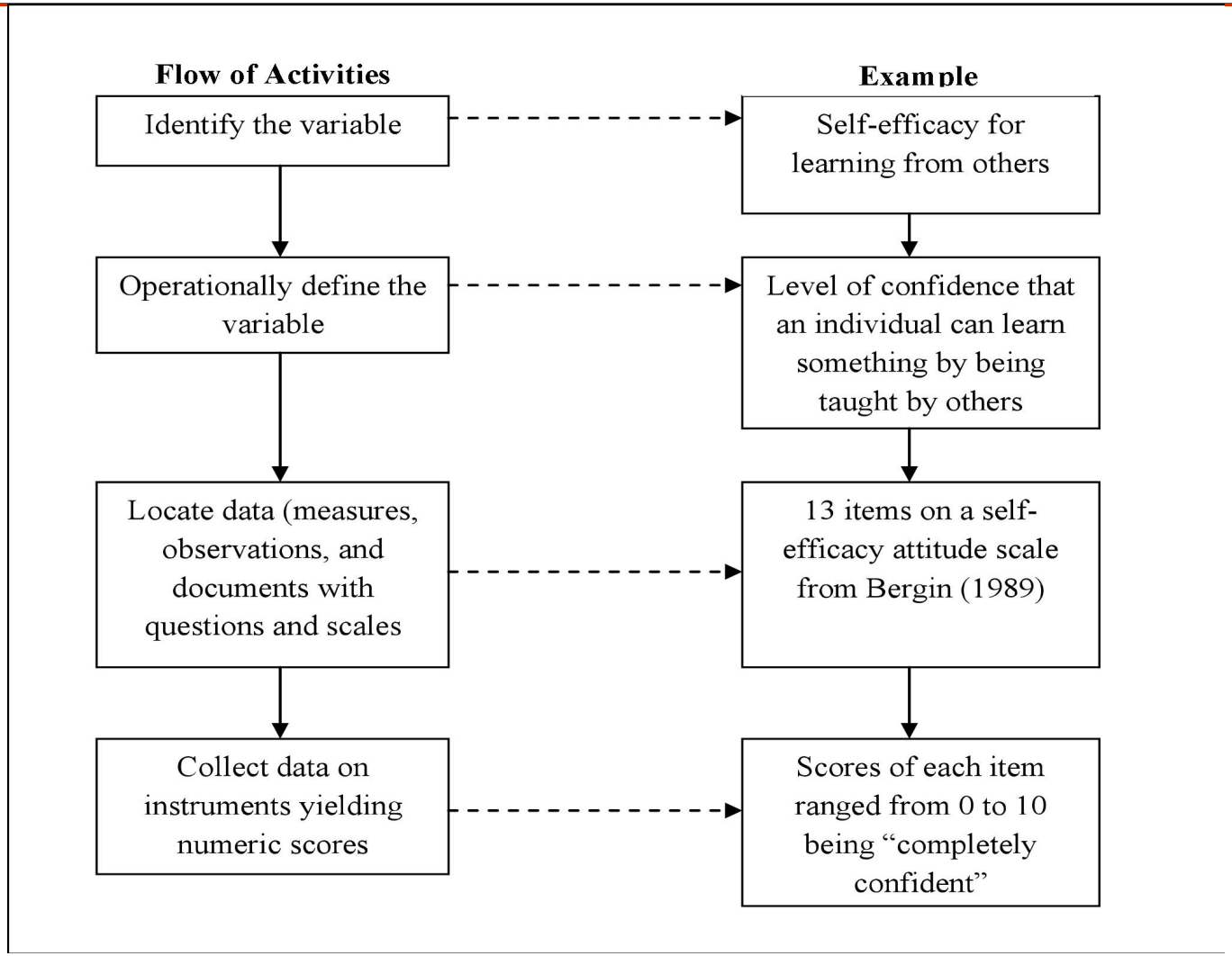
HRMN7610

Collecting quantitative Data (Day 3 AM)

The Flow of Activities in Collecting Data



Source: Prof. Samuel Aryee

Sources of Quantitative Data

- Secondary and archival sources
  - Government statistics (unemployment)
  - Company records (absence, production, sales – over time or per employee)
- Observation
  - E.g., Observe and record the number of customers
- Questionnaires
  - Factual data (age, gender, job tenure,…)
  - Attitudinal data

Scales of measurement

- Nominal scale
  - Mutually exclusive categories
  - but no meaningful order
  - Examples:
    - Gender
    - Religion
    - Country
    - HKBU vs. CUHK vs. HKU
    - Functions (e.g., marketing, sales, production, HR, accounts, etc)
  - *Statistics – mode, chi-square test*

