Descriptive Statistics With R Software

Graphics and Plots

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Bar Diagrams

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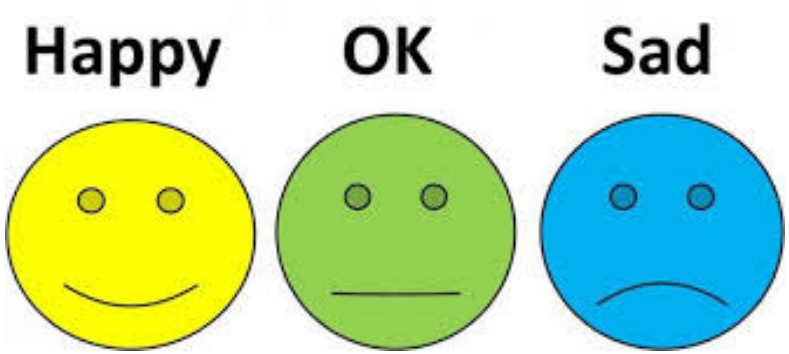
Graphical tools

Graphics summarize the information contained in a data.

For example, the mood of a person may be conveyed very easily by the smilies:



Graphical tools

They have an advantage that they convey the information hidden inside the data more compactly

Appropriate number and choice of plots in analysis provides better inferences.

Graphical tools

Graphical tools- various type of plots

- 2D & 3D plots,
- scatter diagram
- Pie diagram
- Histogram
- Bar plot
- Stem and leaf plot
- Box plot ...

Graphical tools

In R, Such graphics can be easily created and saved in various formats.

- **Bar plot**
- **Pie chart**
- **Box plot**
- **Grouped box plot**
- **Scatter plot**
- **Coplots**
- **Histogram**
- **Normal QQ plot …**

Bar diagrams

Visualizes the relative or absolute frequencies of observed values of a variable.

It consists of one bar for each category.

The height of each bar is determined by either the absolute frequency or the relative frequency of the respective category and is shown on the *y-axis.*

Width of the bar is immaterial or arbitrary.

Bar diagrams

Frequency distribution

Class	Frequency	Relative frequency
A_1	f_1	f_1/n
A_2	f_2	f_2/n
…	…	…
A_{k-1}	f_{k-1}	f_{k-1}/n
A_k	f_k	f_k/n

Bar diagrams

barplot Creates a bar plot with vertical or horizontal bars.

Usage

```
barplot(height, ...)
```

Detailed command

```
barplot(height, width = 1, space = NULL,
names.arg = NULL, legend.text = NULL, beside
= FALSE, horiz = FALSE, density = NULL, angle
= 45, col = NULL, border = par("fg"), main =
NULL, sub = NULL, xlab = NULL, ylab = NULL,
xlim = NULL, ylim = NULL, xpd = TRUE, log =
"", axes = TRUE, axisnames = TRUE, cex.axis =
par("cex.axis"),...)
```

Bar diagrams

```
> help("barplot")
```

```
barplot(height, width = 1, space = NULL,
names.arg = NULL, legend.text = NULL, beside
= FALSE, horiz = FALSE, density = NULL, angle
= 45, col = NULL, border = par("fg"), main =
NULL, sub = NULL, xlab = NULL, ylab = NULL,
xlim = NULL, ylim = NULL, xpd = TRUE, log =
"", axes = TRUE, axisnames = TRUE, cex.axis =
par("cex.axis"), cex.names = par("cex.axis"),
inside = TRUE, plot = TRUE, axis.lty = 0,
offset = 0, add = FALSE, args.legend = NULL,
...)
```

Bar diagrams

barplot

height	either a vector or matrix of values describing the bars which make up the plot. If height is a vector, the plot consists of a sequence of rectangular bars with heights given by the values in the vector.
width	optional vector of bar widths. Re-cycled to length the number of bars drawn. Specifying a single value will have no visible effect unless xlim is specified.
space	the amount of space (as a fraction of the average bar width) left before each bar. May be given as a single number or one number per bar.
names.arg	a vector of names to be plotted below each bar or group of bars. If this argument is omitted, then the names are taken from the names attribute of height if this is a vector, or the column names if it is a matrix.
legend.tex	a vector of text used to construct a legend for the plot, or a logical indicating whether a legend should be included.
…	…
…	…

