Measurement and scaling

Measurement and scaling

- Measurement: assigning numbers or other symbols to characteristics of objects according to certain pre-specified rules
- Scaling: generating a continuum upon which measured objects are located

- Primary scales (p. 237)
  - Nominal scale
    - numbers assigned to football players
    - social security numbers
    - brand numbers, story types, sex classifications
    - percentages mode
    - Chi-square, binominal tests

Measurement and scales

- Ordinal scale
  - rank order or winner
  - quality ranking
  - preference rankings, market position, social class
  - percentile, median
  - rank-order, correlation, Friedman ANOVA

- Interval scale
  - performance rating on a 0-10 scale; 8.2; 9.2; 9.6; temperature
  - attitudes, opinions
  - range, mean, std
  - product-moment, correlations, t-tests, ANOVA, regression, factor analysis

Measurement and scales

- Ratio scale
  - time to finish, in seconds. Zero point is fixed
  - length, weight
  - Age, income, costs, sales, market share
  - Coefficient of variation

Scaling techniques

- Comparative scales
  - direct comparison of stimulus objects
  - do you prefer Coke or Pepsi
  - ordinal or rank order properties
  - no-metric scaling
    - paired comparison, rank order, constant sum scales, Q-sort

- Non-comparative scales
  - each stimulus object is scaled independently of others
  - interval or ratio scales
  - continuous ratings or itemized rating scales
    - Likert, semantic
- Most widely used scaling technique used in marketing research

Non-comparative scaling techniques

- Continuous Rating Scales
  - on a scale between 0 (very low) and 100 (very high) indicate what is the probability that you will buy a car next year

- Itemized Rating Scales
  - a measurement scale having numbers and/or brief descriptions associated with each category. The categories are ordered in terms of scale position

Itemized Rating Scales

- Likert scale
  - 5 point scale from 1-5 strongly disagree to strongly agree
  - can be 7 point scale
- Semantic Differential
  - a 7-point rating scale with end points associated with bipolar labels that have semantic meaning

Cold--------Warm

Powerful-------Weak

- Semantic differentials are popular in marketing
  - comparing brand, product, and company images
  - for developing advertising and promotion strategies,
  - new product development studies
- Stapel scale
  - measure attitudes, even-number range without zero from -5 to +5

Non-comparative itemized rating scale decisions

- The number of scale categories to use
- balanced versus unbalanced scales
- Odd or even number categories
- forced versus non-forced choices
- the nature and degree of the verbal description
- the physical form of the scale

Questionnaire and Form Design

Questionnaire design process

- Specify information needed
- Specify the type of interview method
- Determine the content of each Q
- Design the Qs to overcome the respondent's inability an unwillingness to answer

- Design on the Q structure
- Determine the wording
- Arrange the Qs in proper order
- Identify the form and layout
- Reproduce
- Pretest

Is the Q necessary or do you need more than one Q

- Do you think Coke is tasty and refreshing
  - Wrong! Double-Barreled Q
- Do you think C is tasty?
- Do you think C is refreshing?

- Avoid why questions!
  - They tend to contain two aspects:
    - attributes of the product
    - influences leading to knowledge thereof
  - Why do you shop at Stockmann - Wrong!
  - Instead: What do you like about Stockmann as compared to other stores?
  - How did you first happen to shop at S?

Don't make respondents remember

- People have a poor memory
  - What is the brand name of the shirt you wore 2 weeks ago?
  - What did you have for lunch a week ago?
  - What were you doing a month ago at noon?
  - How many liters of soft drink have you consumed during the last month?

- Ask instead
- How often do you drink soft drinks in a typical week
  - less tahn once a week
  - 1 to 3 times per week
  - 4 to 6 times per week
  - 7 or more times a week
- Telescoping (compressing time)
- Creation (did not occur)

People don't want to answer sensitive info accurately

- money
- family life
- political and religious beliefs
- involvements in accidents or crimes

- Put sensitive topics at the end of the Questionnaire
- Ask the Q in third person
- Hide the Q in a group of Qs that the respondent is willing to answer
- Provide response categories

Order or position bias

- The respondent's tendency to check an alternative based on its position in a list of alternatives.
  - Respondents tend to check the first or the last - especially the first
  - Sometimes also the middle

Choose Q wording

- Use ordinary words
- Make sure the word has a single meaning. Problematic ones are 'usually', 'normally', 'frequently', 'often', 'regularly', 'occasionally', and 'sometimes'
- Avoid leading or biased Qs
- Questionnaire Design Checklist. Malhotra pp. 304-305!

