

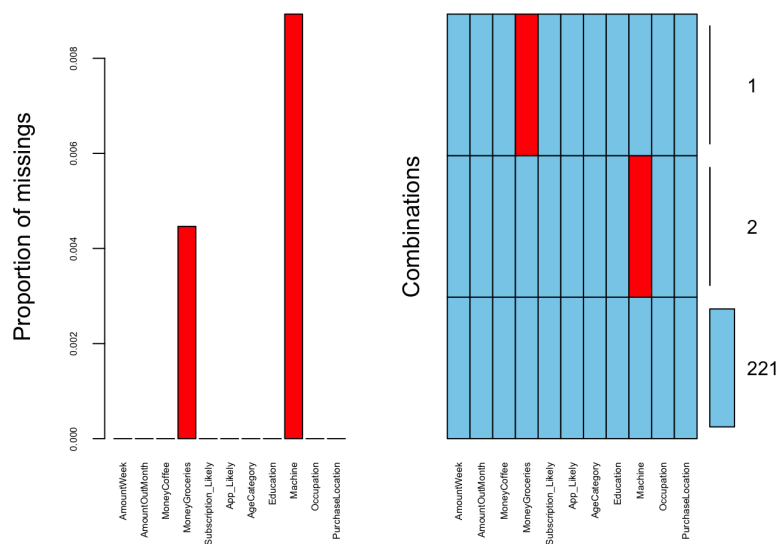
# Thesis Data Analysis

07 March, 2021

## Steps data analysis

- Univariate descriptions - categorical variables
  - Data table
  - Graphs
- Univariate descriptions - numerical variables
  - Summary
  - Confidence intervals
  - Graphs
- Boxplots - numerical
- Joint distribution tables
- Outliers
- Parametric testing
- Relationships & correlations
  - Residual plots
- Regressions
- Data problems

## Introduction



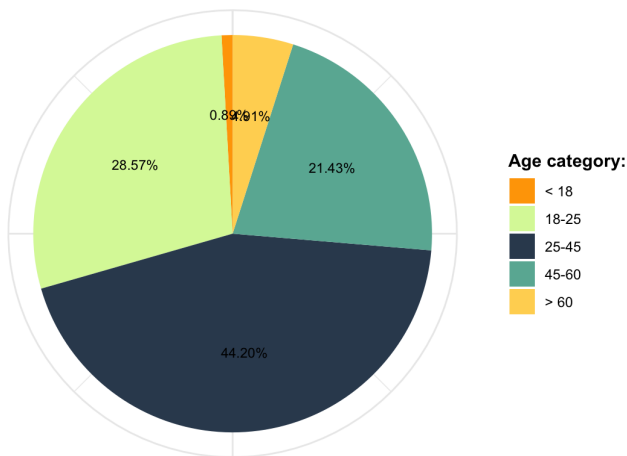
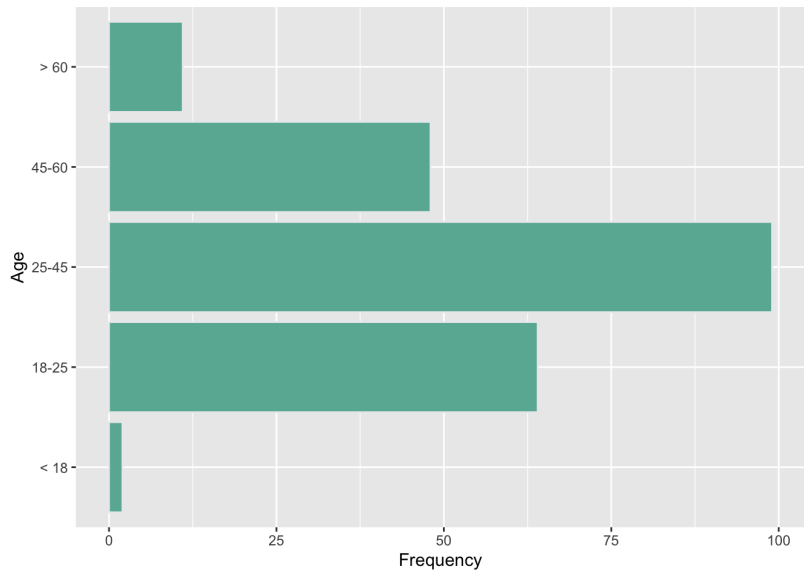
The variables included in the data set are:

Field	Description
AmountWeek	How many cups of coffee do you typically consume weekly?
AmountOutMonth	How frequently do you drink out-of-home per month on average?
MoneyCoffee	How much money on average do you estimate you spend on coffee per month?
MoneyGroceries	How much on average do you spend on general groceries per month?
Machine	How do you brew your coffee at home?
Brand change	How often do you switch between coffee brands?
Purchase location	Where do you usually purchase your coffee?
Supermarket_Positive_Reasons	When you purchase coffee from the supermarket what are your main reasons for doing so?
Supermarket_Negative_Reasons	What would be reasons why you would not purchase coffee from the supermarket?
Criteria_Type_Coffee	What are your main criteria's or evaluation points for choosing the type of coffee?
KnowledgeCoffee	How would you describe your knowledge level regarding coffee in general?
Purchase_Price	I believe that the ____ is important to my decision on which coffee to purchase.
Purchase_Sustainability	I believe that the ____ is important to my decision on which coffee to purchase.
Purchase_Sustainability	I believe that the ____ is important to my decision on which coffee to purchase.
Purchase_Fairtrade	I believe that the ____ is important to my decision on which coffee to purchase.
Purchase_Packaging	I believe that the ____ is important to my decision on which coffee to purchase.
Frequency_Specialty	How often do you drink specialty coffee?
Subscription_Likely	How likely are you to have an online subscription for (specialty) coffee?
Subscription_Not_Likely	What is the number one reasons why you would be hesitant?
App_Likely	How likely are you to value and use an app for your online subscription?
Gender	What is your gender?
AgeCategory	What is your age category?
Occupation	What is your occupational status?
Education	What level of education have you completed?
Home	How would you describe the place you currently live in?

Univariate descriptions - Categorical variables

Age category

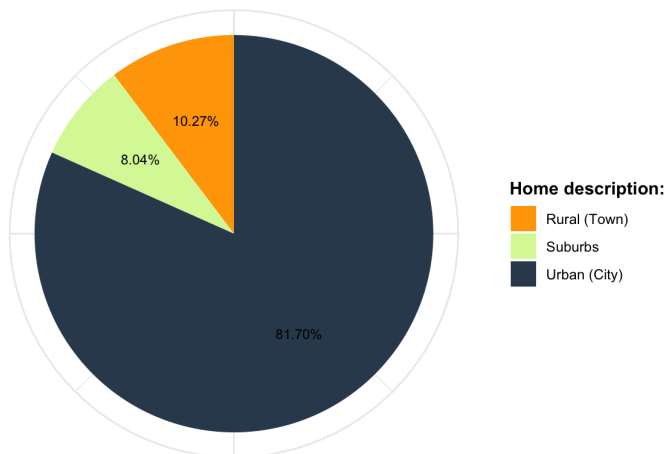
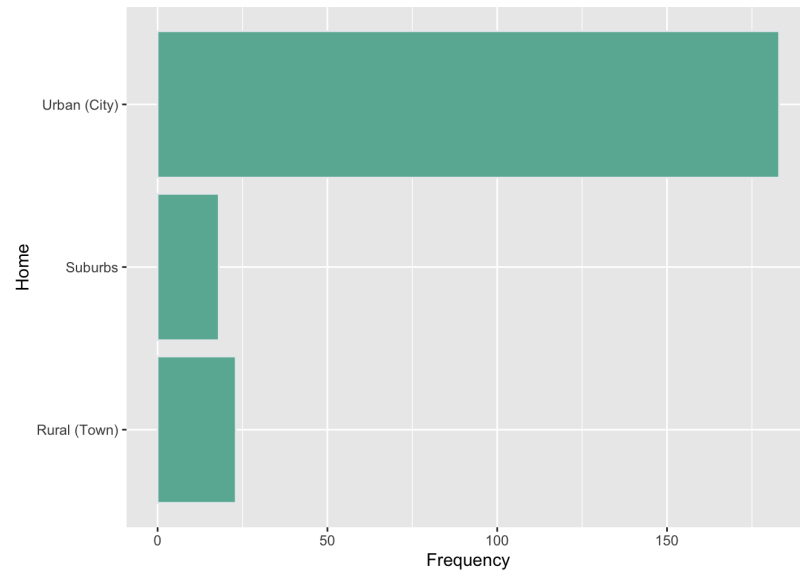
Age Category	Absolute	Relative
< 18	2	0.89%
18-25	64	28.57%
25-45	99	44.20%
45-60	48	21.43%
> 60	11	4.91%



