



## Questionnaire Design and Measurement Scales

**Marika Wenemark, Linköping  
University, Sweden**  
**Ian Dohoo, U of PEI, Canada**



### **Motivation**

Questionnaires are widely used in veterinary epidemiology to gather information about disease occurrence and factors that may contribute to that occurrence. Unfortunately, careful consideration of the design and implementation of those questionnaires is not often carried out, resulting in the collection of a lot of data of dubious validity.

Frequently, what we want to measure through the use of a questionnaire is a construct which can not be directly measured (ie a latent variable) such as “level of knowledge of producers about resistance to antibiotics”. In many cases, a simple summation of the responses to a set of questions is used as a proxy for the latent variable with no consideration as to how well the resulting measurement scale actually measures the construct.

### **Objectives**

This course will combine information on how to design and implement an effective questionnaire and how to combine the collected data into a valid measurement scale (with an emphasis on the use of item response theory models).

The specific learning objectives are:

- to understand the principles of questionnaire design
- to take into consideration the psychology of respondent communication in the development of questionnaires
- to know different methods to pretest survey questions
- to construct questionnaires with high internal and external validity
- to understand the basic concepts behind measurement scales
- to understand classical test theory approaches to the evaluation of a measurement scale (including Cronbach's alpha)
- to know how to use item response theory models for evaluating and developing valid measurement scales

### **Background and skills expected of attendees**

Participants are expected to be familiar with logistic regression modelling procedures. Familiarity with factor analysis will be an asset but is not essential. Familiarity with either Stata or R will be an asset. Participants not familiar with either will be provided with a time limited copy of Stata and enough instruction to help them get started.

## Presenters

**Marika Wenemark** <https://liu.se/en/employee/marwe66> [marika.wenemark@liu.se](mailto:marika.wenemark@liu.se)

Doctor Wenemark is a statistician, specialized in survey methods and questionnaire design. Her special research interest is to combine research from survey methodology, psychology and motivation theory to design surveys and questions that are easy and interesting for the respondents to answer as well as valid and useful for the researcher. Her lectures and courses are highly appreciated by students who often describe their participation as an eye-opening experience.

**Ian Dohoo** <https://www.islandscholar.ca/people/dohoo> [dohoo@upei.ca](mailto:dohoo@upei.ca)

Professor Dohoo is an internationally renowned veterinary epidemiologist. He is a Professor Emeritus at the University of Prince Edward Island, Canada, and the leading author of the textbook 'Veterinary Epidemiologic Research'. Numerous students around the world have participated in his courses. Most have survived. He has a particular interest in the advancement of epidemiologic methods, including analyses of hierarchical data, survival analyses, meta-analyses, bias assessment and the development/evaluation of measurement scales. Professor Dohoo has received multiple honorary doctorates and lifetime achievement awards (so he must be old) and was recently appointed to the Order of Canada. He received this honour for his contributions to veterinary and human epidemiology in developed and developing countries.

### Previous history of workshop

Marika and Ian have previously run a course together "Questionnaire design and management" which was awarded a diploma for one of the three best courses run by the NOVA university network 2018. Marika has taught the questionnaire design material in many formats nationally and internationally and for a wide range of audiences such as government agencies and academic institutions in the fields of statistics, medicine and veterinary medicine. Ian has taught the measurement scale material previously in two formats, one in a set of research workshops held for the International Livestock Research Institute (ILRI) and once in an on-line course with a small number of participants (also known as guinea pigs). However, Ian has a strong reputation as a teacher of a wide range of epidemiologic methods.

### Workshop specifications

Duration: 5 days

Minimum # participants: 10, Maximum # participants 25

Pre-vs-post: Post

Working language: English

On-line participation: No

## Schedule

Note each day there will be bio breaks from 10:00 – 10:30 and 14:30 – 15:00 along with lunch from 12:00 – 1:00. These are not shown in the schedule

Day	Time	Activity / Contents	Details
1	8:30-10:00	Course Intro Basic questionnaire design	lecture / discussion
	10:30-12:00	Questionnaire assignment (Write draft survey questions)	lecture / group work
	13:00-14:30	Introduction to Measurement scales Classical Methods	lecture / discussion
	15:00-16:30	Measurement scales Exercise #1	group work
2	8:30-10:00	Intro IRT (Item Response Theory) models Binary models	lecture / discussion
	10:30-12:00	Measurement scales Exercise #2	group work
	13:00-14:30	Methods for survey data collection and psychology of survey response	lecture / discussion
	15:00-16:30	Questionnaire assignment (Develop survey questions)	group work
3	8:30-10:00	Unidimensionality in measurement scales Measurement scales Exercise #3 (start)	lecture / discussion
	10:30-12:00	Pretesting and evaluating survey questions	lecture / discussion
	13:00-14:30	Data collection in practice and survey ethics	lecture / discussion
	15:00-16:30	Questionnaire assignment (Test and finalize survey questions)	group work
4	8:30-10:00	Measurement models for polytomous data Measurement scales Exercise #3 (cont.)	group work lecture / discussion
	10:30-12:00	Measurement scales Exercise #4	group work
	13:00-14:30	Total survey quality and how to report on survey quality	lecture / discussion
	15:00-16:30	Questionnaire assignment (Prepare for seminar)	
5	8:30-10:00	Group models, hybrid models, developing measurement scales Measurement scales Exercise #5	lecture / discussion group work
	10:30-12:00	Measurement scales: Evaluation of complete data set OR discussion of DASC paper	format to be determined
	13:00-16:30	Questionnaire assignment Group presentations and discussion on questionnaire design	group presentations /discussion