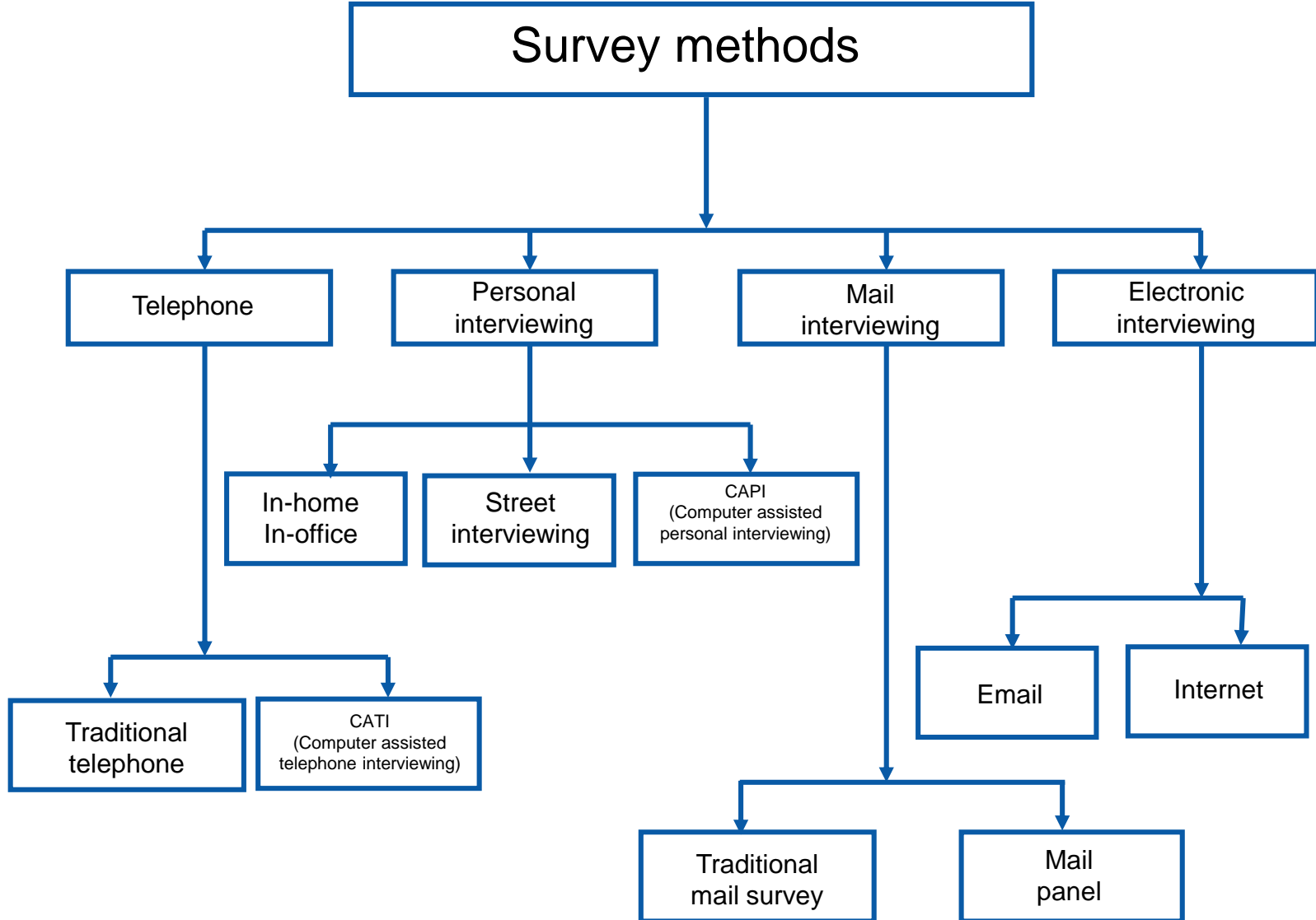
Reasons for the decrease in survey response rates in business research

- Concerns about confidentiality
- Length of interviews
- Relevance of questions
- Number of requests
- No direct benefit to the company.