See help on barplot

Bar diagrams

```
barplot(x, width = 1, space = NULL,…)
```

```
> barplot(table(x))
```
#Bar plot with absolute frequency

```
> barplot(table(x)/length(x))
```
#Bar plot with relative frequency

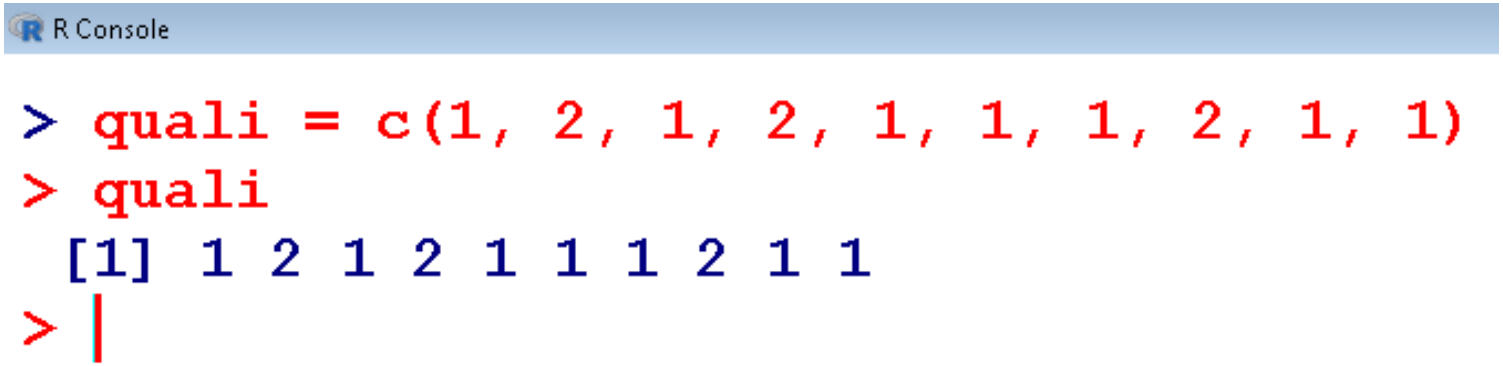
Bar diagrams

Example:

Code of qualification of 10 persons by using, say 1 for graduate (G) and 2 for nongraduate (N).

G,	N,	G,	N,	G,	G,	G,	N,	G,	G
1,	2,	1,	2,	1,	1,	1,	2,	1,	1

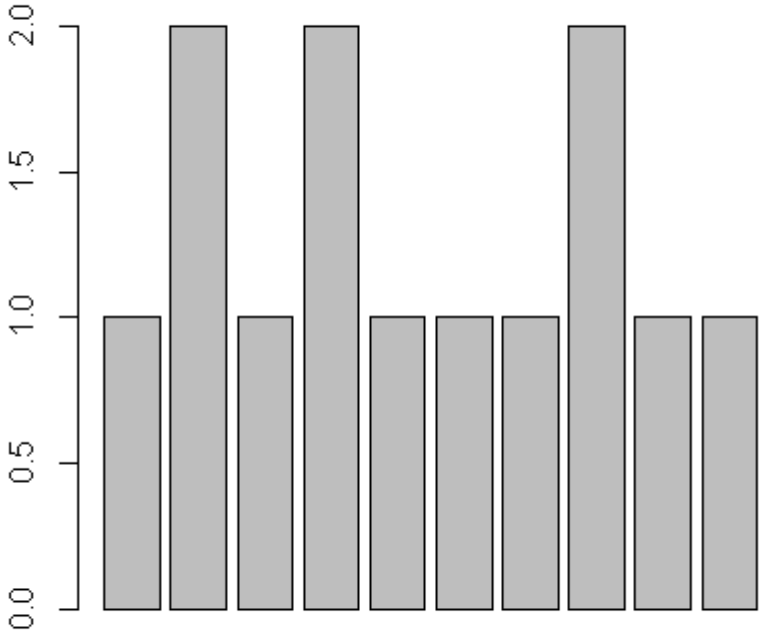
```
> quali = c(1, 2, 1, 2, 1, 1, 1, 2, 1, 1)
> quali
 [1] 1 2 1 2 1 1 1 2 1 1
```



Bar diagrams
Example

```
> barplot(quali)
```

Do you want this?

