

1. load

```
fhs.df <- read.csv('framingham.csv')
fhs.df[ 1:10, 1:10 ]
```

```
##      male age education currentSmoker cigsPerDay BPMeds prevalentStroke
## 1      1  39         4             0          0      0              0
## 2      0  46         2             0          0      0              0
## 3      1  48         1             1         20      0              0
## 4      0  61         3             1         30      0              0
## 5      0  46         3             1         23      0              0
## 6      0  43         2             0          0      0              0
## 7      0  63         1             0          0      0              0
## 8      0  45         2             1         20      0              0
## 9      1  52         1             0          0      0              0
## 10     1  43         1             1         30      0              0
##      prevalentHyp diabetes totChol
## 1              0         0     195
## 2              0         0     250
## 3              0         0     245
## 4              1         0     225
## 5              0         0     285
## 6              1         0     228
## 7              0         0     205
## 8              0         0     313
## 9              1         0     260
## 10             1         0     225
```

dim

```
dim( fhs.df )
```

```
## [1] 4240  16
```

variables

```
names( fhs.df )
```

```
## [1] "male"          "age"           "education"      "currentSmoker"
## [5] "cigsPerDay"    "BPMeds"        "prevalentStroke" "prevalentHyp"
## [9] "diabetes"      "totChol"       "sysBP"          "diaBP"
## [13] "BMI"           "heartRate"     "glucose"        "TenYearCHD"
```

attached var

```
attach( fhs.df )
```

catagorical variables

diabetes

```
is.diabetes <- ifelse( diabetes == 1, 1, 0 )
is.diabetes
```

[illegible]

[illegible]