Quantitative observation techniques

- Quantitative observation involves recording the behavioural patterns of people, objects and events in a systematic manner to obtain information about the phenomenon of interest.

- The observer does not question or communicate with the people being observed unless he or she takes the role of a mystery shopper.

- Information may be recorded as the events occur or from records of past events.

Structured versus unstructured observation

- For **structured observation**, the researcher specifies in detail what is to be observed and how the measurements are to be recorded, e.g. an auditor performing inventory analysis in a store.

- In **unstructured observation**, the observer monitors all aspects of the phenomenon that seem relevant to the problem at hand, e.g. observing children playing with new toys.

Disguised versus undisguised observation

- In **disguised observation**, the respondents are unaware that they are being observed. Disguise may be accomplished by using two-way mirrors, hidden cameras or inconspicuous electronic devices. Observers may be disguised as mystery shoppers or sales staff.

- In **undisguised observation**, the respondents are aware that they are under observation.

Natural versus contrived observation

- **Natural observation** involves observing behaviour as it takes places in the environment. For example, one could observe the behaviour of respondents eating a new menu option in Burger King.

- In **contrived observation**, respondents' behaviour is observed in an artificial environment, such as a test kitchen.

When you can measure what you are speaking about and express it in numbers, you know something about it. – *Lord Kelvin*
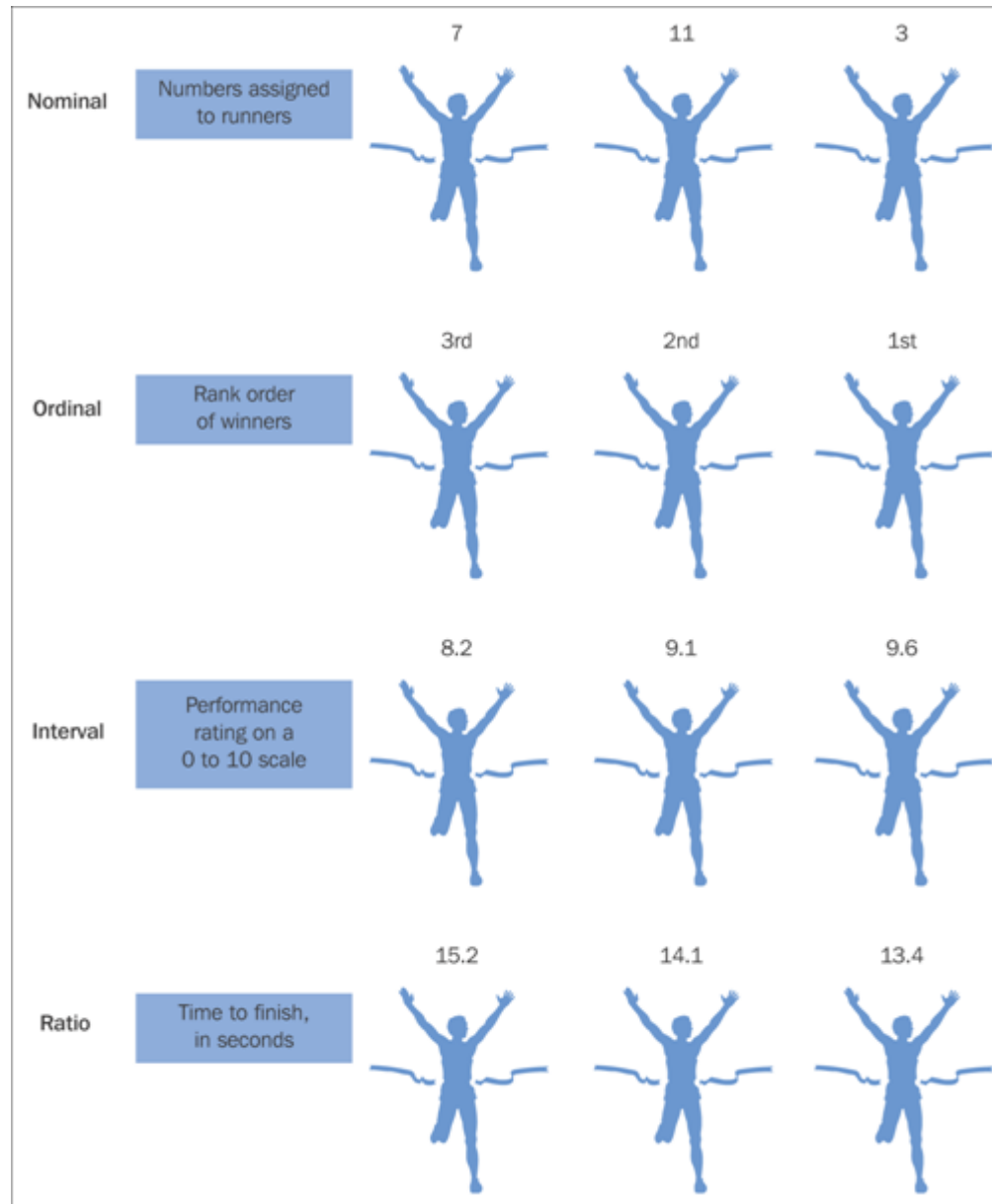
Measurement and scaling