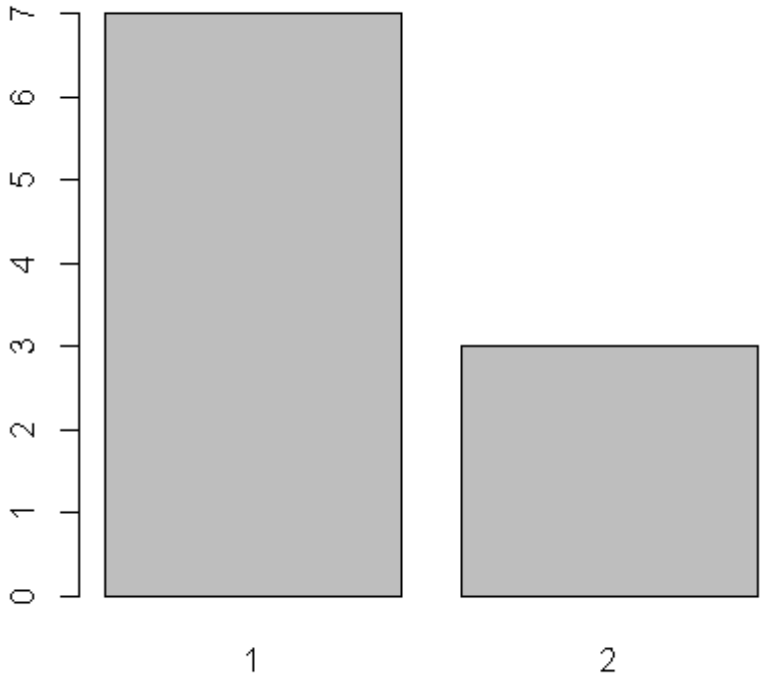


Bar plots:

Example

```
> table(quali)
gender
1 2
7 3

> barplot(table(quali))
```

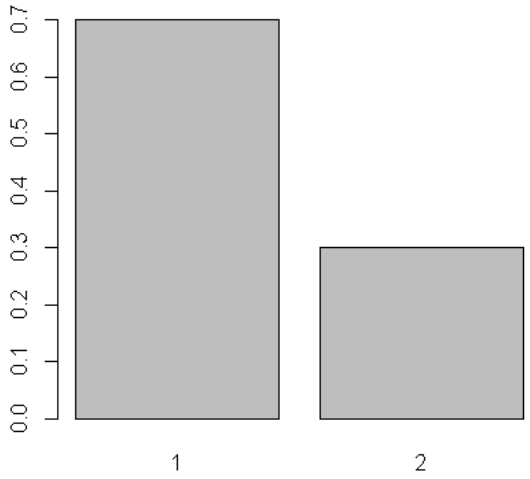


Bar plots:

Example

```
> table(quali)/length(quali)
gender
  1   2
0.7 0.3

> barplot(table(quali)/length(quali))
```



Bar diagrams

Example

There are three salespersons in a shop. They are denoted as 1, 2 and 3. Which salesperson serves the first 100 customers is recorded as follows:

1,1,2,1,2,3,2,2,3,3,3,1,2,3,2,2,3,1,1,3,3,1,2,1,3,3,3,2,2,2,2,1,2,2,1,1,

1,3,2,2,1,2,3,2,2,1,2,3,3,2,1,2,2,3,1,1,2,1,2,3,2,3,2,2,3,1,2,3,3,3,2,1,

1,1,2,1,1,2,1,2,3,3,1,2,3,3,2,1,2,3,2,1,3,2,2,2,2,3,2,2

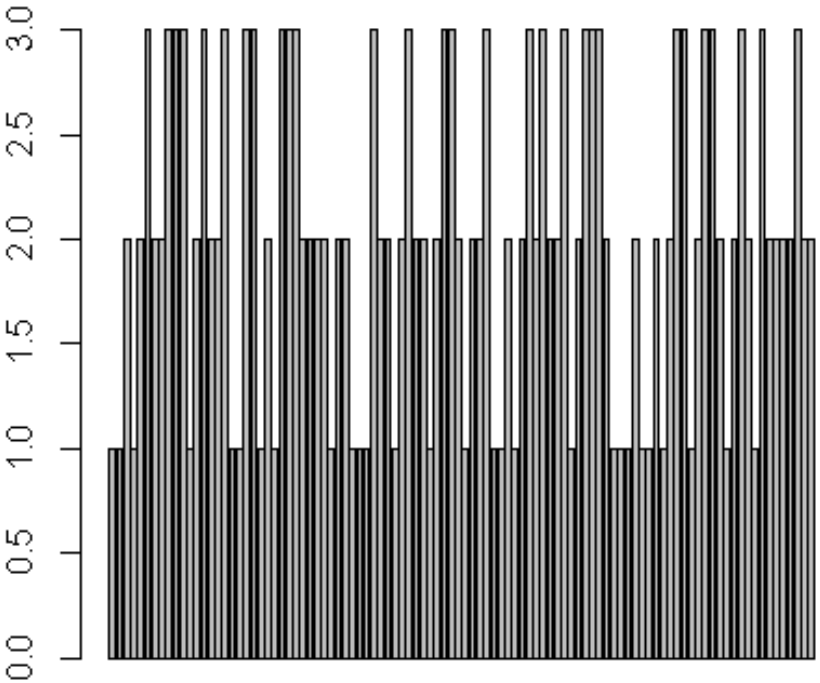
```
salesper = c(1,1,2,1,2,3,2,2,3,3,3,1,2,3,2,2,3,
1,1,3,3,1,2,1,3,3,3,2,2,2,2,1,2,2,1,1,1,3,2,2,
1,2,3,2,2,1,2,3,3,2,1,2,2,3,1,1,2,1,2,3,2,3,2,
2,3,1,2,3,3,3,2,1,1,1,2,1,1,2,1,2,3,3,1,2,3,3,
2,1,2,3,2,1,3,2,2,2,2,3,2,2)
```

Bar diagrams

Example

```
> barplot(salesper)
```

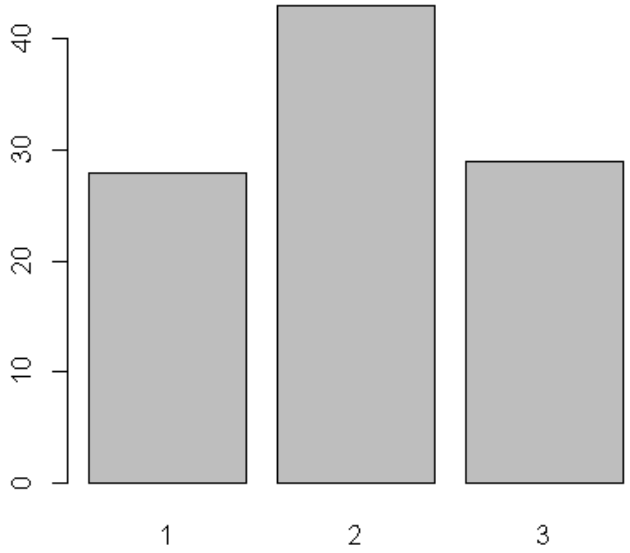
Do you want this?