Home

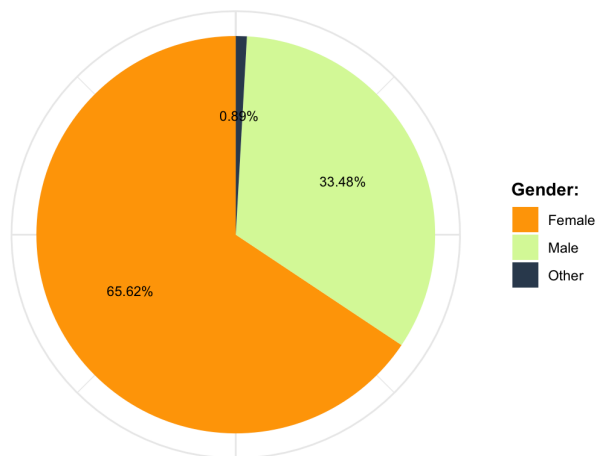
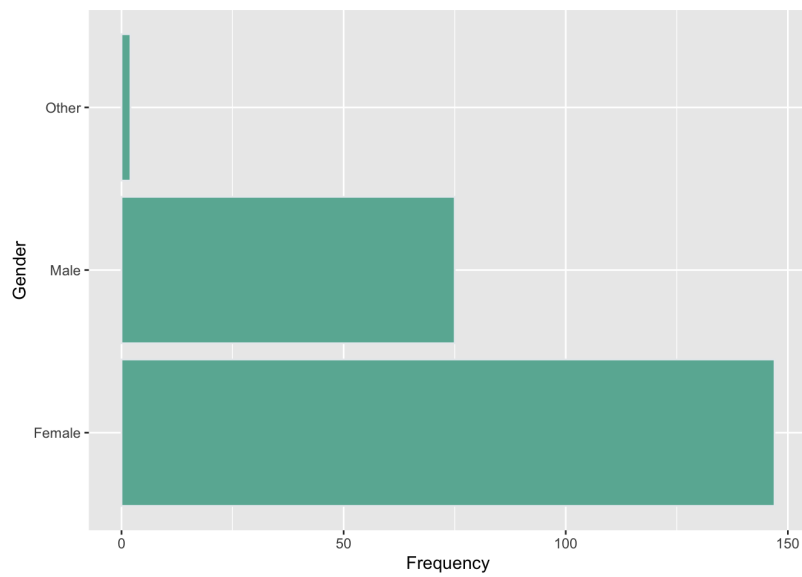


Home	Absolute	Relative
Rural (Town)	23	10.27%
Suburbs	18	8.04%
Urban (City)	183	81.70%



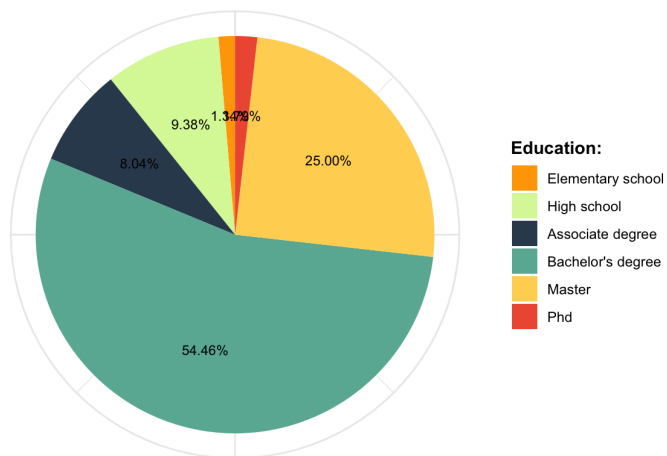
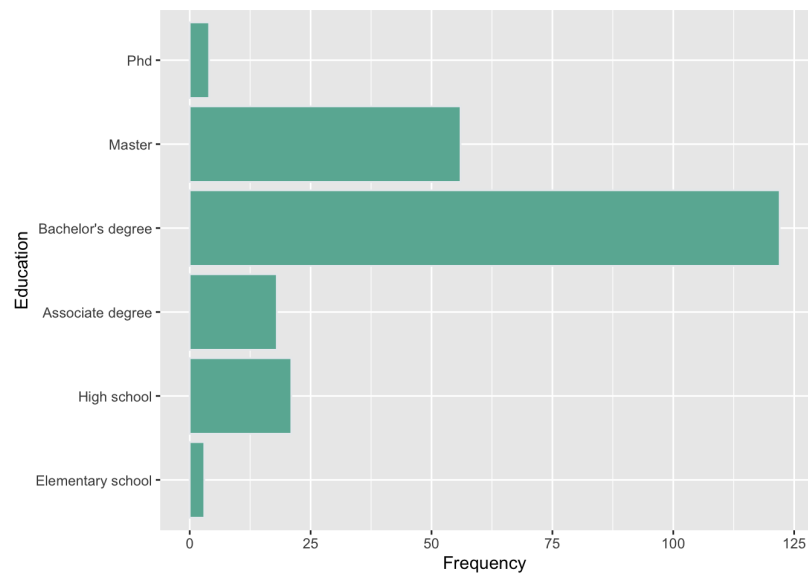
## Gender

Gender	Absolute	Relative
Female	147	65.62%
Male	75	33.48%
Other	2	0.89%



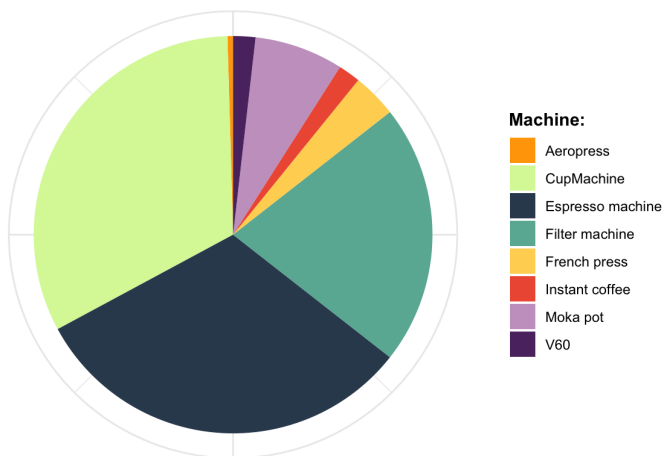
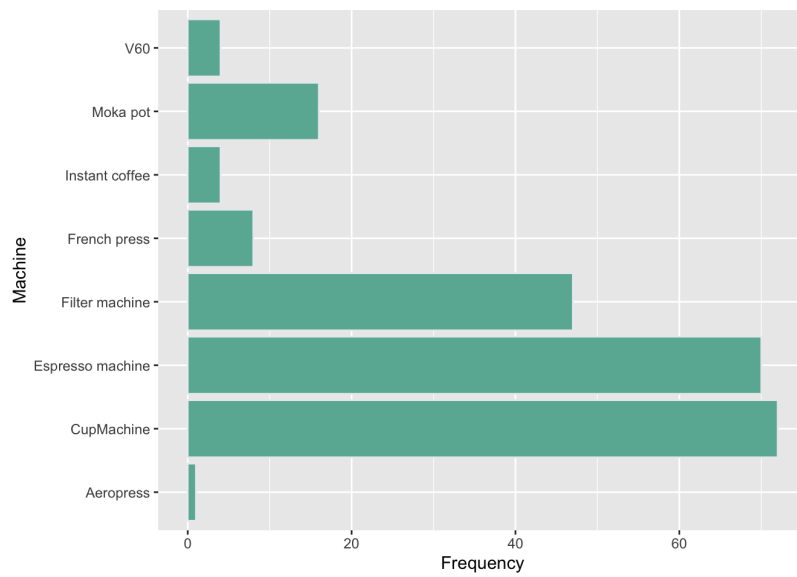
## Education

Education	Absolute	Relative
Elementary school	3	1.34%
High school	21	9.38%
Associate degree	18	8.04%
Bachelor's degree	122	54.46%
Master	56	25.00%
Phd	4	1.79%



