20BCE1025_Abhishek_N_N_Lab_6_Exp-6 Statistical Analysis of qualitative data

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Use the survey data in MASS package to do the following:

1. Import the package MASS

```
library("MASS")
```

2. List the rows of data that has missing values.

```
survey[rowSums(is.na(survey)) > 0,]
```

```
##        Sex Wr.Hnd NW.Hnd W.Hnd    Fold Pulse    Clap Exer Smoke Height      M.I
## 3     Male   18.0   13.3 Right  L on R    87 Neither None Occas     NA     <NA>
## 4     Male   18.8   18.9 Right  R on L    NA Neither None Never 160.00   Metric
## 12    Male   21.0   21.0 Right  R on L    68    Left Freq Never     NA     <NA>
## 13  Female   16.0   16.0 Right  L on R    NA   Right Some Never 155.00   Metric
## 15    Male   16.0   15.5 Right  R on L    60   Right Some Never     NA     <NA>
## 16  Female   17.5   17.0 Right  R on L    NA   Right Freq Never 156.00   Metric
## 19    Male   20.5   20.5 Right  L on R    NA    Left Some Never 190.50 Imperial
## 25  Female   17.0   17.5 Right  R on L    64    Left Some Never     NA     <NA>
## 26    Male   18.5   18.5 Right Neither    90 Neither Some Never     NA     <NA>
## 29    Male   17.8   17.8 Right  L on R    76 Neither Freq Never     NA     <NA>
## 31  Female   18.5   18.0 Right  R on L    76   Right None Occas     NA     <NA>
## 35    Male   18.0   19.0 Right  L on R    54 Neither Some Regul     NA     <NA>
## 37  Female   16.0   16.5 Right  L on R    NA   Right Some Never 168.00   Metric
## 40    Male   19.0   19.0 Right  R on L    NA Neither Freq Occas 171.00   Metric
## 41  Female   17.5   16.0 Right  L on R    NA   Right Some Never 169.00   Metric
## 43    Male     NA     NA Right  R on L    60    <NA> Some Never 172.00   Metric
## 45  Female   13.0   13.0  <NA>  L on R    70    Left Freq Never 180.34 Imperial
## 46    Male   17.0   17.5 Right  R on L    NA Neither Freq Never 180.34 Imperial
## 56    Male   18.5   18.5 Right  L on R    NA Neither Freq Never 171.00   Metric
## 58    Male   19.5   19.7 Right  R on L    72   Right Freq Never     NA     <NA>
## 60    Male   20.6   21.0  Left  L on R    NA    Left Freq Occas 175.26 Imperial
## 64  Female   18.7   18.0  Left  L on R    NA    Left None Never 170.00   Metric
## 66    Male   19.5   19.8 Right Neither    NA   Right Freq Never 183.00   Metric
## 67  Female   19.0   19.1 Right  L on R    NA Neither Freq Never 172.00   Metric
## 68  Female   18.5   18.0 Right  R on L    64   Right Freq Never     NA     <NA>
## 69    Male   19.0   19.0 Right  L on R    NA   Right Some Never 180.00   Metric
## 70    Male   21.0   19.5 Right  L on R    80    Left None  <NA>     NA     <NA>
```

```
## 72    Male   19.4   19.5 Right  R on L    NA   Right Freq Heavy 176.00   Metric
## 78  Female   18.6   18.0 Right  L on R    NA Neither Freq Heavy 165.10 Imperial
## 80    Male   20.0   20.5 Right  L on R    NA   Right Freq Never 185.42 Imperial
## 81    Male   19.5   19.5  Left  R on L    66    Left Some Never     NA     <NA>
## 83  Female   17.5   17.5 Right  R on L    98    Left Freq Never     NA     <NA>
## 84  Female   17.0   17.4 Right  R on L    NA Neither Some Never     NA     <NA>
## 90  Female   18.0   17.7  Left  R on L    92    Left Some Never     NA     <NA>
## 92  Female   17.5   18.0 Right Neither    NA   Right Some Never     NA     <NA>
## 94  Female   18.2   18.5 Right  R on L    NA   Right Some Never 168.00   Metric
## 96  Female   19.0   18.8 Right  L on R    NA   Right Some Never     NA     <NA>
## 99    Male   19.5   19.4 Right Neither    NA   Right Freq Never 165.00   Metric
## 101   Male   21.9   22.2 Right  R on L    NA   Right Some Never 187.00   Metric
## 103 Female   16.0   16.0 Right Neither    NA   Right Some Never 159.00   Metric
## 107 Female   16.2   16.4 Right  R on L    NA   Right Freq Occas 172.00   Metric
## 108 Female   17.0   15.9 Right  R on L    85   Right Freq Never     NA     <NA>
## 121   Male   20.0   20.0 Right  R on L    80 Neither Freq Occas     NA     <NA>
## 126   Male   19.3   19.4 Right  R on L    NA   Right Freq Never 180.34 Imperial
## 133 Female   18.9   20.0 Right  R on L    86   Right Some Never     NA     <NA>
## 137   <NA>   19.8   19.0  Left  L on R    73 Neither Freq Never 172.00   Metric
## 139   Male   20.0   19.5 Right  L on R    NA   Right Freq Never 170.00   Metric
## 142 Female   18.3   19.0 Right  R on L    NA   Right None Never 165.00   Metric
## 157   Male   14.0   15.5 Right  L on R    NA Neither Freq Heavy     NA     <NA>
## 159   Male   20.0   20.5 Right  R on L    NA   Right None Never 187.96 Imperial
## 162   Male   18.1   18.2  Left Neither    NA   Right Some Never 168.00   Metric