Measurement means assigning numbers or other symbols to characteristics of objects according to certain pre-specified rules.

- One-to-one correspondence between the numbers and the characteristics being measured.

- The rules for assigning numbers should be standardised and applied uniformly.

- Rules must not change over objects or time.

Measurement and scaling (Continued)

Scaling involves creating a continuum upon which measured objects are located.

Consider an attitude scale from 1 to 100. Each respondent is assigned a number from 1 to 100, with 1 = extremely unfavourable, and 100 = extremely favourable. Measurement is the actual assignment of a number from 1 to 100 to each respondent. Scaling is the process of placing the respondents on a continuum for example with respect to their attitude toward Formula One racing.

Figure 12.1 An illustration of primary scales of measurement

		7	11	3
Nominal	Numbers assigned to runners			

		3rd	2nd	1st
Ordinal	Rank order of winners			

		8.2	9.1	9.6
Interval	Performance rating on a 0 to 10 scale			

		15.2	14.1	13.4
Ratio	Time to finish, in seconds			

Illustration of primary scales of measurement

No.	Nominal scale Sponsor	Ordinal scale Preference rankings		Interval scale Preference ratings		Ratio scale € Amount spent on merchandise on this team in the last 3 months
				1–7	11–17	
1	BAR	5	53	5	15	35
2	Ferrari	1	10	7	17	250
3	Jaguar	6	61	5	15	100
4	Jordan	8	82	4	14	0
5	McLaren	2	25	7	17	200
6	Minardi	9	95	4	14	0
7	Renault	3	30	6	16	100
8	Sauber	10	115	2	12	10
9	Toyota	7	79	5	15	0
10	Williams	4	45	6	16	0

Ordinal scale

- A ranking scale in which numbers are assigned to objects to indicate the relative extent to which the objects possess some characteristic.

- Can determine whether an object has more or less of a characteristic than some other object, but not how much more or less.

- Any series of numbers can be assigned that preserves the ordered relationships between the objects.

- In addition to the counting operation allowable for nominal scale data, ordinal scales permit the use of statistics based on centiles, e.g. percentile, quartile, median.

Interval scale

- Numerically equal distances on the scale represent equal values in the characteristic being measured.

- It permits comparison of the differences between objects.

- The location of the zero point is not fixed. Both the zero point and the units of measurement are arbitrary.

- Any positive linear transformation of the form $y = a + bx$ will preserve the properties of the scale.

- It is not meaningful to take ratios of scale values.

- Statistical techniques that may be used include all of those that can be applied to nominal and ordinal data in addition the arithmetic mean, standard deviation, and other statistics commonly used in marketing research.

Ratio scale

- Possesses all the properties of the nominal, ordinal and interval scales.

- It has an absolute zero point.

- It is meaningful to compute ratios of scale values.

- Only proportionate transformations of the form $y = bx$, where b is a positive constant, are allowed.

- All statistical techniques can be applied to ratio data.