sex

##	[1]	0	1	0	1	1	1	1	0	0	1	1	0	1	1	1	0	1	1	1	0	0	1	0	1	1	0	0	1	0	0	0	0						
##	[38]	0	1	0	1	1	1	0	1	1	1	0	1	0	1	0	1	1	1	1	1	0	0	1	0	1	0	1	1	0	1	1	0	1	1				
##	[75]	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	1				
##	[112]	0	0	1	1	0	0	1	0	0	1	1	0	1	1	0	0	0	0	1	0	0	0	1	1	0	1	0	1	0	0	1	1	0	1	1			
##	[149]	0	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	0	1	0	1	1	0	1	1	1	1	1	1	0	0	1	0	1			
##	[186]	1	1	0	0	1	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	1	1	1	0	0	0	1	1	1	0	1	0	1	1	1		
##	[223]	1	1	1	0	0	0	1	0	1	1	0	1	0	1	0	1	1	0	0	0	1	1	0	0	1	1	0	1	0	1	1	0	0	1	0	0	1	
##	[260]	1	0	0	1	0	0	0	0	1	0	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	1	0	1	1	1	0	
##	[297]	0	1	0	1	0	1	1	1	1	0	1	0	1	1	1	0	0	0	1	1	1	0	0	1	0	0	1	1	0	1	0	0	1	1	1	1	1	
##	[334]	1	0	1	0	1	1	1	1	1	0	1	1	1	0	1	1	1	0	0	0	0	1	0	1	1	0	0	1	1	1	0	0	0	0	0	1		
##	[371]	1	0	1	1	1	1	1	0	0	1	1	1	1	0	0	0	1	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0	1	1	0	0	1	
##	[408]	1	0	0	0	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	1	1	1	1
##	[445]	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	1	0	1	1	0	0	1	0	0	0	0	1	1	0	1
##	[482]	1	0	0	1	0	1	1	1	1	1	0	1	0	0	0	0	0	0	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	0	0	0	0	
##	[519]	0	0	1	1	0	1	0	1	1	0	0	1	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	0	0	1	0	0	0	1	1	0	1	
##	[556]	1	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1	1	0	1	1	0	0	1	0	1	1	0	1	0	0	1	1	1	1	
##	[593]	0	1	1	0	0	0	1	0	1	1	0	1	0	1	0	1	0	1	1	0	1	1	0	1	0	1	0	1	0	1	1	0	0	1	0	1	0	
##	[630]	1	0	0	1	1	1	1	1	1	0	1	0	0	1	1																							

```

## [963] 1 1 1 0 0 1 1 1 0 1 1 1 0 0 0 0 0 1 1 1 1 1 1 1 1 0 0 0 0 0 1 1 1 0 0 1 1
## [1000] 1 1 0 0 1 1 0 1 1 0 1 0 0 1 0 0 0 0 0 1 1 0 1 0 1 0 0 0 0 1 1 0 1 0 1 0 1
## [1037] 1 0 1 0 0 1 1 0 1 0 1 0 0 0 0 0 0 1 0 0 0 0 1 1 1 1 0 1 0 0 1 1 0 0 1 1 1
## [1074] 0 1 1 1 1 1 1 0 1 1 1 0 1 1 1 0 1 1 0 0 0 1 0 1 0 0 1 1 1 0 1 0 1 0 1 0 1
## [1111] 1 1 1 1 0 0 1 0 1 0 1 0 1 0 1 1 0 1 1 1 1 1 1 1 1 0 1 1 0 0 0 0 1 1 1 1 0
## [1148] 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1 1 0 1 1 0 0 0 1 1 1 1 0 1 0 0 1 0 0 1
## [1185] 1 0 0 0 1 1 1 0 1 1 1 0 1 1 1 0 0 1 1 0 0 1 1 1 1 1 0 0 1 1 1 0 1 0 1 0 1
## [1222] 0 1 1 0 0 1 0 1 1 0 0 1 0 1 0 0 0 1 0 1 0 0 1 1 1 0 1 1 0 1 1 0 0 1 0 1 0
## [1259] 0 1 0 1 1 1 0 0 0 1 0 1 1 1 1 0 1 1 1 0 0 0 0 1 0 0 0 1 1 1 1 1 1 1 1 0 0 1
## [1296] 1 0 1 0 0 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 1 1 0 1 1 1 1 0 0 1 0 1 0 1 1 0
## [1333] 1 0 0 1 1 1 1 0 1 0 0 1 1 1 1 1 0 0 1 1 0 0 1 0 0 0 0 1 0 0 1 0 1 1 1 1 0
## [1370] 1 0 1 0 0 0 1 1 1 0 1 0 1 1 1 0 0 1 0 1 1 1 0 1 0 0 1 0 1 0 0 1 0 1 1 1 0
## [1407] 1 1 0 1 0 1 1 0 1 1 0 1 0 0 1 1 1 1 1 1 0 1 0 1 0 0 1 1 0 1 1 1 0 0 1 1 0
## [1444] 0 1 1 1 1 1 0 1 0 0 0 1 0 1 1 0 1 0 1 1 0 1 1 0 0 0 1 1 1 0 0 1 1 1 1 1 1
## [1481] 1 0 1 0 0 0 0 1 0 1 1 1 1 0 1 1 1 0 1 1 0 1 0 0 1 1 0 0 0 0 1 1 1 1 0 1 0
## [1518] 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 0 1 0 1 1 1 1 1 0 0 1 0 0 1 0 1 1 0 1 0 1 0
## [1555] 1 1 1 0 1 0 1 0 1 1 0 0 0 1 0 1 1 0 1 1 1 1 1 1 1 0 0 1 1 0 0 1 1 1 0 1 1
## [1592] 1 0 1 1 1 0 1 1 1 0 1 