## 165   Male   19.1   19.1 Right Neither    NA   Right Some Never 177.00   Metric
## 169   Male   19.0   18.5 Right  L on R    NA Neither Freq Never 189.00   Metric
## 171 Female   16.5   17.0 Right  L on R    NA   Right Some Never 168.00   Metric
## 173 Female   15.5   15.5 Right Neither    50   Right Some Regul     NA     <NA>
## 179 Female   20.5   20.5 Right  R on L    NA    Left Freq Regul     NA     <NA>
## 195 Female   16.7   15.1 Right Neither    NA   Right None Never 157.48 Imperial
## 203 Female   18.8   17.8 Right  R on L    76   Right Some Never     NA     <NA>
## 210 Female   20.8   20.7 Right  R on L    NA Neither Freq Never 171.50   Metric
## 213   Male   18.0   18.5 Right  R on L    78   Right Freq Never     NA     <NA>
## 216   Male   19.5   20.0 Right Neither    NA   Right Some Never 170.00   Metric
## 217 Female   16.3   16.2 Right  L on R    NA   Right None Never     NA     <NA>
## 219 Female   17.0   17.3 Right  L on R    NA Neither Freq Never 173.00   Metric
## 221   Male   23.2   23.3 Right  L on R    NA   Right None Heavy 171.00   Metric
## 224 Female   17.5   17.6 Right  L on R    NA   Right Freq Never 150.00   Metric
## 225 Female   17.6   17.2 Right  L on R    NA   Right Some Never     NA     <NA>
## 226 Female   17.5   17.8 Right  R on L    96   Right Some Never     NA     <NA>
## 232   Male   18.0   16.0 Right  R on L    NA   Right Some Never 180.34 Imperial
## 235 Female   17.5   16.5 Right  R on L    NA   Right Some Never 170.00   Metric
##        Age
## 3   16.917
## 4   20.333
## 12  18.250
## 13  18.750
## 15  17.167
## 16  17.167
## 19  19.750
## 25  19.167
## 26  17.583
## 29  21.917
## 31  41.583
```

```
## 35  17.750
## 37  19.000
## 40  19.917
## 41  17.500
## 43  28.583
## 45  17.417
## 46  18.500
## 56  18.333
## 58  17.417
## 60  18.417
## 64  19.833
## 66  18.000
## 67  30.667
## 68  16.917
## 69  19.917
## 70  18.333
## 72  17.833
## 78  17.167
## 80  18.750
## 81  16.750
## 83  17.667
## 84  17.167
## 90  17.583
## 92  18.000
## 94  17.083
## 96  17.083
## 99  18.083
## 101 18.917
## 103 20.833
## 107 17.000
## 108 18.500
## 121 17.500
## 126 19.833
## 133 19.083
## 137 21.500
## 139 21.417
## 142 21.083
## 157 21.083
## 159 19.667
## 162 21.167
## 165 19.917
## 169 17.417
## 171 73.000
## 173 18.500
## 179 19.250
## 195 18.167
## 203 18.583
## 210 18.500
## 213 17.500
## 216 21.250
## 217 19.250
## 219 19.167
## 221 20.917
## 224 20.750
```

```
## 225 19.917
## 226 18.667
## 232 20.750
## 235 18.583
```

```
#or
survey[!complete.cases(survey),]
```

```
##        Sex Wr.Hnd NW.Hnd W.Hnd    Fold Pulse    Clap Exer Smoke Height      M.I
## 3     Male   18.0   13.3 Right  L on R    87 Neither None Occas     NA     <NA>
## 4     Male   18.8   18.9 Right  R on L    NA Neither None Never 160.00   Metric
## 12    Male   21.0   21.0 Right  R on L    68    Left Freq Never     NA     <NA>
## 13  Female   16.0   16.0 Right  L on R    NA   Right Some Never 155.00   Metric
## 15    Male   16.0   15.5 Right  R on L    60   Right Some Never     NA     <NA>
## 16  Female   17.5   17.0 Right  R on L    NA   Right Freq Never 156.00   Metric
## 19    Male   20.5   20.5 Right  L on R    NA    Left Some Never 190.50 Imperial
## 25  Female   17.0   17.5 Right  R on L    64    Left Some Never     NA     <NA>
## 26    Male   18.5   18.5 Right Neither    90 Neither Some Never     NA     <NA>
## 29    Male   17.8   17.8 Right  L on R    76 Neither Freq Never     NA     <NA>
## 31  Female   18.5   18.0 Right  R on L    76   Right None Occas     NA     <NA>
## 35    Male   18.0   19.0 Right  L on R    54 Neither Some Regul     NA     <NA>
## 37  Female   16.0   16.5 Right  L on R    NA   Right Some Never 168.00   Metric
## 40    Male   19.0   19.0 Right  R on L    NA Neither Freq Occas 171.00   Metric
## 41  Female   17.5   16.0 Right  L on R    NA   Right Some Never 169.00   Metric
## 43    Male     NA     NA Right  R on L    60    <NA> Some Never 172.00   Metric
## 45  Female   13.0   13.0  <NA>  L on R    70    Left Freq Never 180.34 Imperial
## 46    Male   17.0   17.5 Right  R on L    NA Neither Freq Never 180.34 Imperial
## 56    Male   18.5   18.5 Right  L on R    NA Neither Freq Never 171.00   Metric
## 58    Male   19.5   19.7 Right  R on L    72   Right Freq Never     NA     <NA>
## 60    Male   20.6   21.0  Left  L on R    NA    Left Freq Occas 175.26 Imperial
## 64  Female   18.7   18.0  Left  L on R    NA    Left None Never 170.00   Metric
## 66    Male   19.5   19.8 Right Neither    NA   Right Freq Never 183.00   Metric
## 67  Female   19.0   19.1 Right  L on R    NA Neither Freq Never 172.00   Metric
## 68  Female   18.5   18.0 Right  R on L    