Table 12.1 Primary scales of measurement

Scale	Basic characteristics	Common examples	Marketing example	Permissible statistics	
				Descriptive	Inferential
Nominal	Numbers identify and classify objects	Student registration numbers, numbers on football players' shirts	Gender classification, bank types	Percentages, mode	Chi-square, binomial test
Ordinal	Numbers indicate the relative positions of the objects but not the magnitude of differences between them	Rankings of the top four teams in the football World Cup	Ranking of service quality delivered by a number of banks. Rank order of favourite TV programmes	Percentile, median	Rank-order correlation, Friedman ANOVA
Interval	Differences between objects can be compared; zero point is arbitrary	Temperature (Fahrenheit, Celsius)	Attitudes, opinions, index numbers	Range, mean, standard deviation	Product moment correlations, t tests, ANOVA, regression, factor analysis
atio	Zero point is fixed; ratios of scale values can be computed	Length, weight	Age, income, costs, sales, market shares	Geometric mean, harmonic mean	Coefficient of variation

Figure 12.2 A classification of scaling techniques
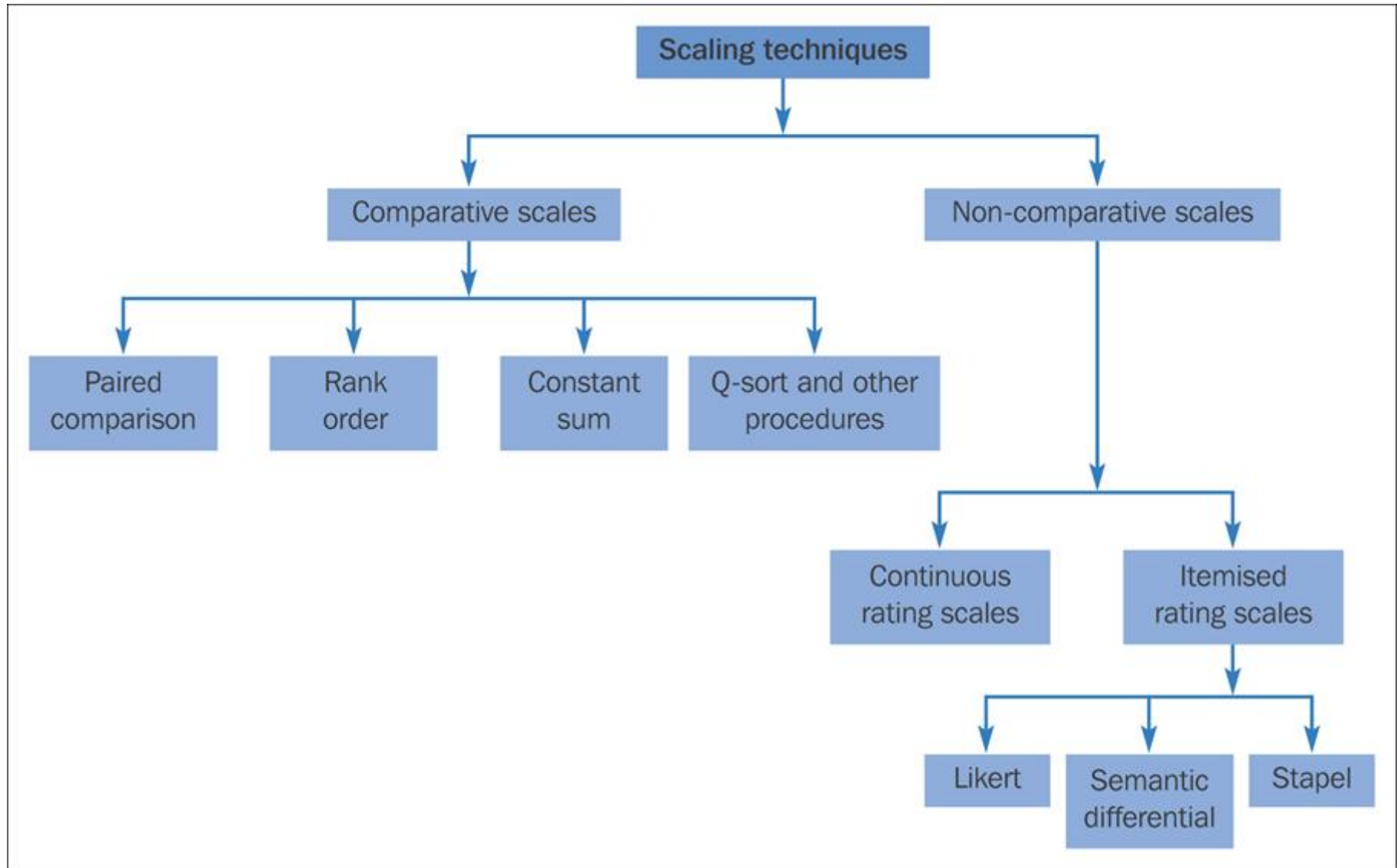
A comparison of scaling techniques

