# Lecture 1 Experiment

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## Introduction

In ophthalmology there are many tests that can perform in a non invasive way. In order to do that automatically we will use a smartphone to perform a psychophysical tests.

We can control the intensity of a point in the screen of smartphone by absolute values, but we want this values in a standard measurement unit, wich is commonly used by professionals of this field.

This report will describe how we made our experiment and show some results got.

## Method

We used a device called luximetry to get measurements of a point's intensities in the screen. In order to block the light from outside, we built a small paperboard box and we painted it inside with black color to minimize possible effects light reflectance.

The point area painted in the screen was measured in 3 different sizes, with diameters of 300, 200 and 100 millimeters.

## Results

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.1.3
```

```
##
## Attaching package: 'dplyr'
##
## The following objects are masked from 'package:stats':
##
##     filter, lag
##
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.1.3
```

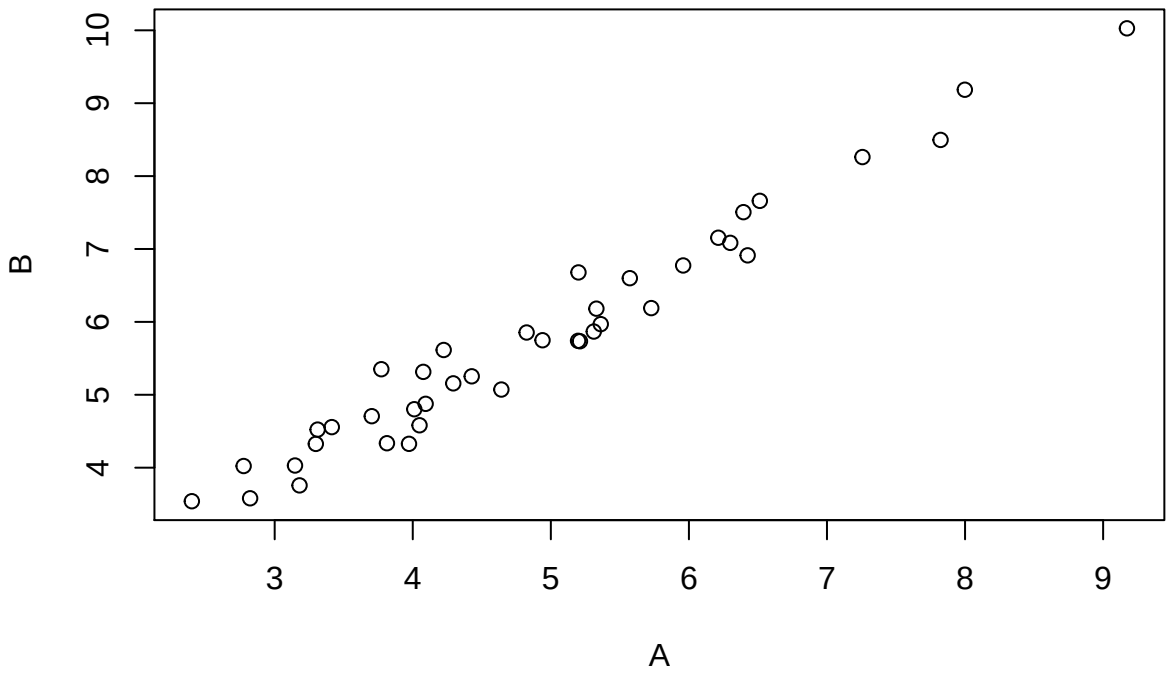
```
library(reshape)
```

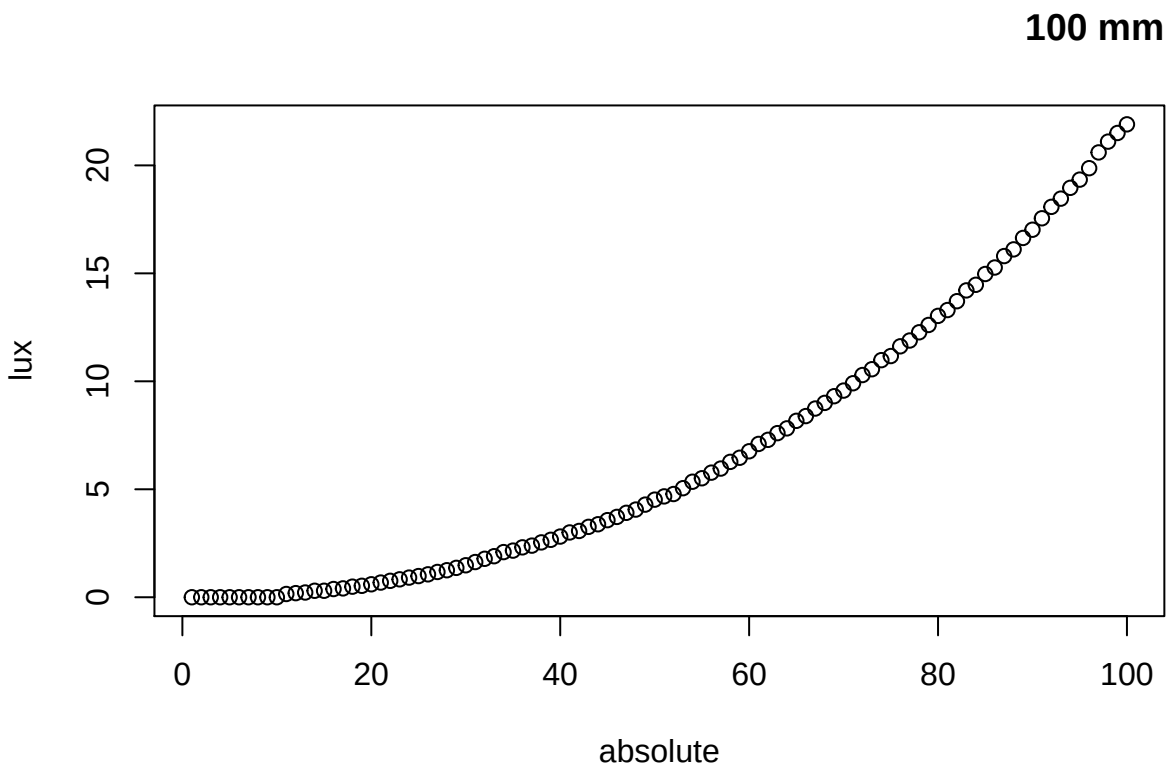
```
## Warning: package 'reshape' was built under R version 3.1.3
```

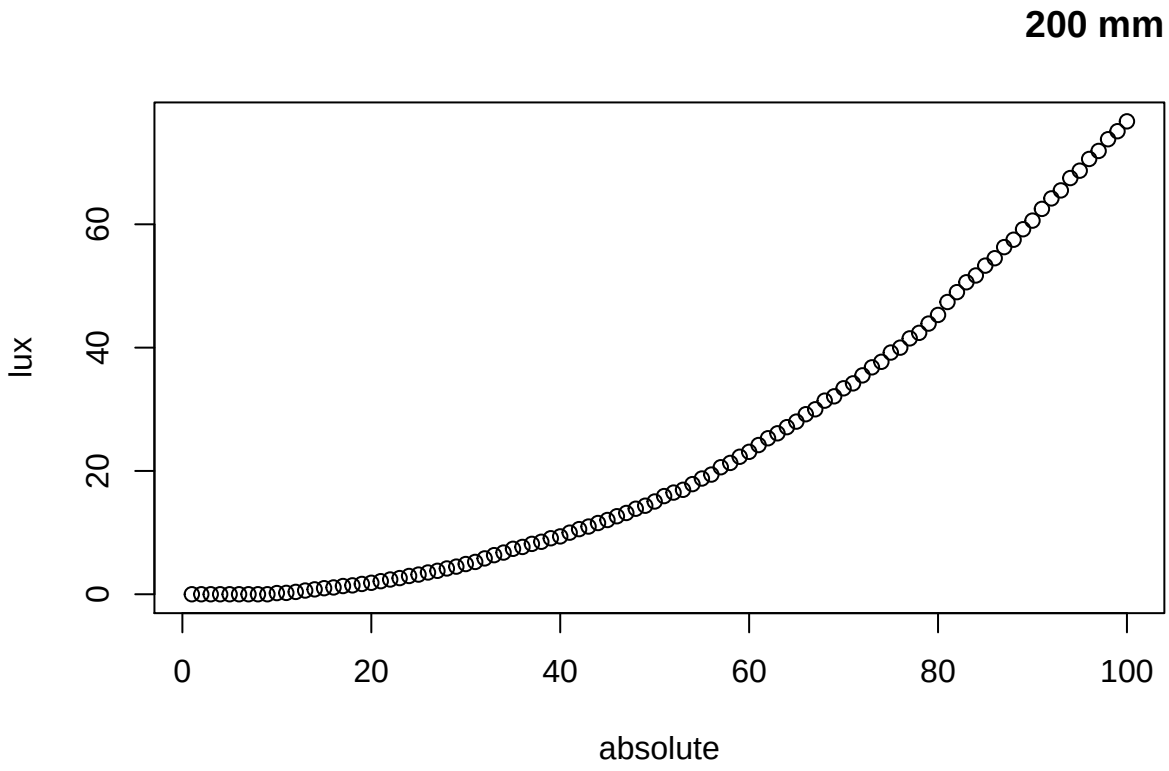
```
##
## Attaching package: 'reshape'
##
## The following object is masked from 'package:dplyr':
##
##     rename
```

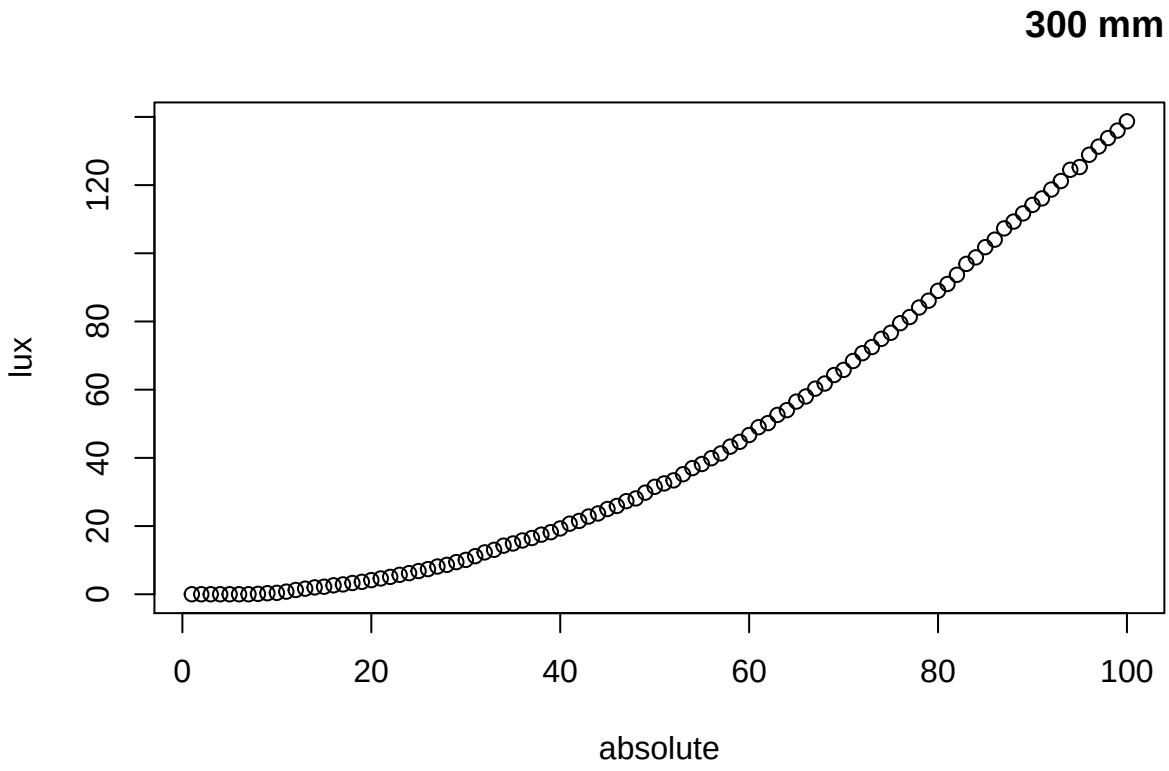
```
df = read.csv("C:/workspaces/ufrgs_4/SMPE/lectures/lecture 2/set1.csv", header=T)

measurements <- read.csv2("C:/workspaces/ufrgs_4/SMPE/lectures/homework_lecture_1/Measurements.csv",
                          header = TRUE, sep = ";", quote="\"", dec=".",fill = TRUE)
summary(measurements)
```

```
##      X300mm            X200mm           X100mm
##  Min.   :  0.000   Min.   : 0.000   Min.   : 0.000
##  1st Qu.:  7.228   1st Qu.: 3.445   1st Qu.: 1.040
##  Median : 32.000   Median :15.480   Median : 4.595
##  Mean   : 45.575   Mean   :23.559   Mean   : 6.759
##  3rd Qu.: 77.400   3rd Qu.:39.400   3rd Qu.:11.283
##  Max.   :138.700   Max.   :76.700   Max.   :21.900
```




100 mm
lux
0
5
10
15
20
0
20
40
60
80
100
absolute


200 mm
lux
0
20
40
60
0
20
40
60
80
100
absolute




Note that, there are some differences in the relation between measurements from 300mm to 200mm and from 200mm to 100mm. In smaller diameters, the ratio between the max value and the value of equivalent intensity related for the index of the first intensity of the smallest point which the sensor could measure, was bigger in smaller points.