Scales of measurement

- Ordinal scale
  - Categories can be ordered meaningfully (i.e., rank ordering)
  - But intervals are not regular or defined
  - Examples:
    - Education (in categories)
    - Position / rank
    - Age, job tenure or income measured in uneven categories
  - *Statistics – median, chi-square test, rank order correlation*

Scales of measurement

- Interval scale
  - Intervals between categories are equal
  - No meaningful zero
  - Examples:
    - An attitude scale (1 = disagree, 2 = slightly disagree, 3 = neutral, 4 = slightly agree, 5 = agree)
    - A frequency scale (1 = never, 2 = sometimes, 3 = often, 4 = always)
  - *Statistics – mean, t-test, analysis of variance, correlation and regression, etc.*

Scales of measurement

- Ratio scale
  - Has a meaningful zero
  - Can say "twice as much"
  - Examples:
    - Age in years
    - Job tenure in years
    - Monthly income in $s
    - Sales in $s
    - Count data (e.g., number of customers)
  - *Statistics – mean, t-test, analysis of variance, correlation and regression, etc.*

Type	Definition	Examples
Nominal	Provides a name. If numeric, then no scale is implied	Male, Female 1 (Republican), 2 (Democratic), 3 (Independent)
Ordinal	Provides an ordered scale	1 (Excellent), 2 (Good), 3 (Fair), 4 (Poor)
Interval	Can be manipulated mathematically. Scale in equal increments.	Temperature in centigrade (80^0 is 20^0 hotter than 60^0, which is 20^0 hotter than 40^0, but 80^0 is not twice as hot as 40^0)
Ratio	Interval scale with a meaningful zero	Temperature in Kelvin (80^0 is twice as hot as 40^0) Weight, length, age

Note. Education or rank could be better examples of ordinal scale.

Scales of measurement

- Nominal → Ordinal → Interval → Ratio
- Higher level of measurement is preferred where possible
  - Contains more information and precision
  - More choice in statistical analysis
- Interval scale is usually sufficient

Exercise

- Read Chang et al. 2014 JAP and identify the scales for HCWS, creativity, age, gender, tenure, and education.

Exercise

- Read Chang et al. 2014 JAP and identify the scales for HCWS, creativity, age, gender, tenure, and education.
- HCWS, creativity: interval
- Age: ordinal (the differences between two points are not equal)
- Gender: nominal (scores are only labels)
- Tenure: ratio
- Education: ordinal (the differences between two points are not equal)

Questionnaire design

Questionnaire design

- Attributes of a good questionnaire
  - Ensures a two-way communication
    - It is often advised to have a pilot test with a very small sample.
  - Assists respondents in recalling and clarifying experiences, attitudes and thoughts
  - Keeps respondents interested and motivated

Questionnaire wording

- Keep the language simple
- Avoid double-barrelled questions
  - "Do you think that the market is growing and that this product would sell well?"
  - Answer may be "Yes" but "No"
  - Split into 2 questions
- Avoid ambiguous questions
  - "Are you happy?" – but about what?
  - People may interpret differently
- Minimise recall-dependent questions
  - "When did your supervisor first conduct your performance appraisal?"
  - Try to use alternative sources of data (e.g., company records)

Questionnaire wording

- Avoid leading or loaded questions
  - "To what extent, in these days of high unemployment, are you happy with your job security?"
  - Signals the "correct" answer → "NO"
- Avoid questions which "signal" a socially desirable response
  - E.g. "Do you beat your wife?"

Sequencing of questions

- Introductory letter
  - Explain purpose, topic, who is sponsoring
  - Assurance of confidentiality and anonymity
  - How the data will be used
  - Promise feedback (if appropriate)
- Questionnaire needs a logical structure, perhaps with subsections and headings
- Personal data questions
  - Usually need such data to describe the sample, even if not in the theory

- Any open-ended questions usually at the end
  - Additional comments
- Length of questionnaire
  - Max 6 pages (A-4 pages, reasonable margins)
- If considering a large mail or internet survey – especially multi-organizational, see:

  Don A. Dillman *Mail and Internet Surveys: The Tailored Design Method*, second edition, New York: Wiley, 2000.

