

Lecture 5

Empirical Research Methods IN4304

Observational methods

IN4304 Empirical Research Methods Spring 2010, Lecture 5

1



Previous lecture

Different type of validity relevant for measure instrument (Face, Content, Criteria, Construct validity)

Attitude scale:

- Thurstone's method of equal-appearing intervals
- Likert scale
- Semantic differential scale

Operationalising constructs

- Construct
- (Sub)Dimension
- Indicator

Statistical method to **analyse reliability**

- Split-half method
- Cronbach's alpha analyse

Content validity Analyse

- Jury rating items 'Essential'
- CVR > Critical CVR

IN4304 Empirical Research Methods Spring 2010, Lecture 5

2



Today

- Participant observation
- Non-participant observation
- Coding
- Observation Reliability

IN4304 Empirical Research Methods Spring 2010, Lecture 5

3



Learning outcomes of lecture 5

After today's lecture you should be able :

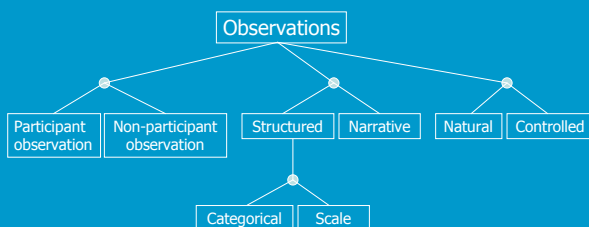
- to explain the difference between participant-observation and non-participant observation
- to list 4 sampling strategies
- to develop a coding scheme
- to calculate inter-observer agreement (Cohen's Kappa)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

4



Type of Observations



What combinations are often made?

IN4304 Empirical Research Methods Spring 2010, Lecture 5

5



Participant observation

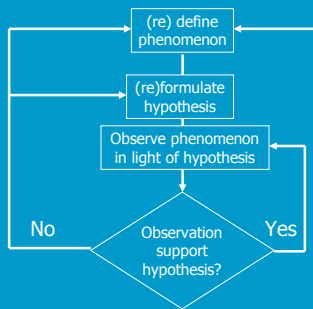
- Observer participates in the group that he/she is observing
- For example if the social phenomenon is difficult to understand for an outsider
- Very time consuming for observer
- Observer *is* the research instrument as he/she has to give interpretation
- Start with descriptive observation (space, actors, activities, objects, acts, events, time, goals, feelings)
- Next step is to develop concepts, dimensions and theoretical framework (analytic induction, e.g. observation and analysis are intertwined)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

6



The process of analytic induction



IN4304 Empirical Research Methods Spring 2010, Lecture 5

7



Recording participant observations

- Need 'system' to capture information unambiguously, faithfully and fully
- Record on the spot, during the event (no later than 24 hours after event)
- Shortly after recording add details
 - Running description (who was involved, communication)
 - Recalls of forgotten material
 - Interpretive ideas
 - Personal impression and feelings
 - Reminder to look for additional information

(Robson, 2002)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

8



Class question

- What biases are specifically relevant for participant-observations?

IN4304 Empirical Research Methods Spring 2010, Lecture 5

9



Participated Observation biases

- Selective attention
- Selective encoding
- Selective memory
- Interpersonal factors

IN4304 Empirical Research Methods Spring 2010, Lecture 5

10



Non-participated observation/structured observation

- Observer does not participate as a group member
- However, observer can, unintentionally, draw attention
- 'Observer' can also be recording device
- Human observer needs to be trained
- Inter-observer reliability

IN4304 Empirical Research Methods Spring 2010, Lecture 5

11



Observation rating scale

	Positive	Neutral	Negative								
Participation	5	4	3	2	1	0	1	2	3	4	5
Rapport	5	4	3	2	1	0	1	2	3	4	5
Confidence	5	4	3	2	1	0	1	2	3	4	5
Aggressiveness	5	4	3	2	1	0	1	2	3	4	5
Withdrawnness	5	4	3	2	1	0	1	2	3	4	5
Friendliness	5	4	3	2	1	0	1	2	3	4	5
Aloofness	5	4	3	2	1	0	1	2	3	4	5

A study of the nature of interaction in a group (Kumar, 2005, p. 122)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

12



Coding scheme – example for evaluating product with children

Breakdown of indication types based on observed actions with the game

- (ACT) Incorrect action
- (EXE) Execution/motor skill problem
- (PAS) Passive
- (IMP) Impatience
- (STP) Subgame-stopped

Breakdown of indication types based on verbal utterances or nonverbal behaviour

- (WGO) Incorrect goal
- (WEX) Incorrect explanation
- (DSF) Doubt, surprise frustration
- (PUZ) Puzzled
- (REC) Recognition
- (PER) Perception problem
- (BOR) Bored
- (RAM) Random actions
- (HLP) Help
- (DIS) Dislike

E.g. Incorrect action :Definition-
An action is omitted from the sequence. An action within a sequence is replaced by another action. Actions within the sequence are performed in reversed order.