Sample

- Population - the aggregate of all the elements that share some common set of characteristics
  - the proportion of consumers who are loyal to a particular brand of toothpaste
- Census - a complete enumeration of the elements of a population
- Sample - a subgroup of the population selected for participation in the study

This you need to know by heart

MARKET	The set of all actual and potential buyers of a product
POTENTIAL MARKET	The set of consumers who profess a sufficient level of interest in the market offer
AVAILABLE MARKET	The set of consumers who have interest, income, and access to a particular market offer
TARGET MARKET	The part of the available market the company decides to pursue
MARKET DEMAND	The total volume of a product that would be purchased by a defined customer group in a defined geographical area in a defined time period in a defined marketing environment under a defined marketing program

Now a few more

Sample	A subgroup of the elements of the population selected for participation in the study
Target Population	The collection of elements or objects that possess the information sought by the researcher
Element	Objects that possess the information sought for by the researcher
Sampling Unit	The basic unit containing the elements of the population to be sampled
Sampling frame	A list or set of directions for identifying the target population, e.g. telephone book, listing of firms in an industry, a city directory.

Sample sizes used in marketing research

Type of study	Minimum	Typical Range
Problem identification (market potential)	500	1000-2500
Problem solving (pricing)	200	300-500
Product test	200	300-500
Test-marketing studies	200	300-500
TV/Radio/Print advertising	150	200-300
Test-market audits	10 stores	10-20 stores
Focus groups	6 groups	10-15 groups

Answers to a single variable

- How many users of a brand can be considered brand loyal?
- What percentage of the market can be considered as heavy users, medium users, light users, and nonusers?

- How many customers are familiar with a new product; somewhat familiar, unfamiliar with the brand? What is the mean familiarity rating? Is there much variance in the extent to which customers are familiar with the new brand?
- What is the income distribution of brand users? Is this distribution skewed toward low-income brackets?

Frequency distribution

- One variable is considered at a time
- Measures of location tend to measure where the center is:
  - Mean
  - Mode (the value that occurs most frequently)
  - Median
  - Range
  - Variance & STD

- Measure of shape:
  - skewness (the symmetry of the mean)
  - -0.094 would indicate a slight negative skew
  - Kurtois(the relative peakedness or flatness of the curve; -1.261 indicates the distribution being a bit flatter than normal

Hypothesis testing

- Formulate the null hypothesis
  - a statement where no difference or effect is expected
- Formulate the alternative hypothesis
  - statement where some difference is expected

- Type I error: when the results lead to the rejection of the null hypothesis when it is in fact true.
- The probability of type I error ($\propto$) is called level of significance

Hypothesis testing

- Type II errors occur when the null hypothesis is not rejected when it is in fact false
- The power of a test is the probability of rejecting the null hypothesis when it should be rejected

- If $\propto$ is extremely low (0.001) type II errors are very likely. Normally, $\propto$ is set at 0.05 or 0.01

Cross-tabulation

- Answering questions to how the single variable is related to other variables.
- How many bran-loyal users are male?
- Is product use (heavy users, medium users, light users, nonusers) related to interest in outdoor activities (high, medium, low)?

- Is familiarity with a new product related to age and education?
- Is product ownership related to income (high, medium, low)?

Cross-tabulation

- also called contingency tables
- cross-tabulation with two variables is also called bivariate cross-tabulation
- The general rule is to compute the percentages in the direction of the iv across the dv

Cross-tabulation

Internet usage		
	Gender	
Internet usage	Male	Female
Light	33.3%	66.7%
Heavy	66.7%	33.3%
Total	100%	100%

- The dv is internet usage; the iv is gender. Assuming the other way makes no sense, i.e. that heavy internet users causes people to be male!!
- But maybe this finding can be mediated by a third variable? Age?

Cross-tabulation - a third variable

Purchase of fashion clothing		
	marital status	
Purchase	Married	Unmarried
High	31%	52%
Low	69%	48%
Total	100%	100%

- Refine the association between the original two
- can indicate no association between the 2 variables, although initially observed
- can reveal some association between the two variables although not initially observed - a suppressed association between the 2 v:s
- Indicate no change in the initial association

Cross-tabulation - a third variable

Purchase of fashion clothes	Gender			
	Male marital status		Female marital status	
	Married	Unmarried	Married	Unmarried
High	35%	40%	25%	60%
Low	65%	60%	75%	40%
Total	100%	100%	100%	100%

- 60% of the high purchasers are unmarried female, 25% of those who are married
- Differences among the male far less
- Gender has refined the original result
- Unmarried respondents are more likely to be high-purchasers and this effect is more pronounced for females than males

Cross-tabulation

- The statistical significance of the observed association is commonly measyred with chi-square
- The strength of the association is interesting only if it is significant and can be measured with phi correlation coefficient, Cramer's V or lambda