STAB22 TUT21

Chong Chen
University of Toronto, Scarborough
Department of Computer and Mathematical Sciences

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1 Observation and Experiment

In an **observational study** we observe individuals and measure variables of interest but do not attempt to influence the responses.

In an **experiment** we deliberately impose some treatment on individuals and we observe their responses.

NOTE: The best way to see the effects of a change is to do an intervention – where we actually impose the change.

1.1 Example

Are the following situations experiments or observational studies? In each case, explain briefly.

(a) Individuals were randomly assigned to two groups. The first group received a herb and the second a placebo. The number of respiratory tract infections in the two groups were compared.

(b) A researcher stood at a busy intersection and recorded the colour of the cars driven by male and female drives.

2 Terminology

Response variable: output of interest. At least one response variable measured.

Explanatory variables: inputs, variables that the experimenter think might

help to explain the value of the response variable. The experimenter manipulates the explanatory variables.

Factor: categorical explanatory variable.

Levels: specific values of a factor.

Treatment: particular combination of values for the factors.

Experimental units/subjects: smallest unit to which a treatment is applied and the response is measured, such as, for example, people or animals participating in the experiment.

3 Completely Randomized Design (CRD)

When all experimental units are allocated at random among all treatments, the experimental design is **completely randomized.**

4 Randomized Block Design (RBD)

A **block** is a group of experimental units or subjects that are known before the experiment to be similar in some way that is expected to affect the response to the treatments.

In a **randomized block design**, the random assignment of units to treatments is carried out separately within each block.