0 1 0 1 0 0 1 1 1 1 1 0 1 1 1 1 0 0 1 1 1 0 1 1 0 1
## [1629] 1 1 0 1 0 1 0 0 0 1 0 1 0 1 1 1 1 0 1 0 1 1 0 1 1 0 1 1 1 0 0 1 0 1 1 1 1
## [1666] 0 1 1 0 1 0 0 0 0 0 0 1 1 0 1 1 1 1 1 0 1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1
## [1703] 1 0 1 1 1 1 1 1 1 1 1 1 0 0 1 1 0 1 0 0 1 0 1 1 0 1 1 1 0 1 0 1 1 1 1 0 1 1
## [1740] 1 0 0 1 1 0 0 1 1 0 0 0 1 0 1 1 0 1 1 1 0 0 1 1 1 1 0 0 1 1 1 1 0 0 0 1 1
## [1777] 0 1 1 0 1 1 1 1 0 0 1 1 1 1 1 0 0 0 0 0 0 1 1 0 0 0 0 0 1 1 0 1 1 0 1 0 0 0
## [1814] 0 1 0 1 1 0 1 1 1 0 0 0 1 1 0 1 1 1 1 1 1 1 1 1 1 0 1 1 0 0 0 0 0 0 0 1 0
## [1851] 1 1 1 1 1 0 0 0 0 1 1 1 0 1 0 1 1 0 1 0 1 1 1 0 1 1 1 1 0 1 1 1 1 1 1 0 0
## [1888] 1 0 1 1 0 1 0 1 0 1 0 0 1 1 1 1 1 0 1 1 0 1 0 1 1 1 0 0 0 0 0 0 1 0 1 1 0
## [1925] 1 0 1 1 1 0 1 1 1 0 1 0 1 1 1 0 1 1 1 0 1 0 1 1 0 1 1 1 0 0 1 1 1 0 1 1 1
## [1962] 1 0 0 1 1 0 0 1 1 1 1 0 0 0 0 0 1 1 0 1 0 1 1 0 1 1 0 1 0 1 0 1 1 0 1 1 1
## [1999] 1 1 1 0 1 0 1 0 0 0 0 1 1 1 1 0 1 1 0 0 0 1 0 1 1 1 1 1 0 1 0 1 0 1 1 0 1
## [2036] 0 1 1 0 0 1 0 0 1 1 0 0 1 1 1 0 1 0 0 1 1 0 0 0 0 0 0 0 0 0 1 1 0 0 1 1 0 1 1
## [2073] 0 1 0 1 0 1 1 0 0 0 1 1 1 1 1 0 0 0 1 0 1 0 1 0 1 0 1 0 1 1 1 1 1 1 0 1 0 0 1
## [2110] 1 0 1 0 0 0 0 1 0 1 0 1 1 1 1 1 0 1 0 1 0 1 0 1 0 1 0 1 1 1 1 0 1 1 1 0 1 0 0
## [2147] 0 1 1 1 0 0 1 1 1 0 1 0 0 1 1 0 1 1 1 0 1 1 1 0 0 1 1 1 1 1 0 1 1 1 1 0 1 0
## [2184] 0 1 1 1 0 0 0 0 1 0 0 0 0 0 1 0 0 1 0 1 1 0 0 0 1 1 1 1 0 1 0 1 0 0 0 0 1
## [2221] 0 0 1 1 1 0 1 1 0 1 0 0 1 1 0 0 1 1 0 0 0 0 1 0 1 1 0 1 1 1 0 1 0 0 1 0 0
## [2258] 0 0 0 1 0 1 1 0 0 0 1 1 0 0 0 1 1 0 1 0 1 0 1 0 1 0 1 1 0 0 1 1 1 0 1 1 0 0
## [2295] 1 1 1 0 0 0 1 1 0 1 0 0 1 1 1 1 0 1 1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 1
## [2332] 1 0 1 1 0 1 1 1 0 1 1 1 0 0 1 1 1 0 1 1 1 1 1 0 1 1 1 0 1 0 1 0 0 0 1 1 1
## [2369] 1 1 1 1 1 1 0 0 0 1 0 1 0 1 0 1 0 1 0 1 1 1 1 0 0 1 0 1 1 1 0 1 1 1 0 0 0
## [2406] 1 1 1 1 0 0 1 0 0 1 1 0 1 0 1 1 1 1 0 0 1 0 0 1 0 0 1 0 0 1 0 1 1 0 1 0 1
## [2443] 0 0 1 1 1 0 1 0 0 1 0 0 1 1 1 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0
## [2480] 1 0 1 1 1 1 1 0 1 1 0 1 0 1 0 1 0 0 1 0 1 0 0 0 0 1 1 1 0 1 1 1 1 1 0 1 0
## [2517] 1 0 1 0 0 0 1 1 0 0 1 0 0 1 1 1 1 0 0 1 0 0 1 1 0 1 0 1 1 1 1 1 1 1 1 0 1
## [2554] 1 0 0 1 1 0 1 0 1 1 1 0 1 0 1 1 1 0 1 0 1 0 1 0 1 0 0 1 0 1 1 1 1 1 0 0 1
## [2591] 1 1 1 1 0 1 1 0 1 0 0 0 1 1 1 0 1 1 1 1 0 0 1 1 0 1 0 0 1 1 0 0 0 1 1 1 1
## [2628] 1 1 1 1 0 0 1 1 1 1 0 0 1 1 1 0 0 0 1 1 1 1 1 1 0 0 0 1 1 0 1 1 0 0 1 1 1
## [2665] 0 0 1 0 1 0 1 1 0 0 0 0 0 0 1 1 1 1 1 1 0 1 0 0 1 1 1 0 1 1 0 1 1 1 1 1 1
## [2702] 1 0 1 1 0 1 1 0 0 0 0 0 1 0 1 0 1 0 0 1 0 1 0 1 1 1 1 1 0 1 0 1 0 1 0 0 0
## [2739] 1 1 1 1 0 1 0 0 1 0 1 1 0 0 1 1 1 0 1 0 1 1 1 1 0 0 0 1 1 0 1 1 1 1 1 1 1
## [2776] 1 0 1 0 0 1 0 0 1 1 1 1 1 0 0 1 1 1 0 0 1 0 0 0 1 1 1 1 0 1 1 0 0 1 1 1 1
## [2813] 0 0 1 0 1 0 0 0 1 0 0 0 1 1 1 1 0 0 1 1 1 1 0 1 1 0 0 0 1 0 1 1 0 0 0 1 1
## [2850] 0 0 1 1 0 0 0 0 1 1 0 1 1 1 1 0 0 0 1 0 0 0 1 1 1 1 0 1 0 0 1 0 1 0 1 0 0
## [2887] 1 1 1 1 1 0 0 0 1 1 1 1 0 0 1 1 1 1 0 1 0 1 1 1 1 0 1 1 1 1 0 1 0 0 0 0
## [2924] 0 0 0 1 0 1 0 1 0 1 0 0 1 1 1 1 1 0 1 0 1 0 1 1 1 0 1 1 1 1 0 1 1 1 0 1