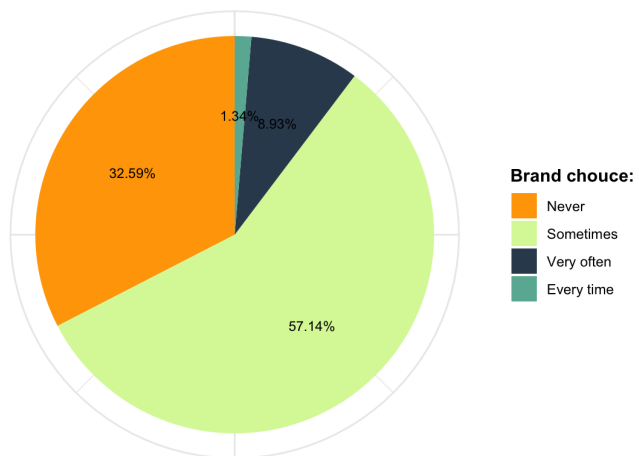
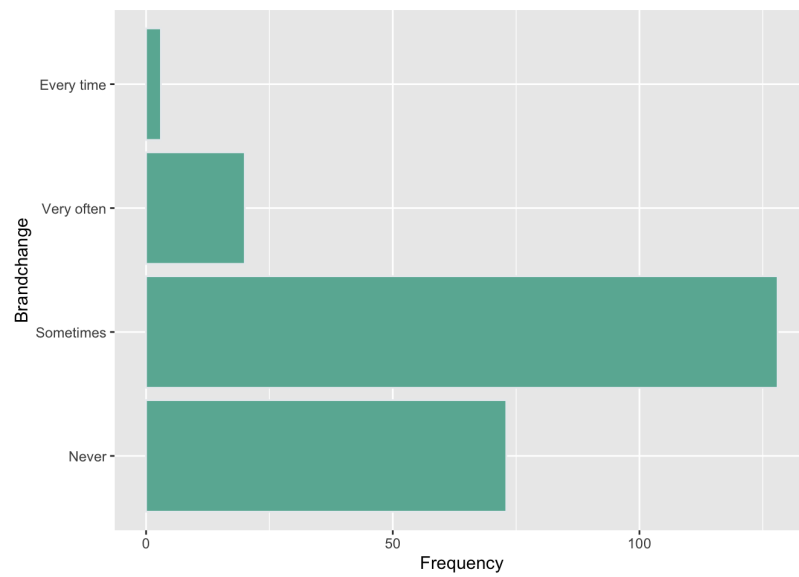
## Machine

Machine	Absolute	Relative
Aeropress	1	0.45%
CupMachine	72	32.43%
Espresso machine	70	31.53%
Filter machine	47	21.17%
French press	8	3.60%
Instant coffee	4	1.80%
Moka pot	16	7.21%
V60	4	1.80%



### Brand choose

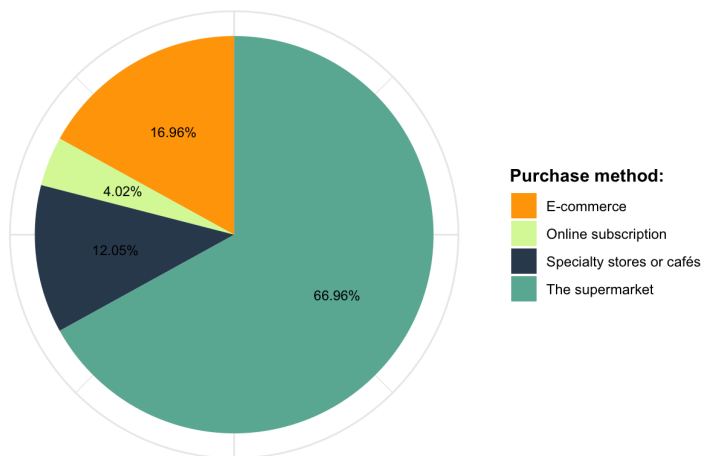
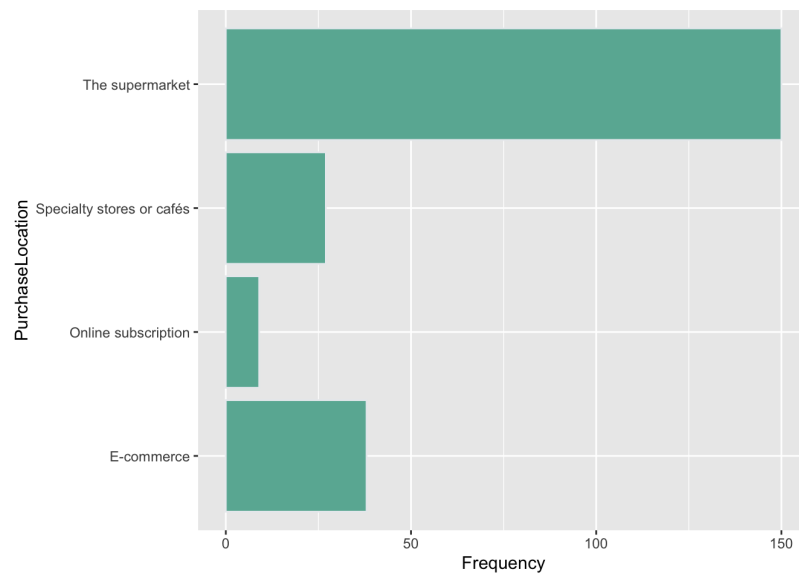
Brand choice	Absolute	Relative
Never	73	32.59%
Sometimes	128	57.14%
Very often	20	8.93%
Every time	3	1.34%



### Purchase Method

Purchase Method	Absolute	Relative
E-commerce	38	16.96%
Online subscription	9	4.02%
Specialty stores or cafés	27	12.05%
The supermarket	150	66.96%





## Multiple option answers:

### Reasons buying from the supermarket

value	Freq
Als de koffie in de reclame is	1
biologisch en een goede smaak.	1
Convenience	1
duurdere merken	1
I am satisfied with the product	39
I do not have special stores near where I live	8
Ik koop soms ook wel koffie ergens anders (bijv. online)	1

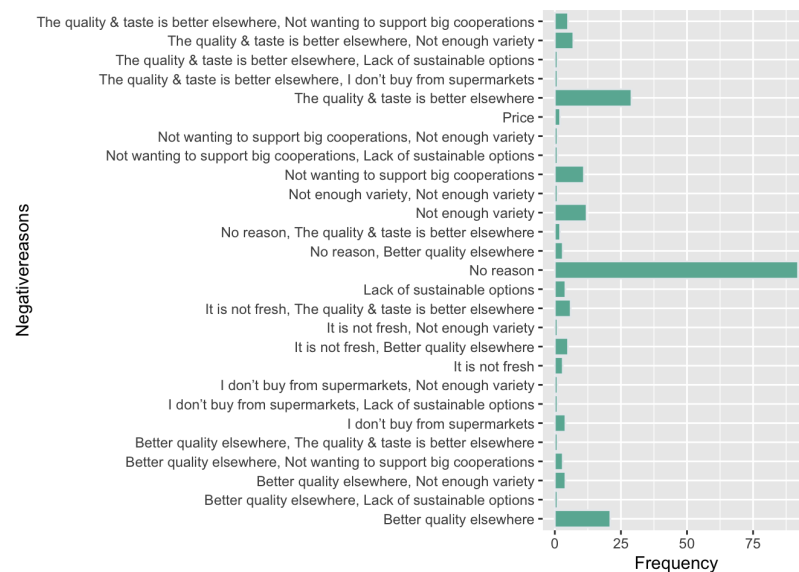
Koffie op en geen tijdige levering	1
Price	13
Time-saving	31
Convenience	49
Fairtrade	1
I am satisfied with the product	47
I do not have special stores near where I live	8
I do not purchase coffee from the supermarket	38
I don't buy coffee in supermarkets	1
I run out of coffee bought online and I buy it at the supermarket just for the time I run out of it	1
ik laat boodschappen thuis bezorgen	1
Koffie is op	1
Lekkere koffie	1
Other	1
Price	55
Time-saving	20

#### Reasons for not buying from the supermarket

Reason	Frequency
Better quality elsewhere	8
I don't buy from supermarkets	1
Lack of sustainable options	4
Not enough variety	15
Not wanting to support big cooperations	8
The quality & taste is better elsewhere	9
Better quality elsewhere	30
I don't buy from supermarkets	6
It is not fresh	15
Lack of sustainable options	4
No reason	97
Not enough variety	13
Not wanting to support big cooperations	13
Price	2
The quality & taste is better elsewhere	43

Negative reasons	Absolute	Relative
Better quality elsewhere	21	9.42%
Better quality elsewhere, Lack of sustainable options	1	0.45%
Better quality elsewhere, Not enough variety	4	1.79%
Better quality elsewhere, Not wanting to support big cooperations	3	1.35%
Better quality elsewhere, The quality & taste is better elsewhere	1	0.45%
I don't buy from supermarkets	4	1.79%
I don't buy from supermarkets, Lack of sustainable options	1	0.45%