(Markopoulos et al., 2008)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

13



Developing coding scheme

If possible use or adapt existing coding scheme

To make coding scheme consider:

- Focused
- Objective
- No context-dependent
- Explicitly defined
- Exhaustive
- Mutually exclusive
- Easy to record

(Robson, 2002)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

14



Class question

- Create your own coding scheme to observe the lecture

IN4304 Empirical Research Methods Spring 2010, Lecture 5

15



Event coding

Event trigger the recording of observations

Simple checklist

Event 1: ||||| 2: ||||| ||| 3: ||

Sequence record

Event 2 1 2 2 2 1 3 1 2 2

Sequence record on time-scale



IN4304 Empirical Research Methods Spring 2010, Lecture 5

16



VRET example

- Observation of therapist using VRET system to treat patient with a fear of flying
- Coding scheme related to user interface interaction

IN4304 Empirical Research Methods Spring 2010, Lecture 5

17



Event Matrix

Identifying sequence of Phases

Phases	Following events								
	S	T	A	O	F1	F2	F3	F4	L
S		14							
T			4	13					
A				4					
O					1	17			
F1						16		2	10
F2					1		16		
F3					1		1	9	2
F4						7		1	3
L	2	2							

Identifying sequence of Phases (Fgrouped)

Phases	Following events					
	S	T	A	O	F	L
S		14				
T			4	13		
A				4		
O					1	17
F					1	15
L	2	2				

S= Standing Still
T= Taxiing
A= Add. Taxiing
O= Taking off
F1= Flying Fair
F2= Flying Cloud Upper
F3= Flying In the Cloud
F4= Flying Cloud Lower
L= Landing

IN4304 Empirical Research Methods Spring 2010, Lecture 5

18



Transition graph

S= Standing Still
 T= Taxiing
 A= Add. Taxiing
 O= Taking off
 F1= Flying Fair
 F2= Flying Cloud Upper
 F3= Flying In the Cloud
 F4= Flying Cloud Lower
 L= Landing

IN4304 Empirical Research Methods Spring 2010, Lecture 5

TU Delft

Log file analysis – software components

Red - connection failed
 Yellow - connecting
 Green - connected
 Current radio station

Selection bar
 Radio station list
 Selection bar upwards
 Make connection
 Selection bar downwards

Lower-level layers
 Higher-level layers

Bob
 Station List
 Receiver

1 Back (1)
 2 Next (1)
 3 Next (1)
 4 Play (1)
 5 Next (1)
 6 Play (1)
 7 Next (1)
 8 Back (1)
 9 Next (1)
 10 Back (1)
 11 Play (1)
 12 Play (1)
 13

Play BBC 5 (2)
 Play BBC 6 (2)
 Play BBC 5 (2)

Yellow indicator light up
 Yellow indicator light up
 Green indicator light up
 Reseed completed

IN4304 Empirical Research Methods Spring 2010, Lecture 5

TU Delft

State sampling

- State change triggers the recording of observations

IN4304 Empirical Research Methods Spring 2010, Lecture 5

TU Delft

Interval Sampling

- Recording is triggered by time
- Fix time interval, e.g. 30 seconds
- Record what has happened in that time interval
- Problem: if interval is longer than shortest duration of typically encountered for codable state.

IN4304 Empirical Research Methods Spring 2010, Lecture 5

TU Delft

Time (point) sampling

- Recording is triggered by time
- Fix time interval, e.g. 30 seconds
- Record what has happened at that specific moment

Alternative:

- A principle (e.g. random) is used to select the time intervals during which coding takes place (Robson, 2002, p338)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

TU Delft

Inter-observer agreement

- Observation reliability: How consistent are observation
- Observer consistency: same result when looking at the same video, tape twice
- Inter-observer agreement: extent to which two or more observers obtain the same results when measuring the same behaviour
- Observation scale:
 - Interval : Pearson Correlation
 - Ordinal : Spearman Correlation
 - Nominal : Cohen's Kappa

IN4304 Empirical Research Methods Spring 2010, Lecture 5

TU Delft

Cohen's Kappa

Observer 1

$$K = (P_o - P_c) / (1 - P_c)$$
$$K = (0.61 - 0.34) / (1 - 0.34)$$
$$K = 0.41$$

K of 0.4-0.6 'fair'
K of 0.6 - 0.75 'good'
K of above 0.75 'excellent'
(Robson, 2002)

	Observer 2			
	A	B	C	
A	8	3	2	13
B	4	9	1	14
C	0	5	6	11
	12	17	9	38
	.32	.45	.24	1

Proportion of agreement P_o = number of agreement / total
= $(8+9+6) / 38 = 0.61$
Proportion of expected by chance P_c =
 $(.34*.32)+(.37*.45)+(.29*.24) = 0.34$

IN4304 Empirical Research Methods Spring 2010, Lecture 5

25



Summary

participant-observation and non-participant observation

Does the observer act as a member of the group?

Sampling strategies

Event sampling, state sampling, interval sampling, time sampling

Coding scheme

- Focused
- Objective
- No context-dependent
- Explicitly defined
- Exhaustive
- Mutually exclusive
- Easy to record

Inter-observer agreement (Cohen's Kappa)

$$K = (P_o - P_c) / (1 - P_c)$$

IN4304 Empirical Research Methods Spring 2010, Lecture 5

26



This week in practicum

- Entering data into SPSS
- Reliability analysis, (Inter-rater reliability)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

27



Next time

Data preparation methods

- Exploratory data analysis
- (Robson ch. 13. p391-p416)

IN4304 Empirical Research Methods Spring 2010, Lecture 5

28



References

- Kumar, R. (2005). *Research Methodology; A step-by-step guide for beginners* (2nd ed). London, UK: SAGE.
- Markopoulos, P., Read, J., Mac Farlane, and Höysniemi, J. (2008). *Evaluating children's interactive products: Principles and practices for interaction designers*. Amsterdam: The Netherlands, Morgan Kaufmann.
- Robson, C., (2002) *Real world research: A resource for social scientists and practitioner-researchers* (2nd ed). Malden: MA, Blackwell.

IN4304 Empirical Research Methods Spring 2010, Lecture 5

29