64   Right Freq Never     NA     <NA>
## 69    Male   19.0   19.0 Right  L on R    NA   Right Some Never 180.00   Metric
## 70    Male   21.0   19.5 Right  L on R    80    Left None  <NA>     NA     <NA>
## 72    Male   19.4   19.5 Right  R on L    NA   Right Freq Heavy 176.00   Metric
## 78  Female   18.6   18.0 Right  L on R    NA Neither Freq Heavy 165.10 Imperial
## 80    Male   20.0   20.5 Right  L on R    NA   Right Freq Never 185.42 Imperial
## 81    Male   19.5   19.5  Left  R on L    66    Left Some Never     NA     <NA>
## 83  Female   17.5   17.5 Right  R on L    98    Left Freq Never     NA     <NA>
## 84  Female   17.0   17.4 Right  R on L    NA Neither Some Never     NA     <NA>
## 90  Female   18.0   17.7  Left  R on L    92    Left Some Never     NA     <NA>
## 92  Female   17.5   18.0 Right Neither    NA   Right Some Never     NA     <NA>
## 94  Female   18.2   18.5 Right  R on L    NA   Right Some Never 168.00   Metric
## 96  Female   19.0   18.8 Right  L on R    NA   Right Some Never     NA     <NA>
## 99    Male   19.5   19.4 Right Neither    NA   Right Freq Never 165.00   Metric
## 101   Male   21.9   22.2 Right  R on L    NA   Right Some Never 187.00   Metric
## 103 Female   16.0   16.0 Right Neither    NA   Right Some Never 159.00   Metric
## 107 Female   16.2   16.4 Right  R on L    NA   Right Freq Occas 172.00   Metric
## 108 Female   17.0   15.9 Right  R on L    85   Right Freq Never     NA     <NA>
## 121   Male   20.0   20.0 Right  R on L    80 Neither Freq Occas     NA     <NA>
## 126   Male   19.3   19.4 Right  R on L    NA   Right Freq Never 180.34 Imperial
## 133 Female   18.9   20.0 Right  R on L    86   Right Some Never     NA     <NA>
```

```
## 137   <NA>   19.8   19.0  Left  L on R    73 Neither Freq Never 172.00   Metric
## 139   Male   20.0   19.5 Right  L on R    NA   Right Freq Never 170.00   Metric
## 142 Female   18.3   19.0 Right  R on L    NA   Right None Never 165.00   Metric
## 157   Male   14.0   15.5 Right  L on R    NA Neither Freq Heavy     NA     <NA>
## 159   Male   20.0   20.5 Right  R on L    NA   Right None Never 187.96 Imperial
## 162   Male   18.1   18.2  Left Neither    NA   Right Some Never 168.00   Metric
## 165   Male   19.1   19.1 Right Neither    NA   Right Some Never 177.00   Metric
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## 171 Female   16.5   17.0 Right  L on R    NA   Right Some Never 168.00   Metric
## 173 Female   15.5   15.5 Right Neither    50   Right Some Regul     NA     <NA>
## 179 Female   20.5   20.5 Right  R on L    NA    Left Freq Regul     NA     <NA>
## 195 Female   16.7   15.1 Right Neither    NA   Right None Never 157.48 Imperial
## 203 Female   18.8   17.8 Right  R on L    76   Right Some Never     NA     <NA>
## 210 Female   20.8   20.7 Right  R on L    NA Neither Freq Never 171.50   Metric
## 213   Male   18.0   18.5 Right  R on L    78   Right Freq Never     NA     <NA>
## 216   Male   19.5   20.0 Right Neither    NA   Right Some Never 170.00   Metric
## 217 Female   16.3   16.2 Right  L on R    NA   Right None Never     NA     <NA>
## 219 Female   17.0   17.3 Right  L on R    NA Neither Freq Never 173.00   Metric
## 221   Male   23.2   23.3 Right  L on R    NA   Right None Heavy 171.00   Metric
## 224 Female   17.5   17.6 Right  L on R    NA   Right Freq Never 150.00   Metric
## 225 Female   17.6   17.2 Right  L on R    NA   Right Some Never     NA     <NA>
## 226 Female   17.5   17.8 Right  R on L    96   Right Some Never     NA     <NA>
## 232   Male   18.0   16.0 Right  R on L    NA   Right Some Never 180.34 Imperial
## 235 Female   17.5   16.5 Right  R on L    NA   Right Some Never 170.00   Metric
##        Age
## 3   16.917
## 4   20.333
## 12  18.250
## 13  18.750
## 15  17.167
## 16  17.167
## 19  19.750
## 25  19.167
## 26  17.583
## 29  21.917
## 31  41.583
## 35  17.750
## 37  19.000
## 40  19.917
## 41  17.500
## 43  28.583
## 45  17.417
## 46  18.500
## 56  18.333
## 58  17.417
## 60  18.417
## 64  19.833
## 66  18.000
## 67  30.667
## 68  16.917
## 69  19.917
## 70  18.333
## 72  17.833
## 78  17.167
```

```
## 80  18.750
## 81  16.750
## 83  17.667
## 84  17.167
## 90  17.583
## 92  18.000
## 94  17.083
## 96  17.083
## 99  18.083
## 101 18.917
## 103 20.833
## 107 17.000
## 108 18.500
## 121 17.500
## 126 19.833
## 133 19.083
## 137 21.500
## 139 21.417
## 142 21.083
## 157 21.083
## 159 19.667
## 162 21.167
## 165 19.917
## 169 17.417
## 171 73.000
## 173 18.500
## 179 19.250
## 195 18.167
## 203 18.583
## 210 18.500
## 213 17.500
## 216 21.250
## 217 19.250
## 219 19.167
## 221 20.917
## 224 20.750
## 225 19.917
## 226 18.667
## 232 20.750
## 235 18.583
```