```

```

## [2961] 0 0 0 1 0 0 0 1 0 1 1 1 1 0 1 0 0 0 0 1 1 0 1 0 0 1 1 1 0 1 1 1 1 0 1 1 1
## [2998] 0 0 0 0 0 1 0 0 1 1 1 0 0 0 1 1 0 0 1 1 1 1 1 0 0 1 1 0 0 1 1 1 1 1 1 1 1
## [3035] 1 0 1 0 0 1 0 0 1 0 1 0 1 0 1 1 1 1 0 1 1 1 1 0 0 1 1 0 0 1 0 0 0 0 1 0 1
## [3072] 1 0 0 1 0 1 1 1 1 1 0 0 0 1 0 0 0 1 0 1 0 1 0 1 1 0 1 1 1 1 1 0 1 1 1 1 0
## [3109] 0 1 0 1 0 0 0 0 1 1 1 0 1 1 1 1 1 0 0 1 0 1 0 1 0 1 0 1 1 1 0 1 1 1 1 1 1
## [3146] 1 1 1 0 1 1 0 1 1 0 0 0 0 1 0 0 1 0 1 0 0 1 0 1 1 0 0 1 1 1 1 0 0 1 0 1 0
## [3183] 1 1 1 0 1 0 0 1 1 0 1 1 1 0 0 0 1 0 1 1 0 1 0 1 0 0 1 0 0 1 0 0 1 1 1 1 1
## [3220] 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 0 1 0 1 0 1 0 0 0 0 0 1 1 0 1 0 1 0 0
## [3257] 1 1 0 1 0 0 1 0 1 1 0 0 0 0 1 0 1 1 0 1 0 1 0 1 1 0 0 0 1 1 1 1 1 1 1 0 1
## [3294] 0 1 1 0 1 1 1 0 1 0 0 1 1 0 1 0 0 0 0 1 1 1 1 1 0 1 0 1 1 0 1 1 0 1 0 0 0
## [3331] 0 1 1 1 0 1 1 0 1 1 1 1 1 1 1 0 0 1 0 0 0 1 1 1 1 0 0 0 0 1 0 1 1 0 1 0 0 1
## [3368] 1 1 0 1 1 0 0 0 1 0 1 0 1 1 0 1 0 0 0 1 0 0 0 1 1 1 0 1 0 0 0 1 1 0 0 0 0
## [3405] 1 0 0 0 1 1 1 0 1 0 1 1 1 0 1 0 1 0 1 0 1 1 1 0 0 1 0 0 1 1 0 0 0 0 0 0 1
## [3442] 1 0 1 1 1 0 1 1 1 1 1 1 1 0 0 1 1 0 1 1 0 0 0 0 1 0 1 1 1 1 1 0 0 0 1 0 1
## [3479] 0 0 0 1 0 1 0 0 1 1 1 1 1 0 0 1 1 1 0 0 0 1 1 1 0 1 1 0 1 0 0 0 0 0 1 1 1 1
## [3516] 0 0 1 0 0 1 0 1 0 1 1 1 0 0 0 1 1 0 1 0 1 0 0 1 1 0 1 1 1 0 0 1 1 1 1 1 1
## [3553] 0 1 1 0 1 0 1 1 0 1 1 0 0 1 1 0 1 1 1 1 0 1 0 1 1 1 0 1 1 1 0 1 1 0 1 0 0 1
## [3590] 0 1 1 0 1 1 1 0 0 1 1 1 1 1 0 1 0 0 1 1 0 1 0 1 1 1 0 1 1 0 0 0 0 0 1 1 0
## [3627] 1 0 0 1 1 1 1 1 0 1 1 1 1 1 1 0 1 0 0 1 1 1 1 0 1 1 1 0 0 1 1 1 1 1 1 1
## [3664] 1 0 0 0 0 1 1 1 0 1 0 1 0 0 0 0 1 1 1 1 0 0 0 1 0 1 0 1 1 0 0 1 0 0 1 0 1
## [3701] 1 1 0 0 0 0 0 1 0 1 0 0 1 0 0 1 1 1 1 1 0 1 0 1 0 1 1 1 0 0 0 0 1 1 1 1 0
## [3738] 1 1 1 0 0 1 0 1 1 1 1 1 1 1 1 1 1 0 1 1 0 1 1 0 1 0 1 1 1 0 0 0 0 0 1 0 0
## [3775] 1 1 0 1 1 1 1 1 1 1 1 1 0 1 0 0 1 0 1 0 1 1 1 0 0 0 1 1 1 0 1 0 1 1 0 0 1
## [3812] 0 1 1 0 0 1 0 1 1 0 0 1 1 1 1 1 1 1 0 0 0 0 0 0 1 1 1 1 0 1 1 1 0 1 0 0 1
## [3849] 0 1 0 0 1 1 0 0 0 1 1 1 1 1 1 1 0 0 0 0 0 0 1 1 0 1 0 0 1 1 1 0 0 0 1 0 1 0
## [3886] 1 0 0 0 1 1 1 0 1 1 1 1 0 0 0 0 0 0 1 1 0 1 1 0 0 1 0 0 1 1 1 0 1 1 0 0 1
## [3923] 0 0 1 1 1 1 0 1 1 0 1 1 0 1 0 1 1 0 1 1 1 0 1 1 1 0 1 0 1 1 1 1 0 0 1 0 0
## [3960] 0 1 1 1 1 1 1 0 0 1 1 1 0 1 1 1 0 1 1 0 1 1 1 1 1 0 1 1 1 1 1 0 1 1 1 0
## [3997] 1 1 1 0 0 1 1 1 0 1 0 0 1 0 0 0 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 1 0 1 0 0
## [4034] 1 1 1 1 1 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 1 1 0 0 1 1 0 0 0 1 1 0 1 0 0 1
## [4071] 1 1 0 0 1 0 1 0 0 0 1 1 0 1 1 1 1 1 0 1 0 0 1 1 0 0 1 0 0 1 0 1 0 1 1 0 1
## [4108] 1 1 0 0 1 0 1 1 1 0 0 1 0 0 1 0 0 0 1 0 1 0 0 1 0 1 1 0 1 1 1 0 1 0 0 0 0
## [4145] 0 0 0 1 0 1 1 1 1 0 0 0 1 1 1 0 1 1 1 0 0 1 0 1 1 1 1 0 0 1 0 0 1 1 0 1 0
## [4182] 0 0 1 0 0 1 1 1 0 1 1 0 1 0 1 1 1 1 1 1 0 1 0 1 1 1 1 1 0 0 0 0 0 1 1 1 1
## [4219] 1 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 1 1 1 0 1