I don't buy from supermarkets, Not enough variety	1	0.45%
It is not fresh	3	1.35%
It is not fresh, Better quality elsewhere	5	2.24%
It is not fresh, Not enough variety	1	0.45%
It is not fresh, The quality & taste is better elsewhere	6	2.69%
Lack of sustainable options	4	1.79%
No reason	92	41.26%
No reason, Better quality elsewhere	3	1.35%
No reason, The quality & taste is better elsewhere	2	0.90%
Not enough variety	12	5.38%
Not enough variety, Not enough variety	1	0.45%
Not wanting to support big cooperations	11	4.93%
Not wanting to support big cooperations, Lack of sustainable options	1	0.45%
Not wanting to support big cooperations, Not enough variety	1	0.45%
Price	2	0.90%
The quality & taste is better elsewhere	29	13.00%
The quality & taste is better elsewhere, I don't buy from supermarkets	1	0.45%
The quality & taste is better elsewhere, Lack of sustainable options	1	0.45%
The quality & taste is better elsewhere, Not enough variety	7	3.14%
The quality & taste is better elsewhere, Not wanting to support big cooperations	5	2.24%



### Criteria for choosing the type of coffee

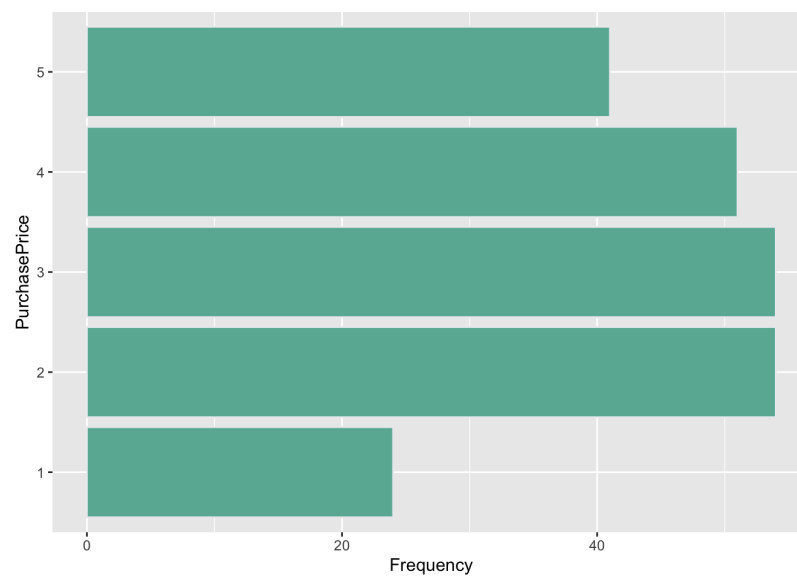
value	Freq
Sustainability & Fair Trade	3
Arabica or Robusta	8
Flavour profile	83
Origin	5

Roast level	15
Sustainability & Fair Trade	6
Arabica or Robusta	9
Flavour profile	60
Origin	31
Price	83
Roast level	46
Sustainability & Fair Trade	6

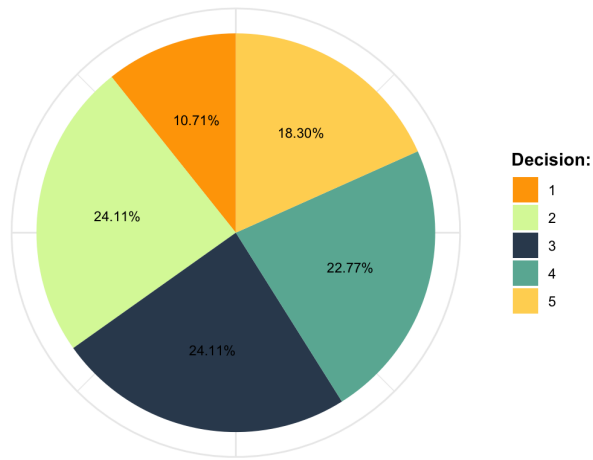
## Purchase decisions 1-5

### Price

Purchase decision - price	Absolute	Relative
1	24	10.71%
2	54	24.11%
3	54	24.11%
4	51	22.77%
5	41	18.30%

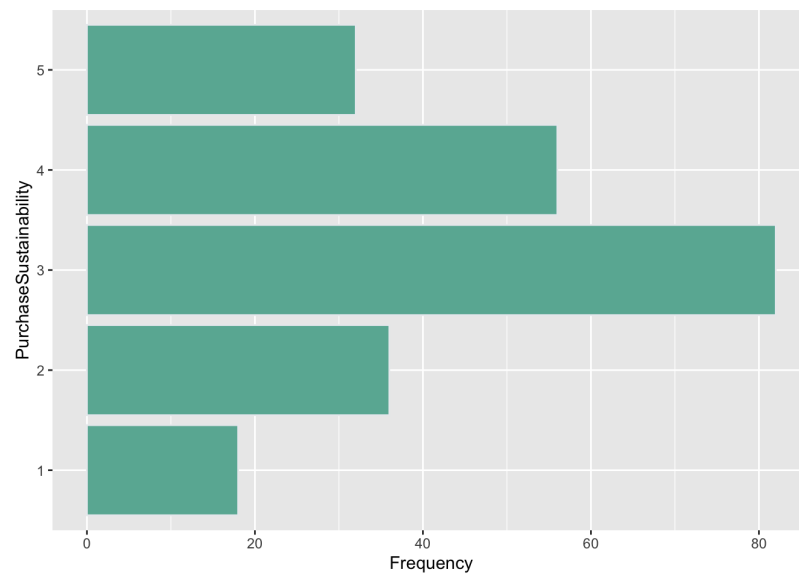


## Price

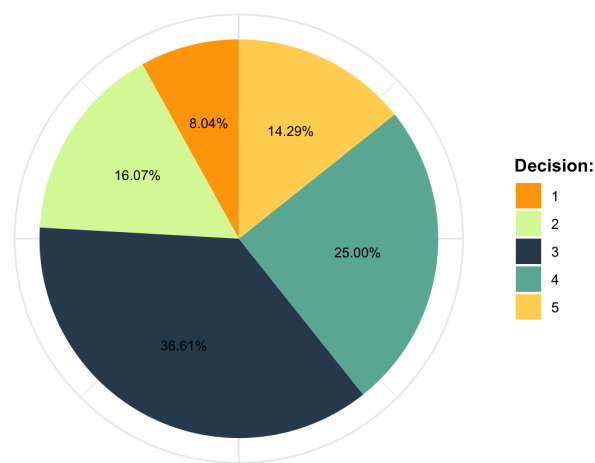


## Sustainability

Purchase decision - sustainability	Absolute	Relative
1	18	8.04%
2	36	16.07%
3	82	36.61%
4	56	25.00%
5	32	14.29%

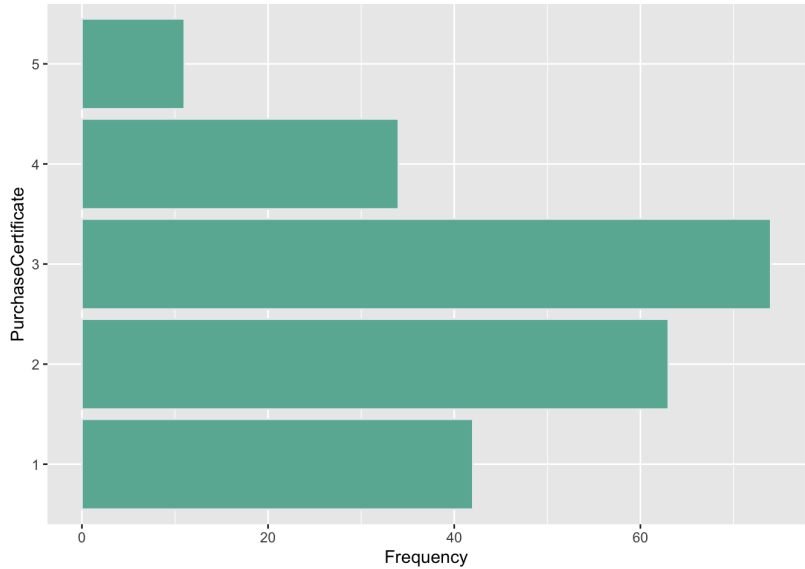


Sustainability

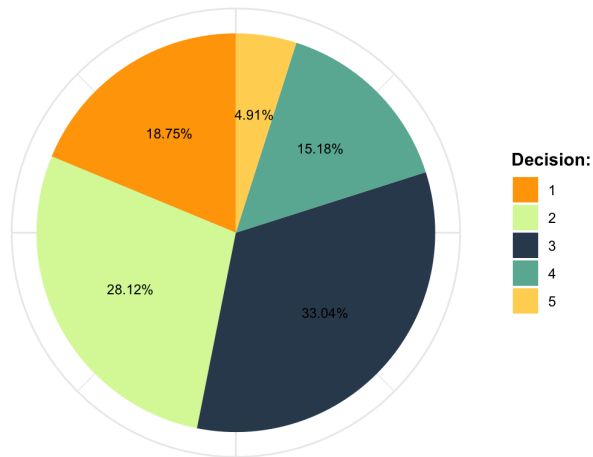


Certificates

Purchase decision - certificate	Absolute	Relative
1	42	18.75%
2	63	28.12%
3	74	33.04%
4	34	15.18%
5	11	4.91%