3. Create a data frame 'newsurvey' that contains the survey data after removing the na values. Use it for answering further queries

```
newsurvey<-na.omit(survey)
```

4. How many male and female students participated in the survey?

```
table(newsurvey["Sex"])
```

```
##
## Female   Male
##     84     84
```

5. How many the left and right handers are there?

```
table(newsurvey["W.Hnd"])
```

```
##
##  Left Right
##    12   156
```

6. Find the relative frequency distribution of left and right handers and display them with the precision of two decimal places.

```
round(table(newsurvey["W.Hnd"])/length(newsurvey$W.Hnd),2)
```

```
##
##  Left Right
##  0.07  0.93
```

7. Display the male left hander and female left hander in the column format.

```
t <- tapply(newsurvey$W.Hnd, newsurvey$Sex, table)
t<-unname(unlist(t))
d <-
  data.frame(
    male_left_hander = c(t[3]),
    female_left_hander = c(t[1])
  )
d
```

```
##   male_left_hander female_left_hander
## 1                7                  5
```

8. What percentage of male left handers never smokes?

```
install.packages("dplyr")
```

```
## Installing package into '/home/abhishek_n_n_20bce1025/R/x86_64-pc-linux-gnu-library/4.1'
## (as 'lib' is unspecified)
```

```
library("dplyr")
```

```
##
## Attaching package: 'dplyr'

## The following object is masked from 'package:MASS':
##
##     select

## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
male_left_never=length(filter(newsurvey, Sex=="Male" & W.Hnd=="Left" & Smoke=="Never"))
male_left=length(filter(newsurvey, Sex=="Male" & W.Hnd=="Left"))
male_left_never/male_left*100
```

```
## [1] 100
```