```

smoking?

```

is.smoker <- ifelse( currentSmoker == 1, 1, 0 )
is.smoker

```

```

## [1] 0 0 1 1 1 0 0 1 0 1 0 0 1 0 1 1 1 1 1 0 1 0 0 1 1 1 0 1 0 0 1 1 0 1 1 0 0
## [38] 0 1 0 1 1 0 0 0 0 0 1 1 1 1 0 1 0 1 1 1 1 0 1 1 0 1 1 0 0 0 1 1 0 0 1 0 1
## [75] 1 0 0 1 0 1 1 0 0 1 0 1 0 1 1 0 1 1 0 0 1 0 1 0 0 1 1 0 1 0 1 0 0 1 0 1 0
## [112] 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 1 0 1 1 1 1 1 1 0 0 1 1 0 1 0 0 1 0 1 0
## [149] 0 0 0 0 0 0 1 1 0 0 0 0 1 1 0 1 0 0 0 1 1 1 0 0 1 1 1 1 0 1 1 1 0 1 1 1 0
## [186] 0 1 0 1 0 1 1 0 1 0 1 1 1 1 0 0 1 1 1 1 0 0 1 0 1 1 0 0 0 0 1 0 1 0 0 1 1
## [223] 0 0 0 0 1 0 0 0 0 0 0 0 1 1 1 0 1 1 0 1 0 1 1 1 0 1 1 1 1 0 0 0 1 0 0 1 0
## [260] 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 1 1 1
## [297] 0 1 0 0 0 0 0 0 1 1 0 1 1 0 0 1 1 1 0 1 1 0 1 1 1 1 1 1 0 0 1 1 0 0 1 1 0
## [334] 0 1 1 1 0 0 0 0 1 1 1 1 0 0 1 1 0 0 1 1 1 1 1 0 1 1 1 1 1 0 1 1 0 1 0 1 0
## [371] 0 0 0 1 0 1 1 0 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 1 0 0 0 1 1 0 1 0 0 0 1 1 0