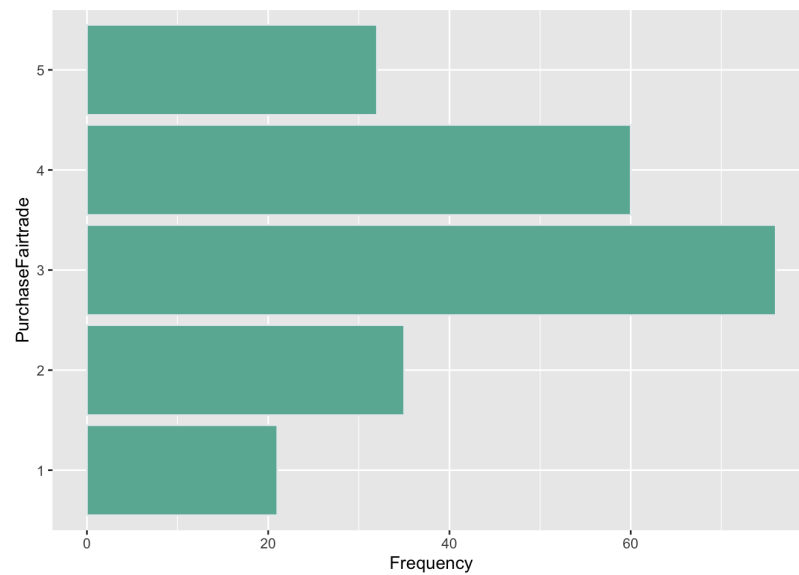


## Certificate

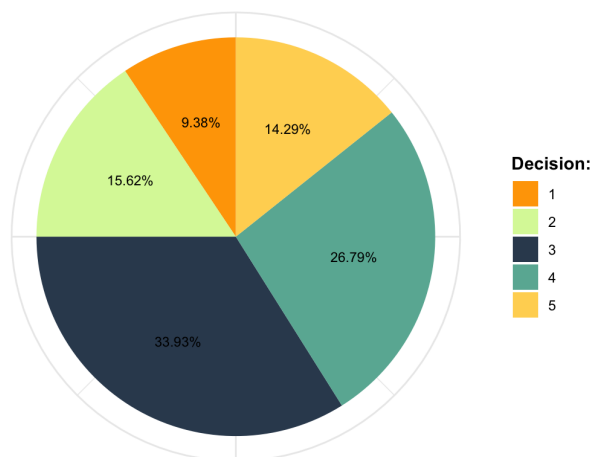


## Fairtrade

Purchase decision - fairtrade	Absolute	Relative
1	21	9.38%
2	35	15.62%
3	76	33.93%
4	60	26.79%
5	32	14.29%

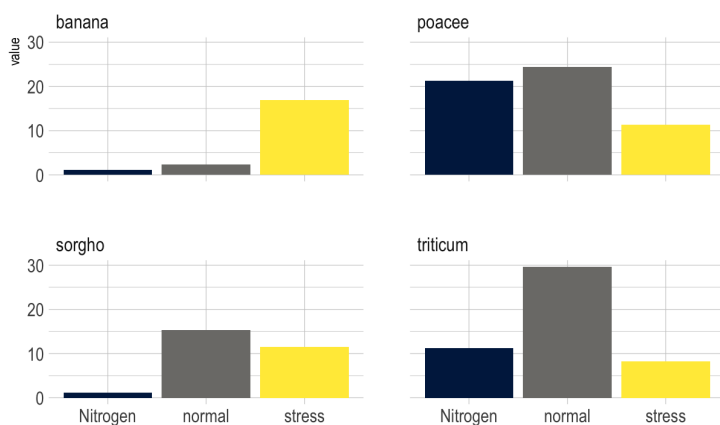


## Fair trade



Loading required package: viridisLite

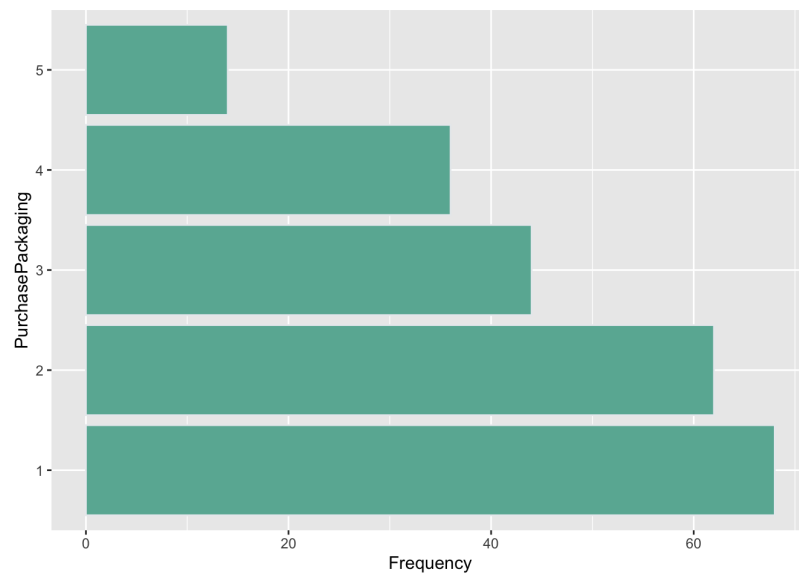
## Studying 4 species..



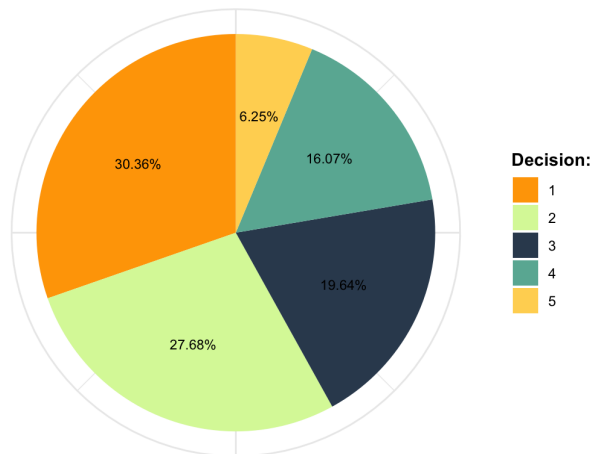
## Packaging

Purchase decision - packaging	Absolute	Relative
1	68	30.36%
2	62	27.68%
3	44	19.64%
4	36	16.07%
5	14	6.25%



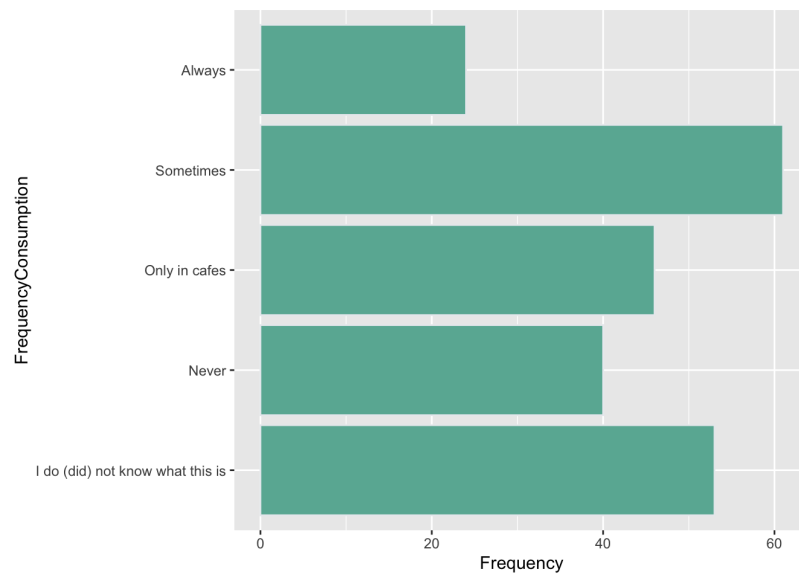


## Packaging



## Frequency specialty coffee consumption

Frequency coffee consumption	Absolute	Relative
I do (did) not know what this is	53	23.66%
Never	40	17.86%
Only in cafes	46	20.54%
Sometimes	61	27.23%
Always	24	10.71%