- **Comparative scales** involve the direct comparison of stimulus objects. Comparative scale data must be interpreted in relative terms and have only ordinal or rank order properties.

- In **non-comparative scales**, each object is scaled independently of the others in the stimulus set. The resulting data are generally assumed to be interval or ratio scaled.

Non-comparative scaling techniques

- Respondents evaluate only one object at a time, and for this reason non-comparative scales are often referred to as monadic scales.

- Non-comparative techniques consist of continuous and itemised rating scales.

Relative advantages of comparative scales

- Small differences between stimulus objects can be detected.

- Same known reference points for all respondents.

- Easily understood and can be applied.

- Involve fewer theoretical assumptions.

- Tend to reduce halo or carryover effects from one judgment to another.

Relative disadvantages of comparative scales

- Ordinal nature of the data

- Inability to generalise beyond the stimulus objects scaled.

Figure 12.6 Continuous rating scales

How would you rate the quality of Michelin tyres used in Formula One Racing?

Version 1
Probably the worst ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~✓~~~~~~~~~~Probably the best

Version 2
Probably the worst ~~~~~~~~~~~~~~~~~~~~~~~~~~~~✓~~~~~~~~~~Probably the best

0   10   20   30   40   50   60   70   80   90   100

Version 3

      Very bad   *Neither good nor bad*   *Very good*

Probably the worst ~~~~~~~~~~~~~~~~~~~~~~~~~~~~✓~~~~~~~~~~Probably the best

0   10   20   30   40   50   60   70   80   90   100

Figure 12.7 The Likert scale

Instructions

Listed below are different beliefs about Renault cars. Please indicate how strongly you agree or disagree with each by putting a tick next to your choice on the following scale:

1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1 Renault produces high-quality cars	1	2✓	3	4	5
2 Renault has poor after-sales service	1	2✓	3	4	5
3 I like to visit Renault dealerships	1	2	3✓	4	5
4 Renault does not offer a good range of optional extras for its cars	1	2	3	4✓	5
5 The credit terms at Renault dealerships are terrible	1	2	3	4✓	5
6 Renault is the embodiment of European excellence in car manufacturing	1✓	2	3	4	5
7 I do not like Renault advertising	1	2	3	4✓	5
8 Renault has an excellent selection of car types	1	2	3	4✓	5
9 The price of Renault cars is fair	1	2✓	3	4	5

Figure 12.8 Semantic different scale

Instructions

What does Formula One racing mean to you? The following descriptive scales, bounded at each end by bipolar adjectives, summarise characteristics of the sport. Please mark **X** the blank that best indicates what Formula One means to you.

Form

Formula One is:

Boring	:__::__::__::__::__:: **X** ::__:	Exciting
Conservative	:__::__::__::__::__:: **X** ::__:	Innovative
Dangerous	:__::__::__::__::__::__:: **X** :	Safe
Staid	:__::__::__::__::__:: **X** ::__:	Dynamic
Uninspiring	:__:: **X** ::__::__::__::__::__:	Inspirational

A semantic differential scale for measuring self-concepts, person concepts, and product concepts