```

```

## [408] 0 0 1 0 0 1 0 1 1 1 0 1 1 0 0 1 0 1 1 0 1 0 0 0 0 1 0 1 1 0 1 1 0 1 0 1 0
## [445] 0 1 0 1 1 1 0 1 0 0 0 1 1 0 1 1 1 1 0 1 0 1 1 1 1 0 0 0 1 0 1 1 0 1 1 0 1
## [482] 0 1 0 0 1 0 1 1 0 1 0 1 1 1 1 1 1 0 0 1 0 0 1 0 1 0 1 0 1 0 0 0 0 1 1 0 1
## [519] 1 1 0 0 1 1 1 0 1 1 1 0 0 0 1 0 0 0 1 0 0 1 1 0 0 1 0 1 1 0 1 0 0 1 1 0 1
## [556] 0 0 0 1 1 0 0 0 0 0 0 0 0 1 0 1 1 0 0 0 1 1 0 1 1 0 0 1 1 1 0 0 1 1 1 0 1
## [593] 1 1 1 0 0 0 1 0 1 0 1 1 1 1 1 0 1 1 1 0 0 1 1 0 0 1 0 1 0 1 0 1 1 0 1 1
## [630] 1 1 1 1 1 1 0 1 0 0 1 1 1 0 0 0 1 0 0 1 0 1 1 1 1 1 1 1 1 1 0 0 1 0 0 1 0
## [667] 0 1 1 0 0 1 1 1 1 0 0 1 1 0 0 0 1 0 1 0 0 1 0 1 1 1 0 1 1 1 0 1 1 0 0 0 1
## [704] 0 1 0 0 1 1 1 1 1 1 1 0 0 1 1 0 1 1 1 0 0 0 0 1 0 1 0 0 0 1 1 1 0 1 0 0 1
## [741] 1 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 1 1 1 0 1 1 1 0 0 1 1 1 1 0 1 0 1 0 0 0 0
## [778] 0 1 1 1 1 0 1 1 1 0 1 0 0 0 1 1 0 0 1 1 0 0 1 1 1 0 0 0 1 0 1 1 1 0 0 0 0
## [815] 0 1 1 1 0 1 0 0 1 1 1 1 0 1 1 0 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 1 0 0 0 1
## [852] 0 0 1 0 0 1 0 0 1 0 1 1 1 0 0 1 1 1 0 0 1 1 0 0 1 0 0 1 0 0 1 0 1 0 1 1 0
## [889] 1 0 0 0 1 1 1 1 0 1 1 1 0 1 1 0 0 1 0 1 1 0 0 1 0 0 1 0 0 1 1 1 0 0 1 1 0
## [926] 1 1 1 1 1 1 1 0 0 1 0 1 0 1 0 0 1 1 1 1 0 1 0 1 1 0 1 1 1 0 1 0 0 0 1 0 0
## [963] 1 1 1 1 0 0 0 0 1 0 1 1 1 1 1 0 1 0 1 1 0 0 1 1 1 0 0 0 0 1 0 1 0 1 1 0 0
## [1000] 0 0 0 0 0 0 0 0 0 1 1 1 1 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1
## [1037] 1 0 0 1 1 1 0 1 0 0 1 0 0 1 1 1 0 0 1 1 0 1 0 0 1 1 0 0 0 0 0 0 1 0 1 0 1
## [1074] 0 1 1 0 1 0 0 1 0 1 0 0 1 0 1 1 1 0 1 1 1 0 1 1 0 0 1 0 0 1 1 0 0 1 1 0 0
## [1111] 0 0 0 0 1 1 1 1 0 1 0 1 1 0 0 0 1 1 1 0 0 0 0 0 0 1 1 1 1 1 1 0 0 0 0 0 1
## [1148] 1 0 1 1 0 0 1 0 1 1 0 1 0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 0 1 1 0 1 1 0
## [1185] 1 0 0 1 0 0 1 1 1 0 0 1 1 0 1 1 1 0 1 1 0 0 0 0 1 1 0 0 0 1 0 0 0 1 0 0 0
## [1222] 0 1 1 0 0 1 0 1 1 1 0 1 0 0 1 0 1 0 0 1 1 0 0 0 1 0 1 1 1 0 0 0 0 1 0 0 1
## [1259] 0 0 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 1 1 1 1 1 1 0 0 1 1 0 0 0 0 0 1 1 1 0 0
## [1296] 1 1 1 0 1 0 1 0 0 1 0 1 1 1 0 1 1 1 0 0 0 0 0 1 1 0 0 1 1 1 0 0 1 0 0 1 1
## [1333] 0 0 1 0 0 0 0 1 1 1 1 1 1 0 0 1 0 1 1 0 1 0 1 0 0 0 0 0 1 1 1 1 1 0 0 0 0
## [1370] 0 1 0 1 1 0 0 0 0 1 0 1 1 1 1 0 0 0 1 1 0 1 1 1 1 0 1 1 0 1 1 1 0 0 1 0 1
## [1407] 0 0 1 0 0 0 1 