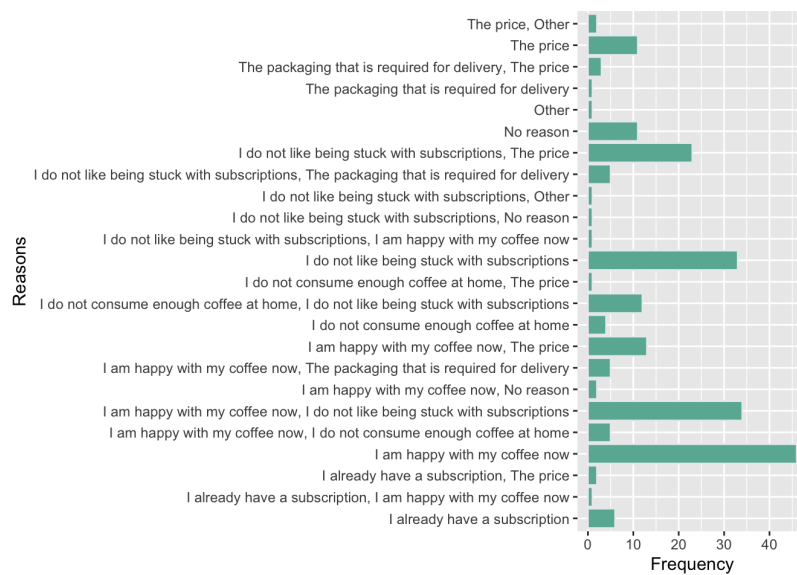


### Reasons for not being likely to set up a subscription

value	Freq
I am happy with my coffee now	2
I do not consume enough coffee at home	5
I do not like being stuck with subscriptions	46
No reason	3
Other	3
The packaging that is required for delivery	10
The price	42
I already have a subscription	9
I am happy with my coffee now	105
I do not consume enough coffee at home	17
I do not like being stuck with subscriptions	64
No reason	11
Other	1
The packaging that is required for delivery	4
The price	13

Reasons	Absolute	Relative
I already have a subscription	6	2.68%
I already have a subscription, I am happy with my coffee now	1	0.45%
I already have a subscription, The price	2	0.89%
I am happy with my coffee now	46	20.54%
I am happy with my coffee now, I do not consume enough coffee at home	5	2.23%
I am happy with my coffee now, I do not like being stuck with subscriptions	34	15.18%
I am happy with my coffee now, No reason	2	0.89%
I am happy with my coffee now, The packaging that is required for delivery	5	2.23%

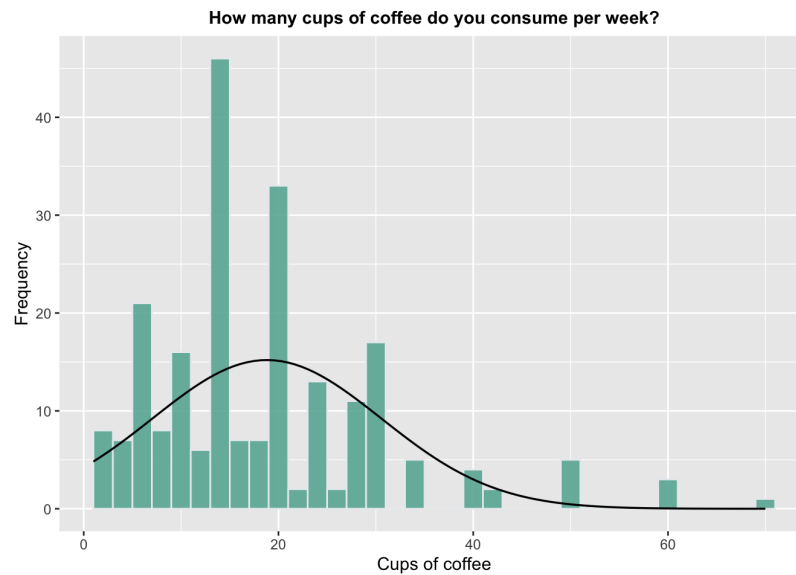
I am happy with my coffee now, The price	13	5.80%
I do not consume enough coffee at home	4	1.79%
I do not consume enough coffee at home, I do not like being stuck with subscriptions	12	5.36%
I do not consume enough coffee at home, The price	1	0.45%
I do not like being stuck with subscriptions	33	14.73%
I do not like being stuck with subscriptions, I am happy with my coffee now	1	0.45%
I do not like being stuck with subscriptions, No reason	1	0.45%
I do not like being stuck with subscriptions, Other	1	0.45%
I do not like being stuck with subscriptions, The packaging that is required for delivery	5	2.23%
I do not like being stuck with subscriptions, The price	23	10.27%
No reason	11	4.91%
Other	1	0.45%
The packaging that is required for delivery	1	0.45%
The packaging that is required for delivery, The price	3	1.34%
The price	11	4.91%
The price, Other	2	0.89%



## Univariate descriptions - Numerical variables

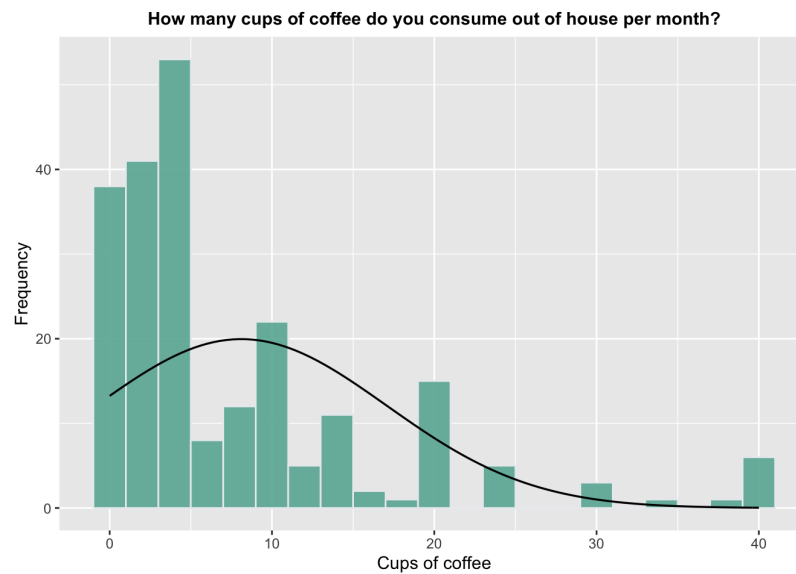
### Amount coffe consumed weekly

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
1.00	10.00	15.50	18.81	25.00	70.00



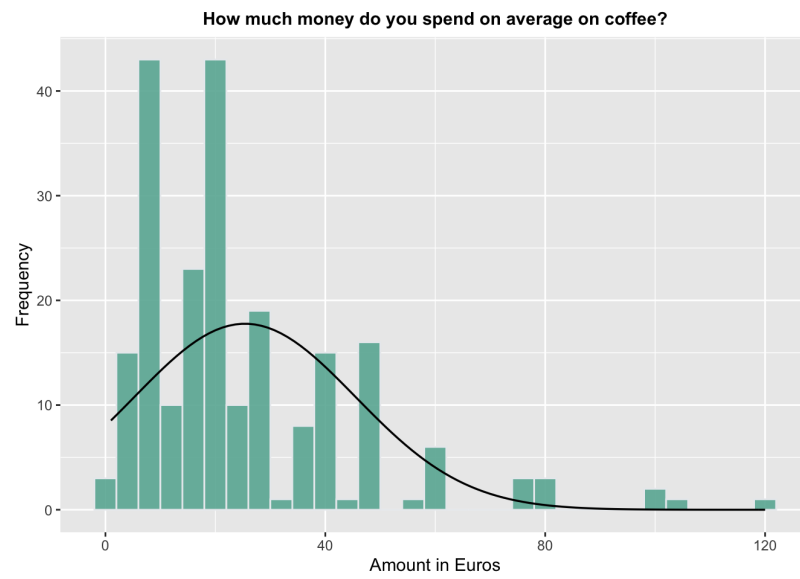
### Amount per month out of house

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.000	2.000	5.000	8.107	10.000	40.000