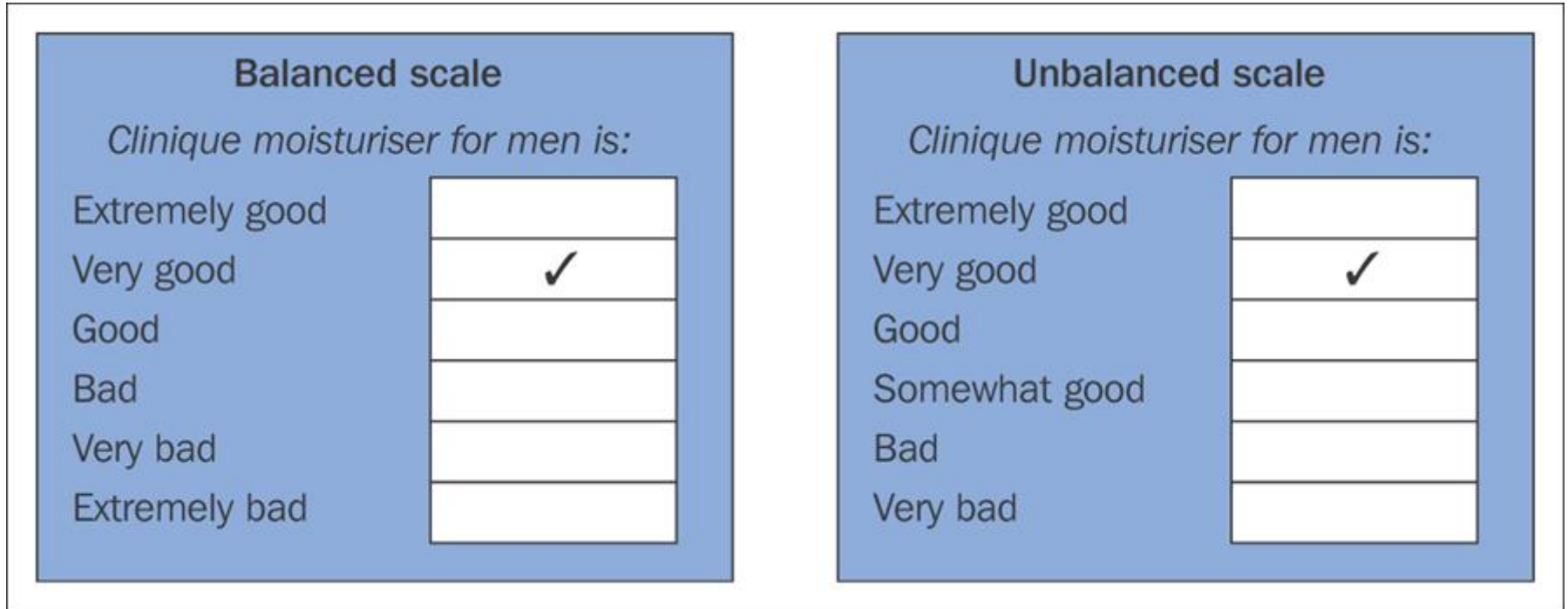|		
1) Rugged	:---:---:---:---:---:---:---:	Delicate
2) Excitable	:---:---:---:---:---:---:---:	Calm
3) Uncomfortable	:---:---:---:---:---:---:---:	Comfortable
4) Dominating	:---:---:---:---:---:---:---:	Submissive
5) Thrifty	:---:---:---:---:---:---:---:	Indulgent
6) Pleasant	:---:---:---:---:---:---:---:	Unpleasant
7) Contemporary	:---:---:---:---:---:---:---:	Obsolete
8) Organised	:---:---:---:---:---:---:---:	Unorganised
9) Rational	:---:---:---:---:---:---:---:	Emotional
10) Youthful	:---:---:---:---:---:---:---:	Mature
11) Formal	:---:---:---:---:---:---:---:	Informal
12) Orthodox	:---:---:---:---:---:---:---:	Liberal
13) Complex	:---:---:---:---:---:---:---:	Simple
14) Colourless	:---:---:---:---:---:---:---:	Colourful
15) Modest	:---:---:---:---:---:---:---:	Vain

Figure 12.9 Stapel scale

Instructions
Please evaluate how accurately each word or phrase describes Formula One racing. Select a positive number for the phrases you think describe the sport accurately. The more accurately you think the phrase describes the sport, the larger the plus number you should choose. You should select a minus number for the phrases you think do not describe the sport accurately. The less accurately you think the phrase describes the sport, the larger the negative number you should choose. You can select any number from +5 for phrases you think are very accurate, to –5 for phrases you think are very inaccurate.