Measurements (some practical suggestions)

Measuring variables

- Factual variables
  - Age or job tenure in years
  - Gender
  - Number of units produced by an individual
- Attitudinal variables
  - Job satisfaction
  - Organisational commitment
  - (Perceived) Procedural justice

Measuring attitudinal constructs

- Dimensions
  - Some (not all) constructs have sub-dimensions
  - Examples:
    - Organizational justice – procedural and distributive justice
    - Organizational commitment – affective, normative and continuance
- Items – actual questionnaire items
  - summed or averaged to measure the constructs (and/or their sub-dimensions)

Measuring attitudinal constructs - Example

- Job satisfaction
- Three–item scale – average the items:
  - All in all, I am satisfied with my job.
  - In general, I don't like my job. [reverse coded]
  - In general, I like working here.

- Seven response choices:

Strongly disagree.	Disagree.	Slightly disagree.	Neither agree nor disagree.	Slightly agree.	Agree.	Strongly agree.
1	2	3	4	5	6	7

- Michigan Organizational Assessment Scale (Cammann et al, 1979; Spector 1997: 19)
  - Internal reliability (alpha) 0.77

Issues to worry about

- Validity
  - Are we *really* measuring this construct?
- Reliability
  - Do the questionnaire items provide a consistent measure?

Validity

- ***Are we really measuring this construct?***
- Content validity
  - Judgmental - do the questionnaire items have face validity?
  - Do experts agree that the items properly reflect the construct domain?
  - Not really a big problem if you use an established measure
- Criterion-related validity
  - Correlational - does the measure predict expected outcomes? (e.g., affective commitment predict turnover; is IQ a valid predictor of performance?)

Validity

- Construct validity
  - How well does the measure reflect the underlying construct?
  - 1.Convergent validity – does the measure correlate highly with other measures known to measure the same construct?
  - 2. Discriminant validity – does the measure have a lower correlation with measures known to be **un**related to the construct?
- Again, use well-established measures
- Make sure that the scale you use to measure a construct is conceptually aligned with the construct definition

Reliability

- ***Does the measure provide consistent results?***
- Reliability as internal consistency - consistent results amongst the items in the measure?
  - Inter-item consistency - Cronbach's alpha
  - Conventional cut-off criteria > .70 (Nunnally, 1978)
  - E.g., .70 or 70% of the variance of the total scores is reliable variance.
  - I.e., Items that are positively and moderately correlated reveal that they share some common elements

Reliability

- Reliability as stability - consistent results if the measure is repeated on the same subjects?
  - Usually it is called "test-retest reliability"
    - Repeated measure within 6 months
    - Compute a correlation between the 2 measures across the sample of subjects

Reliability

- Poor reliability if:
  - Items are not consistent
  - Small number of items
- **Relationship to validity**
  - Reliability of a measure places an upper limit on the possible validity of a measure
    - A highly reliable measure is not necessarily valid – *reliability is not sufficient*.
    - But unreliable measures will result in low validity - *reliability is necessary*.
- In your own research, reporting reliability is a minimum requirement.

Exercise

- Read Chang et al. 2013 JOM for relevant discussions on reliability and validity.

Practical advice

- Use existing questionnaire measures that have been carefully constructed
- Authors cite evidence on validity and reliability in articles – evaluate *and cite* this
- Developing your own measures is very time consuming & risky
  - For academic research and study, where possible use existing valid and reliable measures from the literature

Translation of Measurements

- Most existing measures were originally developed in the Western context, primarily in English
- What should we do if we need to administer the survey questionnaire in Chinese?
- Translation and Back Translation (Brislin, 1990)
  - Translate the items into Chinese
  - Without providing the original English items, ask another person to translate the Chinese items into English
  - Compare the original and back-translated English items and check the agreement
  - Both people need to be fluent in both English & Chinese
  - Watch out for cultural differences in wordings

Translation Exercise

Cover Letter & Instruction

- State the purpose
- Who are the researchers
- Instructions on how to complete the survey
- How the information will be used
- Assure confidentiality
- Anonymity??
- How to return the completed survey
- Contact info – enquiries
- Importance of the responses – direct appeal
- Thank the participant

Sample cover letter

- **调研问卷**
- 您好：首先，非常感谢你参与本次研究。这项研究是由美国伊利诺伊大学、香港浸会大学和华东理工大学共同发起和设计的，旨在研究正念在企业中的影响。我们希望可以通过本研究，探讨如何改善和提高组织中人力资本的管理，并提出有效的建议。
- 完成本问卷大约需要5分钟的时间。**本调查资料只作学术研究之用，并将绝对保密。研究结果只会表示综合结果，绝不涉及任何个人信息。您提供的问卷在我们资料收集完成后会被及时销毁。**