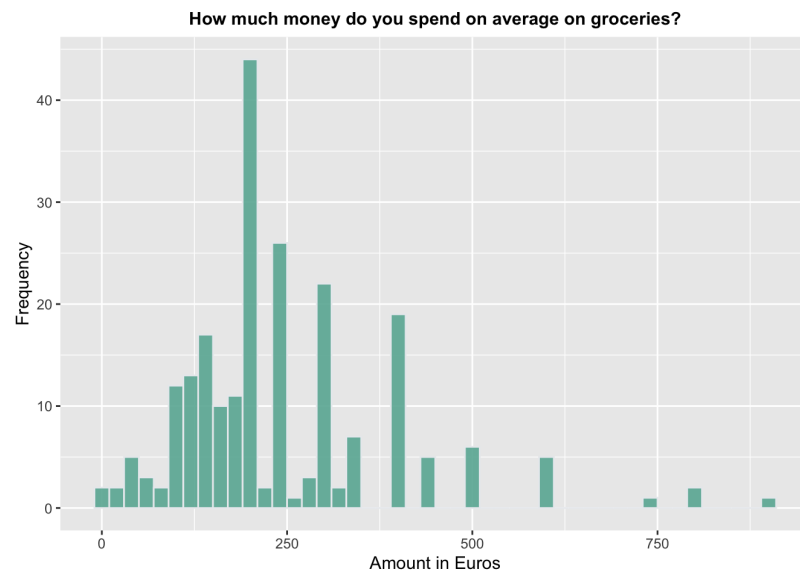
### Money coffee

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
1.00	10.00	20.00	25.38	35.00	120.00



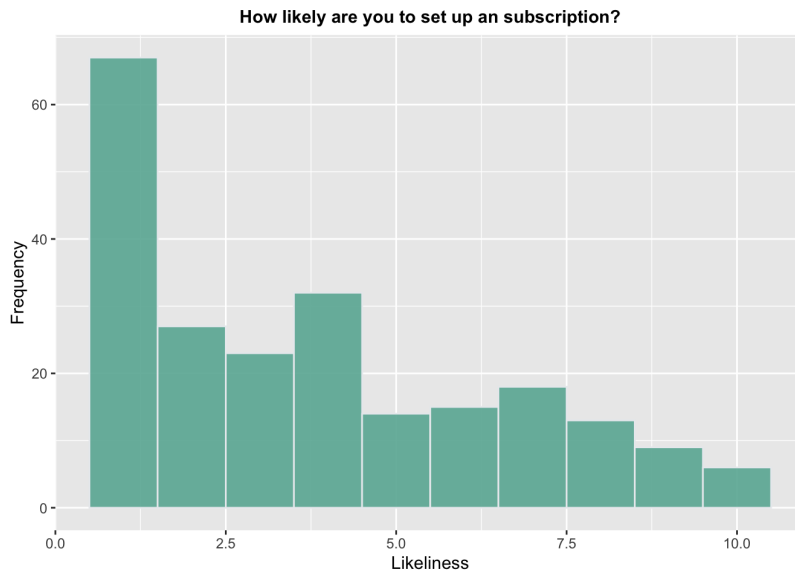
### Money groceries

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	NA's
0.0	155.0	200.0	247.5	300.0	900.0	1



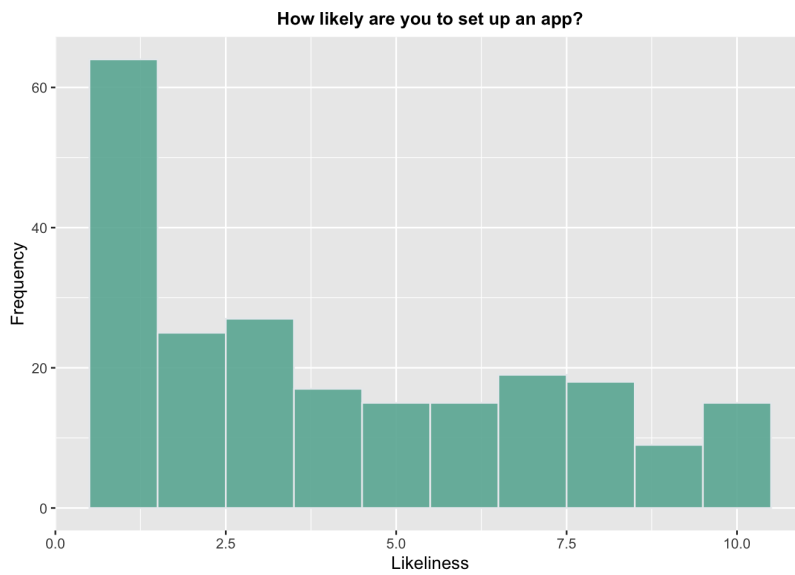
### Subscription likely

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
1.00	1.00	3.00	3.79	6.00	10.00

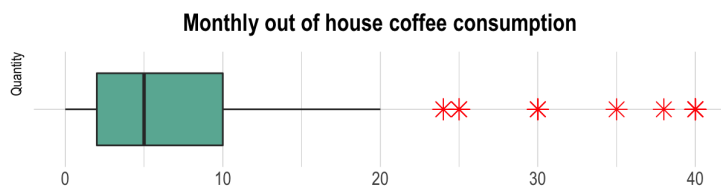
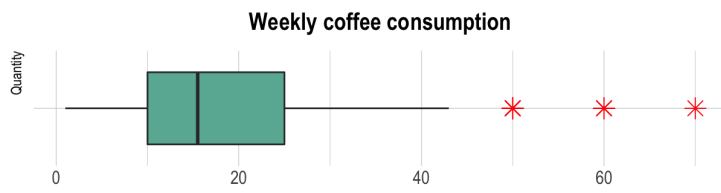


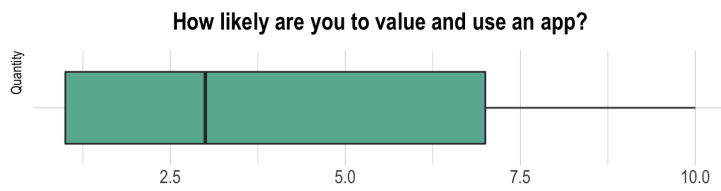
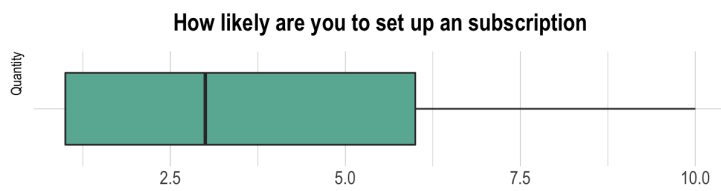
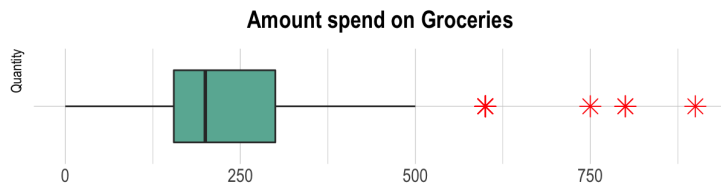
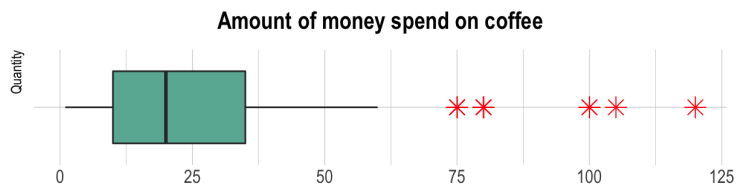
### App likely

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
1.000	1.000	3.000	4.179	7.000	10.000



## Boxplots







## Parametric testing

H<sub>0</sub> <- There is no association between the two variables.

H<sub>a</sub> <- There is a association.