1 1 1 1 0 1 1 1 1 1 0 1 1 1 1 1 0 1 0 0 0 1 0 0 0 0 1 0 0 1
## [1444] 1 1 1 0 0 1 1 0 1 1 1 0 1 0 0 0 0 1 0 0 1 0 1 0 0 1 0 0 0 1 0 0 1 0 0 0 0
## [1481] 0 0 0 0 0 1 0 0 1 0 1 0 0 1 1 0 1 1 1 0 1 0 0 0 0 1 1 0 1 1 0 0 0 0 1 1 0
## [1518] 0 1 1 1 1 1 0 0 0 1 0 1 1 0 0 1 0 1 0 1 0 0 1 1 1 0 0 1 0 1 0 0 0 1 1 1 1
## [1555] 1 1 0 0 0 1 0 0 0 0 0 0 1 0 1 1 0 0 1 0 0 1 1 0 1 1 0 1 1 0 1 0 1 1 0 1 0
## [1592] 0 0 1 0 0 1 0 1 1 1 0 0 1 1 1 0 0 0 1 1 0 0 0 0 0 0 0 0 1 0 0 0 1 1 0 1 0
## [1629] 1 0 0 0 1 0 1 1 0 1 1 1 1 0 0 1 0 1 0 1 0 0 1 1 0 1 1 0 1 1 0 0 1 1 1 0 0
## [1666] 1 1 1 1 0 1 1 1 1 0 1 1 1 0 1 0 0 0 0 1 0 1 0 1 1 1 0 0 0 1 1 0 1 0 1 0 1
## [1703] 1 0 0 1 1 1 1 0 0 1 0 1 1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 1 0 0 0 1 1 0 1 0 1
## [1740] 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 1 0 1 0 1 1 0 0 1 0 0 0 0 0 1 0 1 0 0 0 0
## [1777] 1 0 0 1 0 0 0 1 1 0 0 1 1 0 1 1 0 1 0 1 0 1 0 0 0 1 1 0 0 1 1 1 0 0 1 1 1
## [1814] 1 0 1 0 1 0 1 1 0 1 1 1 0 0 0 1 0 1 0 1 0 0 0 0 0 1 0 0 0 1 0 1 0 0 0 0 1
## [1851] 1 0 0 0 0 0 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1 0 1 0 0 0 1 1
## [1888] 0 1 0 0 1 1 0 1 1 1 0 1 0 1 0 1 0 1 0 1 0 0 0 0 1 0 1 0 0 1 1 1 1 0 1 1 0
## [1925] 1 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 1 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1
## [1962] 1 0 1 0 0 1 1 1 0 0 0 1 1 1 1 1 0 1 1 1 1 0 0 0 1 1 1 1 0 0 0 0 0 0 0 0
## [1999] 1 0 1 1 1 1 0 1 1 1 1 1 1 0 0 1 0 0 1 1 1 0 0 0 1 0 0 0 1 1 1 1 0 0 0 0 1
## [2036] 0 0 0 1 0 0 0 0 0 1 0 1 1 0 0 1 0 0 1 0 0 1 0 1 1 0 1 0 0 1 1 1 1 0 1 0 0
## [2073] 1 1 1 1 0 0 1 1 0 1 1 0 0 1 1 0 0 1 0 0 1 1 0 1 0 1 0 0 0 1 0 0 1 1 0 0 1
## [2110] 1 0 1 0 1 1 0 1 1 0 0 0 0 1 0 1 1 1 0 1 1 0 1 1 0 0 1 0 1 1 1 0 0 0 1 1 0
## [2147] 0 0 0 1 1 0 1 0 1 0 1 0 1 1 0 1 0 1 0 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 0 1 1
## [2184] 1 0 1 1 1 1 1 1 1 1 1 1 1 0 0 1 0 0 0 0 0 1 1 1 0 1 1 0 0 1 1 0 1 1 1 1 1
## [2221] 1 1 1 1 1 0 0 0 0 1 1 0 1 1 0 1 0 0 1 1 0 1 1 1 0 0 1 0 1 0 0 1 0 1 0 1 0
## [2258] 0 1 1 1 0 1 1 1 0 1 0 0 0 1 1 0 0 1 1 1 1 1 0 0 0 1 1 1 0 1 0 0 1 0 0 0 1
## [2295] 0 0 0 1 1 0 0 0 0 0 0 1 0 1 0 0 0 1 1 1 1 0 0 0 1 1 1 1 1 0 1 1 1 1 1 1 0
## [2332] 1 1 1 0 1 1 1 0 0 0 0 1 0 0 1 0 0 1 0 0 0 0 1 1 1 0 0 1 1 1 0 0 1 1 1 0 0
## [2369] 1 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 1 1 0 1 0 0 0 0 1 1 1 0 0 1 1 0 1 1 1 1