Form

Formula One

+5	+5
+4✗	+4
+3	+3
+2	+2
+1	+1
Prestigious	*Elitist*
–1	–1
–2	–2✗
–3	–3
–4	–4
–5	–5

Non-comparative itemised rating scale decisions

- The number of scale categories to use
- Balanced versus unbalanced scale
- Odd or even number of categories
- Forced versus non-forced choice
- Nature and degree of verbal description
- Physical form of the scale

Figure 12.10 Balanced and unbalanced scales

Balanced scale	Unbalanced scale
Clinique moisturiser for men is:	Clinique moisturiser for men is:
Extremely good	Extremely good
Very good ✓	Very good ✓
Good	Good
Bad	Somewhat good
Very bad	Bad
Extremely bad	Very bad

Figure 12.11 Rating scale configurations

A variety of scale configurations may be employed to measure the gentleness of *Clinique Face Scrub for Men*.

Some examples include:

Clinique Face Scrub for Men is:

1 Very harsh ___ ___ ___ ___ ___ ___ ___ Very gentle

2 Very harsh   1   2   3   4   5   6   7   Very gentle

3 • Very harsh

   •

   •

   • Neither harsh nor gentle

   •

   •

   • Very gentle

4						
Very harsh	Harsh	Somewhat harsh	Neither harsh nor gentle	Somewhat gentle	Gentle	Very gentle

5						
−3	−2	−1	0	+1	+2	+3
Very harsh			Neither harsh nor gentle			Very gentle

Figure 12.12b Some unique rating scale configurations

Smiling face scale

Instructions

Please tell me how much you like Barbie Doll by pointing to the face that best shows how much you like it. If you did not like the Barbie Doll at all, you would point to Face 1. If you liked it very much, you would point to Face 5. Now tell me, how much did you like the Barbie Doll?

Form

1   2   3   4   5

Some Commonly Used Scales in Marketing

CONSTRUCT   SCALE DESCRIPTORS

Attitude	Very bad	Bad	Neither bad nor good	Good	Very good
Importance	Not all all important	Not important	Neutral	Important	Very important
Satisfaction	Very dissatisfied	Dissatisfied	Neither dissatisfied nor satisfied	Satisfied	Very satisfied
Purchase intent	Definitely will not buy	Probably will not buy	Might or might not buy	Probably will buy	Definitely will buy
Purchase freq	Never	Rarely	Sometimes	Often	Very often