### Age - Amount coffee drank

Pearson's Chi-squared test

data: AmountWeek and AgeCategory

X-squared = 254.16, df = 136, p-value = 0.000000003461

Pearson's Chi-squared test with simulated p-value (based on 500 replicates)

data: AmountWeek and AgeCategory

X-squared = 254.16, df = NA, p-value = 0.00998

### Education - Amount coffee drank

Pearson's Chi-squared test

data: AmountWeek and Education

X-squared = 236.72, df = 170, p-value = 0.000546

Pearson's Chi-squared test with simulated p-value (based on 500 replicates)

data: AmountWeek and Education

X-squared = 236.72, df = NA, p-value = 0.0519

### Gender - Amount coffee drank

Pearson's Chi-squared test

data: AmountWeek and Gender

X-squared = 71.44, df = 68, p-value = 0.3643

Pearson's Chi-squared test with simulated p-value (based on 500 replicates)

data: AmountWeek and Gender

X-squared = 71.44, df = NA, p-value = 0.3253

### Home - Amount coffee drank

Pearson's Chi-squared test

data: AmountWeek and Home

X-squared = 68.057, df = 68, p-value = 0.4753

Pearson's Chi-squared test with simulated p-value (based on 500 replicates)

```
data: AmountWeek and Home
X-squared = 68.057, df = NA, p-value = 0.4631
```

#### App - Age

Pearson's Chi-squared test

```
data: App_Likely and AgeCategory
X-squared = 53.162, df = 36, p-value = 0.03254
```

Pearson's Chi-squared test with simulated p-value (based on 500 replicates)

```
data: App_Likely and AgeCategory
X-squared = 53.162, df = NA, p-value = 0.04391
```

#### Coffee knowledge - Age

Pearson's Chi-squared test

```
data: KnowledgeCoffee and AgeCategory
X-squared = 151.89, df = 36, p-value = 0.0000000000000003491
```

Pearson's Chi-squared test with simulated p-value (based on 500 replicates)

```
data: KnowledgeCoffee and AgeCategory
X-squared = 151.89, df = NA, p-value = 0.001996
```

#### Coffee knowledge - Purchase location

Pearson's Chi-squared test

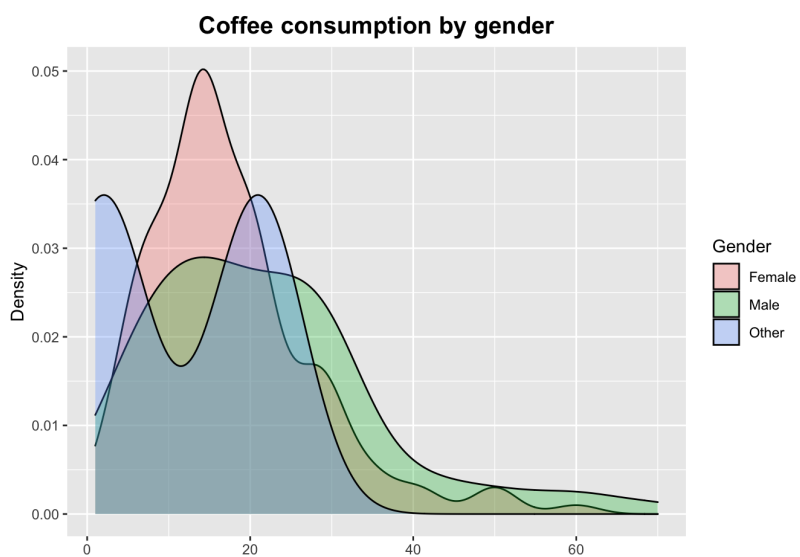
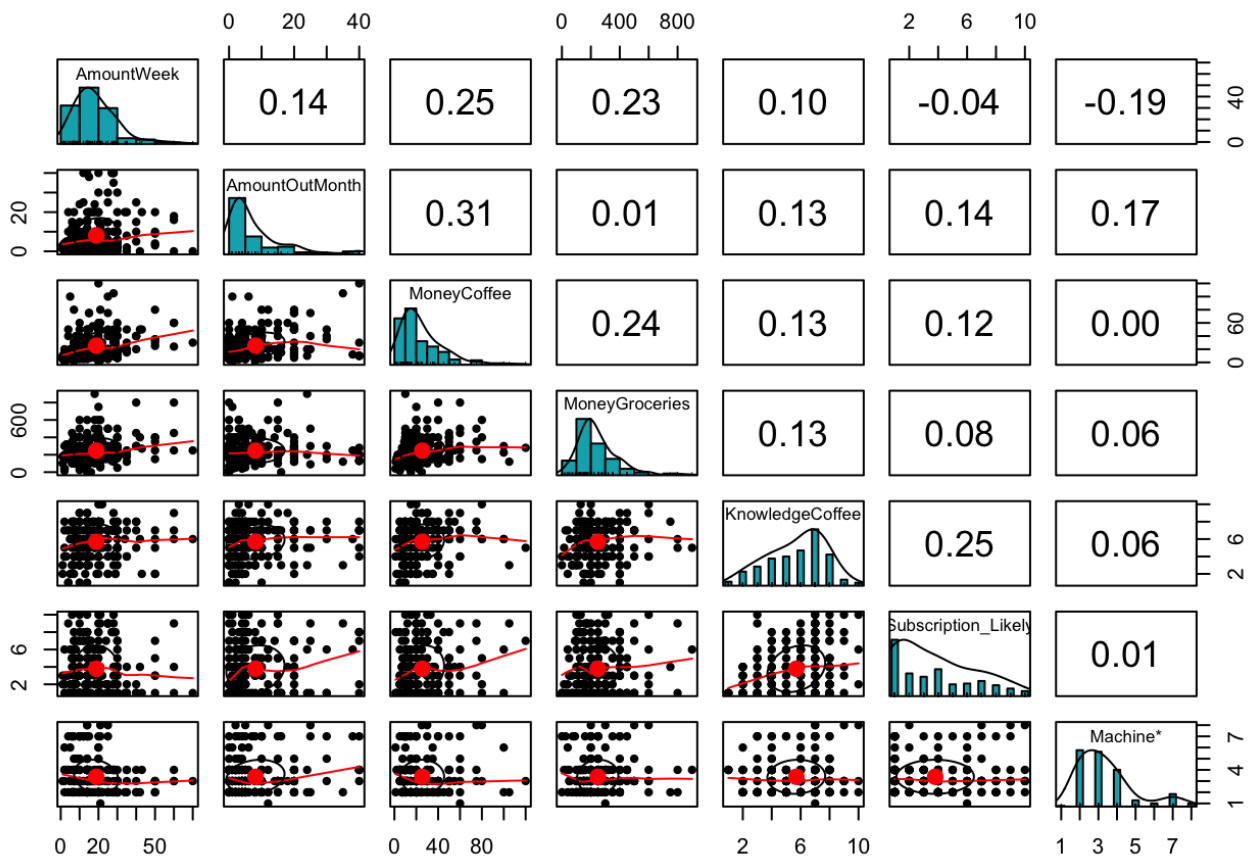
```
data: KnowledgeCoffee and PurchaseLocation
X-squared = 35.066, df = 27, p-value = 0.1372
```

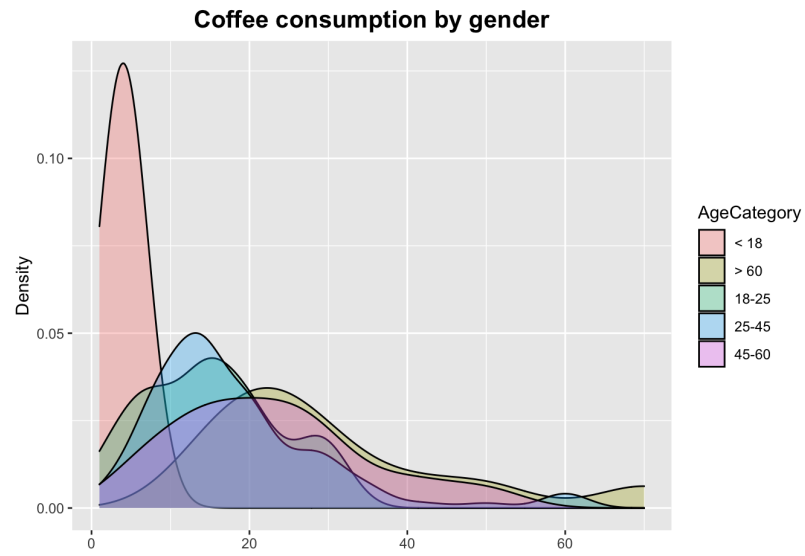
Pearson's Chi-squared test with simulated p-value (based on 500 replicates)

```
data: KnowledgeCoffee and PurchaseLocation
X-squared = 35.066, df = NA, p-value = 0.1297
```

---

## Relationships





## Regressions

```
Call:
lm(formula = Subscription_Likely ~ KnowledgeCoffee)

Residuals:
    Min       1Q   Median       3Q      Max
-3.8949 -2.2229 -0.5541  2.1059  7.1115

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)   1.88533     0.52658   3.580 0.000421 ***
KnowledgeCoffee 0.33439     0.08723   3.833 0.000165 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.607 on 222 degrees of freedom
Multiple R-squared:  0.06208,    Adjusted R-squared:  0.05785
F-statistic: 14.69 on 1 and 222 DF,  p-value: 0.0001647
```

Incl categorical variables as dummies

Cooks distance -> outliers

---

## Data problems