Bar diagrams

Example

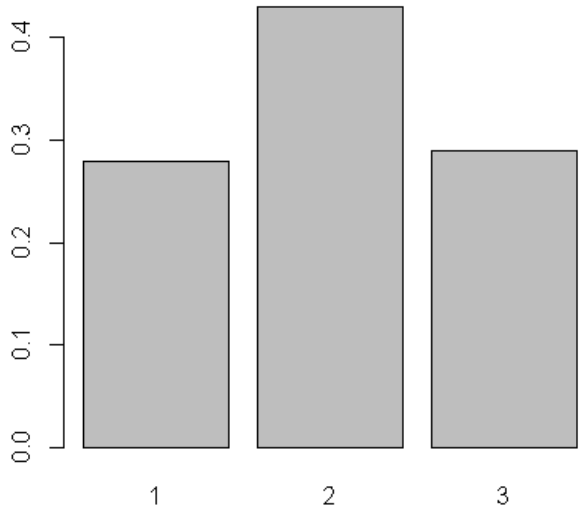
```
> barplot(table(salesper))
```



Bar diagrams

Example

```
> barplot(table(salesper)/length(salesper))
```

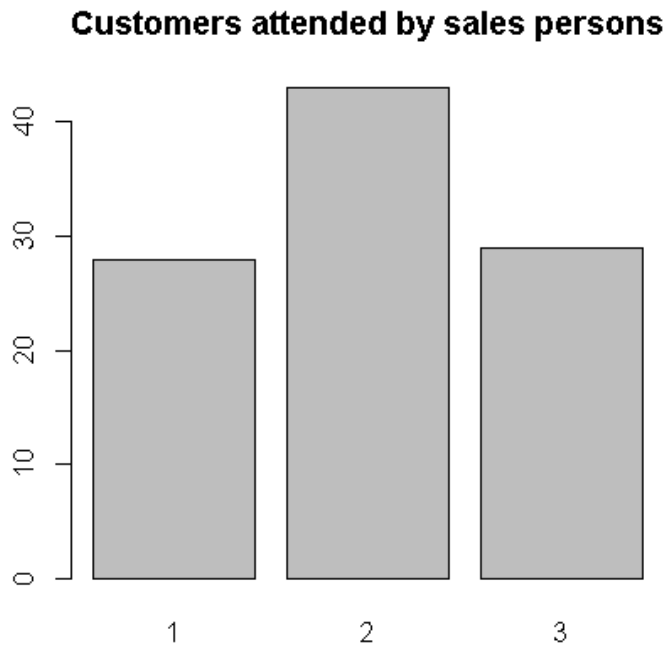


Bar diagrams

Example

If we want to give a title to the graph

```
> barplot(table(salesper), main = "Customers
attended by sales persons")
```

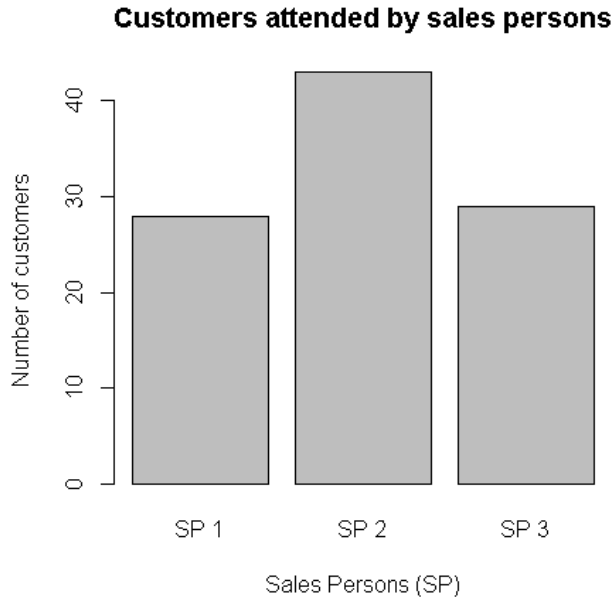


Bar diagrams

Example

If we want to further add legends and axis titles to the graph

```
> barplot(table(salesper), main = "Customers
attended by sales persons", names.arg=c("SP
1", "SP 2", "SP 3"), xlab = "Sales Persons
(SP)", ylab = "Number of customers")
```



Bar diagrams

Example

If we want to further add colours in the bars to the graph

```
> barplot(table(salesper), main = "Customers
attended by sales persons", names.arg=c("SP
1", "SP 2", "SP 3"), xlab = "Sales Persons
(SP)", ylab = "Number of customers",  col=
c("red","green","orange"))
```