Figure 12.14 Scale evaluation
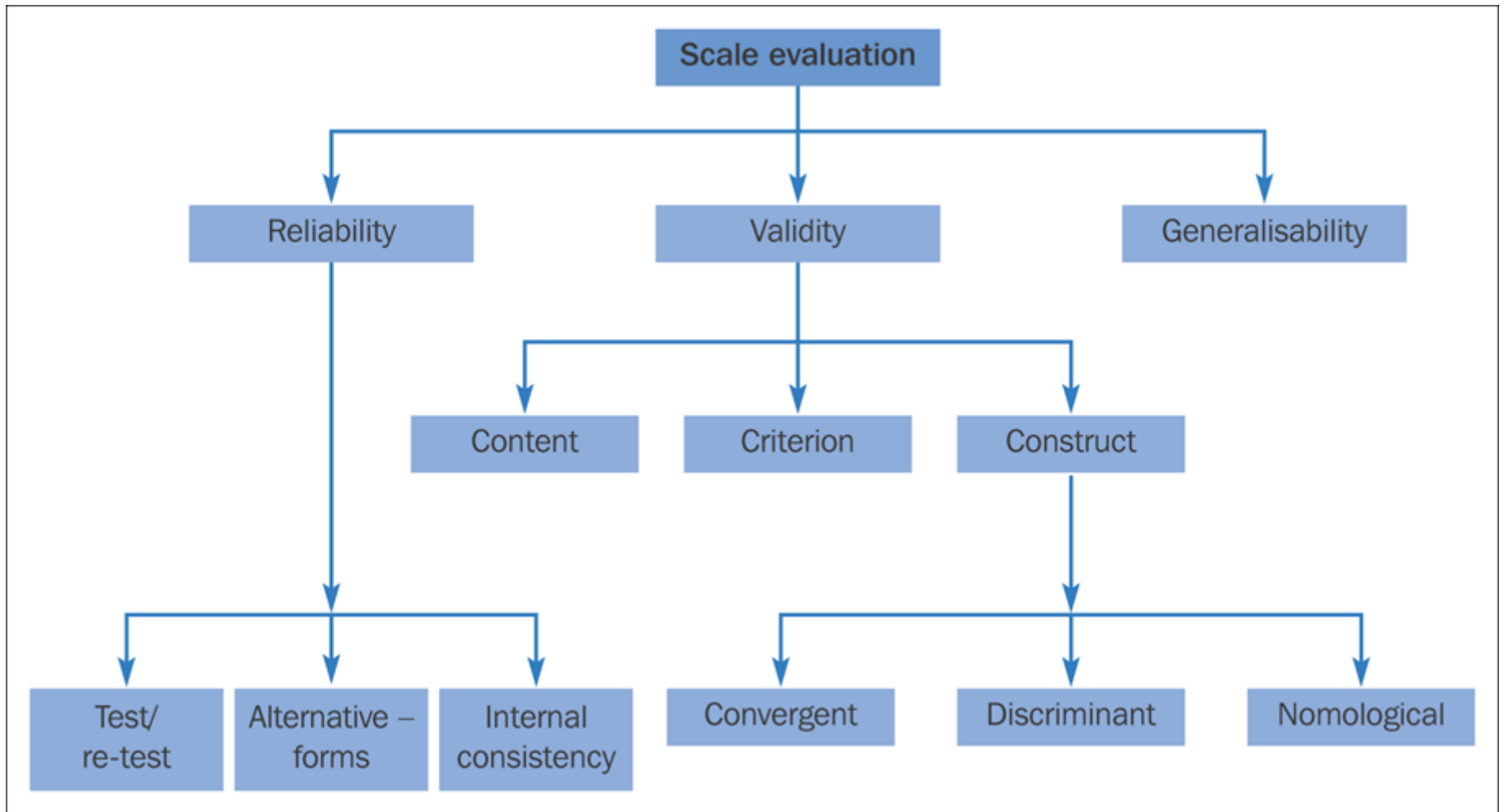
Potential sources of error on measurement

1. **Other relatively stable characteristics of the individual that influence the test score, such as intelligence, social desirability and education**.

2. **Short-term or transient personal factors, such as health, emotions and fatigue**.

3. **Situational factors, such as the presence of other people, noise and distractions.**

4. **Sampling of items included in the scale: addition, deletion or changes in the scale items.**

5. **Lack of clarity of the scale, including the instructions or the items themselves.**

6. **Mechanical factors, such as poor printing, overcrowding items in the questionnaire and poor design.**

7. **Administration of the scale, such as differences among interviewers**.

8. **Analysis factors, such as differences in scoring and statistical analysis.**

Reliability

- **Reliability** can be defined as the extent to which measures are free from random error, X_R. If $X_R = 0$, the measure is perfectly reliable.

- In **test-retest reliability**, respondents are administered identical sets of scale items at two different times and the degree of similarity between the two measurements is determined.

- The **coefficient alpha**, or Cronbach's alpha, is the average of all possible split-half coefficients resulting from different ways of splitting the scale items. This coefficient varies from 0 to 1, and a value of 0.6 or less generally indicates unsatisfactory internal consistency reliability.

Validity

- The **validity** of a scale may be defined as the extent to which differences in observed scale scores reflect true differences among objects on the characteristic being measured, rather than systematic or random error. Perfect validity requires that there be no measurement error ($X_O = X_T$, $X_R = 0$, $X_S = 0$).