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Data Seminars

How to kill your study – An introduction to planning studies

[Powerpoint - Recorded video of the lecture](#)

Presenter: Bart Jacobs

“To consult the statistician after an experiment is finished is often merely to ask him to conduct a post mortem examination. He can perhaps say what the experiment died of.” (Ronald Fisher, 1938)

In the enthusiasm of setting up a study to examine a new and exciting theory, researchers may not be concerned with the details of the data analysis that will happen months, if not years, in the future. We introduce a variety of easily avoidable problems that may arise when studies do not properly plan for high quality data early. We also provide straightforward ideas on how to smartly handle these potential drawbacks. This session will serve as an introduction to a variety of topics that will be discussed in later seminars of this series.

When 1 is not larger than 0 – Types of data and how to use them

[Powerpoint - Recorded video of the lecture](#)

Presenter: Jozefien Buyze

Data come in a lot of shapes and sizes and often from a variety of sources ranging from vague notes in a patient file over precise lab values and imprecise estimates of dates of events. In this session, we will look into the advantages and disadvantages of different types of data and how they can be correctly analysed. Additionally, we offer advice on which choices (not) to make and when to dichotomize.

My bias is better than your bias – Why we should all be aware of our cognitive biases

[Powerpoint - Recorded video of the lecture](#)

Presenter: Bart Jacobs

Spoiler: if I'd truly think my bias is better than yours, I would suffer from “bias blind spot”: recognizing bias in others while failing to see my own. In this seminar, we will give a brief overview of a selection of the hundreds of known cognitive biases. We will explain why it's very important to be aware of our own biases and those of our respected colleagues and patients. Additionally, we will illustrate a few more complex biases in data-analysis that are surprisingly prevalent yet severely undermine the

credibility of results.

Making noise with results, not with data – Sources of variation

[Powerpoint - Recorded video of the lecture](#)

Presenter: Bart Jacobs

Typically, we draw our conclusions from an estimate that we distil from the data. In most cases, it is equally important to understand how precise we can expect our result to be. We will discuss the importance of reporting the precision of an estimate in this session and give an introduction to different sources of variation.

It's not the size of the dataset that matters, it's what you can do with it – Data replication

[Powerpoint - Recorded video of the lecture](#)

Presenter: Meryam Krit & Bart Jacobs

In the previous session, we discussed the concept of variation. Consequently, we need to know how to find and estimate the variation associated with our data. The key to this is typically repeated measurements at different levels. In this session, we discuss the strengths and weaknesses of repeated measures to account for sources of variation and when to apply them.

Bigger, better, faster, more! – Sample size calculation

[Powerpoint - Recorded video of the lecture](#)

Presenter: Tom Smekens

Sample size calculations are a necessary tool when planning quantitative studies. Most researchers follow standard practice but in doing so often repeat common mistakes, or get stuck in rituals that aren't helpful for the research question at hand. In this seminar, we dive deeper into the actual underlying reasons for calculating a sample size and how you can get valuable information out of them.

Why eating ice cream doesn't cause summer – Association and causation

[Powerpoint - Recorded video of the lecture](#)

Presenter: Jozefien Buyze

These days, it's commonly known by researchers that an association doesn't necessarily imply causation. Nevertheless, it's common to still find this mistake even in high impact papers. In this session, we discuss confounding and interaction (also known as effect-modification) and why finding an association may be very valuable in some settings but not sufficient in others.

Why we introducing randomness to find systematic effects – clinical trials statistics

[Powerpoint - Recorded video of the lecture](#)

Presenter: Jozefien Buyze

In clinical trials, the randomized double-blind placebo-controlled study is generally considered the gold standard. In this session, we give an overview about the importance of those concepts and why observational non-randomized studies have a lot of limitations when we are only interested in a true causal effect.

The religion of $P < 0.05$ – How to (not) use and interpret p-values

[Powerpoint - Recorded video of the lecture](#)

Presenter: Tom Smekens

P-values provide useful information on a research result and can be understood intuitively if their meaning and purpose are respected. Accidents happen when p-values are stretched beyond their usefulness or treated as the end goal. And what of statistical significance? We will return to the basics in this session and discuss the qualities and limitations of this important statistical concept and how it can be complemented with other concepts to provide a more complete picture.

How frequently should we use Bayesian analysis – A practical guide to Bayesian thinking

[Powerpoint - Recorded video of the lecture](#)

Presenter: Tom Smekens

You may have heard of Bayesian methods and how they are supposedly so much better but also so much more complicated. Or you may have considered them yourself as an alternative approach to typical hypothesis testing. In this session, we introduce you to the concepts of Bayesian thinking, where nothing is certain and everything is permitted, without going into the very complex mathematical background and explain in which cases its approach can help you the most.

How to analyse a snowboarding granny – dealing with outliers

[Powerpoint - Recorded video of the lecture](#)

Presenter: Achilleas Tsoumanis

Are outliers just false measurements and is it OK to remove all outliers from a study before data-analysis? Despite this being a common practice, the actual answer is not

surprisingly no. In this session, we discuss what outliers are and why they are valuable tools to study the quality of your data rather than annoying patients that are best left out of the analysis.

Help, my data has gone missing – an introduction to incomplete data

[Powerpoint - Recorded video of the lecture](#)

Presenter: Achilleas Tsoumanis

Missing data occur in almost every study and can be a major problem during the analysis stage. Even for the simplest of designs, there is typically more than one way to handle the data when some input is missing. We will give a short introduction to different types of missingness and the dangers of ignoring the problem altogether. Additionally, we will give a brief introduction to some techniques that can handle missing data.

Pie is for birthdays, not for graphs – Simple tips for better graphs

[Powerpoint - Recorded video of the lecture](#)

Presenter: Bart Jacobs

They say that a picture says more than a thousand words. Indeed, to properly explain all the information found in a picture, multiple paragraphs are typically needed. Similarly, in research, it's not uncommon for specialists to do a first "read" of papers by only glancing at the figures. Good quality graphs are therefore vital to get a message across. Additionally, graphs can easily mislead readers without being intended that way. In this session, we highlight some important choices leading to both visually pleasing and correct figures.

10 ways to hack your data into significance (and why you shouldn't do it)

[Powerpoint - Recorded video of the lecture](#)

Presenter: Bart Jacobs

It's often disappointing when a scientific study does not produce the significant association that was hypothesized. Researchers can be very creative in finding ways to squeeze something significant out of their data anyway, with the hope of improving their chances of publication. In this session, we will explain you some of these methods, not to apply them yourself, but to recognize them when studying the literature and adjust expectations accordingly when planning your own study.

Do small datasets produce more significant results? – Reproducible research

[Powerpoint - Recorded video of the lecture](#)

Presenter: Tom Smekens

In this session, we look into the myth that small datasets seemingly typically produce more significant results than large datasets. The real reason for this phenomenon is publication bias. The prevalence and consequences are probably even worse than you might think. We will also share some tips on how to make your research as robust and reproducible as possible.

Improving your study – How the tips from these seminars can help you

[Powerpoint - Recorded video of the lecture](#)

Presenter: Bart Jacobs

In this final seminar, we will give a brief overview of the different topics that we touched during the series and highlight how your newfound knowledge about them can help you from setting up your newest study to publishing the results. We also welcome all questions and feedback and will try to answer any additional questions you have.