```

```

## [2406] 1 0 1 1 1 1 1 1 1 0 0 1 1 1 0 0 0 1 1 1 0 1 1 1 1 1 1 1 1 0 1 1 1 1 0 0 1
## [2443] 0 0 0 1 1 1 1 0 0 0 1 0 0 1 1 1 0 0 0 0 1 0 1 1 0 0 0 1 1 0 1 1 0 0 1 1 0
## [2480] 0 1 0 1 1 1 0 1 1 1 0 1 0 1 0 0 0 0 1 0 1 1 0 0 1 1 1 0 0 0 1 0 1 1 1 0 0
## [2517] 0 0 0 0 0 1 1 1 1 1 0 1 0 0 1 1 0 0 0 0 1 0 0 0 1 1 1 0 0 0 0 0 0 0 1 1
## [2554] 0 0 1 1 1 0 0 1 0 0 0 0 0 0 1 1 0 0 1 0 1 0 0 1 1 1 0 0 1 0 1 1 1 0 0 1 0
## [2591] 1 1 0 1 0 0 1 1 1 1 1 1 0 0 0 1 0 0 0 0 1 1 1 0 1 1 1 1 0 1 0 1 0 0 0 0 1
## [2628] 0 0 1 1 1 0 0 1 0 1 1 0 0 0 1 0 0 1 0 0 1 0 0 0 0 1 0 1 0 0 0 1 1 1 0 0 0
## [2665] 1 1 1 1 0 0 0 0 1 1 1 1 1 0 1 0 0 0 0 0 1 0 1 0 0 0 0 1 0 1 0 1 0 1 0 1 0
## [2702] 1 1 0 0 1 0 0 1 1 1 0 1 0 1 1 0 0 1 1 1 1 1 1 0 1 0 1 1 1 1 1 1 1 0 1 1 1
## [2739] 0 1 1 0 1 1 1 1 1 1 0 0 0 1 0 1 0 1 1 1 0 0 0 0 1 1 0 1 1 0 0 0 0 0 1 0 0
## [2776] 0 0 0 1 0 0 1 1 0 0 1 1 1 1 1 0 0 1 1 1 0 0 0 0 0 0 1 0 0 0 1 1 1 0 1 0 1
## [2813] 1 1 1 1 0 1 0 0 0 1 1 1 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 1 1 1 0
## [2850] 1 1 0 0 1 1 0 1 0 0 1 0 0 0 0 0 1 1 1 0 1 1 0 0 0 1 1 1 1 1 0 1 0 1 0 1 0
## [2887] 0 1 0 0 0 0 1 0 1 1 0 0 1 1 0 0 0 1 1 1 1 0 1 0 1 0 0 0 1 0 0 0 0 1 1 1 1
## [2924] 1 0 1 0 1 0 1 1 0 1 1 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 1 0 1 0 0
## [2961] 1 0 1 0 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 1 1 0 1 1 0 0 0 1 1 1 0 1 0 0 0 0
## [2998] 1 0 0 1 0 1 1 0 1 0 1 1 1 0 0 1 0 1 1 0 0 1 1 1 1 0 0 1 1 0 1 0 1 1 0 1 1
## [3035] 1 0 0 1 0 0 0 0 1 0 0 1 0 0 0 1 0 1 0 0 1 1 1 1 1 1 0 0 1 0 0 0 1 1 1 1 1
## [3072] 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 1 0 0 1 1 1 1 1 0 0 0 1 0 0 0 1 0
## [3109] 1 1 1 0 1 1 1 0 0 1 1 1 1 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 1 0 1 1 0 0 0 1 0
## [3146] 1 1 0 0 1 0 1 1 0 1 1 1 0 0 1 1 0 1 1 1 1 0 1 0 1 0 1 0 0 1 1 1 1 0 1 0 1
## [3183] 0 1 1 0 1 0 0 0 1 1 1 0 1 1 0 1 0 0 1 1 1 1 0 0 0 1 0 1 0 0 1 1 0 0 0 0 1
## [3220] 0 0 1 0 1 0 0 1 1 1 0 1 1 0 0 1 0 0 1 0 1 1 1 1 0 0 0 0 1 1 0 1 1 1 1 1 1
## [3257] 0 1 0 0 0 1 0 1 1 1 0 1 0 1 1 0 0 1 1 1 1 0 1 0 1 1 1 1 1 1 1 0 1 0 0 0 0 1
## [3294] 1 0 1 1 0 1 1 0 1 1 0 1 1 0 0 1 1 1 1 1 1 0 1 0 1 1 1 0 0 1 1 1 1 0 1 0 1
## [3331] 1 0 0 1 1 0 0 1 1 0 0 1 0 0 1 1 1 0 0 1 1 0 1 0 0 1 0 1 0 1 0 0 0 1 0 1 0 0
## [3368] 0 0 1 0 0 1 0 1 0 1 0 0 1 1 0 0 1 0 1 1 1 1 1 0 0 1 0 1 1 1 1 1 1 0 1 1 1 1
## [3405] 0 0 1 1 0 0 1 1 0 0 0 1 0 0 0 1 0 1 0 0 0 1 0 1 1 0 1 0 1 1 1 0 0 1 0 1 1
## [3442] 1 1 0 1 1 0 0 0 1 1 0 1 1 0 1 1 0 1 0 0 1 0 1 1 1 0 0 1 0 0 0 1 0 1 0 0 0
## [3479] 1 0 0 1 0 1 0 1 0 1 0 0 0 1 1 0 0 1 0 0 1 0 0 1 1 0 1 0 0 1 0 1 1 0 0 0 0
## [3516] 1 1 0 0 1 0 0 1 1 1 0 0 1 1 0 0 1 1 0 1 1 1 0 1 1 1 0 1 0 0 0 0 0 1 0 0 1
## [3553] 1 0 1 1 1 1 1 1 1 1 0 1 0 0 1 0 1 1 0 0 0 0 0 1 1 0 1 1 1 1 0 1 0 0 1 0 1
## [3590] 1 1 0 1 0 1 1 1 1 1 1 1 1 0 0 0 0 0 1 0 1 1 0 0 0 0 1 1 1 1 1 0 0 0 0 1 1
## [3627] 0 1 0 1 1 0 0 1 1 1 1 0 1 0 0 0 0 0 1 1 1 1 1 0 0 1 1 1 1 1 1 0 0 1 0 0 1
## [3664] 0 0 0 0 1 1 1 0 0 1 1 0 0 1 1 1 1 1 1 0 1 1 0 1 1 1 1 0 0 0 0 0 1 1 1 0 0
## [3701] 1 1 1 1 0 1 1 1 0 1 1 1 0 0 0 1 0 0 1 1 0 1 1 1 0 0 1 0 0 0 1 0 1 1 1 0 0
## [3738] 1 1 0 0 0 1 1 1 0 1 0 0 0 1 1 0 0 1 1 1 1 1 0 1 1 1 0 1 1 1 1 1 1 1 1 1 1
## [3775] 0 0 0 1 1 0 1 0 0 0 1 0 1 0 0 0 0 1 0 0 1 0 0 0 0 1 0 0 1 1 0 1 1 0 1 0 1
## [3812] 1 1 0 1 0 0 1 1 0 0 1 0 0 1 0 0 0 1 0 0 1 1 0 1 0 0 0 0 0 1 0 0 1 1 1 0 1
## [3849] 1 1 1 1 0 0 0 0 1 0 1 1 0 0 1 1 1 0 0 1 0 0 0 1 1 0 1 1 0 0 0 1 0 0 1 0 0
## [3886] 0 0 1 0 0 1 0 1 0 1 0 1 0 0 0 0 0 1 0 0 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1
## [3923] 0 0 1 0 1 0 1 1 0 1 1 1 1 0 0 0 1 0 1 1 1 0 0 0 0 1 0 1 0 0 0 1 1 0 0 1 1
## [3960] 1 0 1 0 0 0 0 0 1 0 1 1 0 0 0 0 1 0 1 1 0 0 0 0 1 0 1 0 0 1 0 0 1 1 0 1 1
## [3997] 0 1 1 1 1 0 0 1 1 0 1 0 0 1 1 1 1 1 0 0 1 1 1 1 0 1 1 1 1 1 1 0 1 1 0 1 1
## [4034] 1 1 1 0 1 0 1 0 0 0 1 0 0 1 1 0 1 1 1 1 0 0 1 0 1 0 0 0 0 0 0 1 0 1 1 1 0
## [4071] 0 0 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 1 0 1 0 0 1 1 0 1 1 1 0 0 1 1
## [4108] 1 0 1 0 0 0 1 0 0 0 0 0 1 1 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1 0 1 0 1 0
## [4145] 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0 0 1 1 1 1 1 0 0 0 0 1 1 1 0 0 1 0 0 1 1 0 0
## [4182] 0 0 0 1 0 1 1 0 1 0 1 1 0 1 1 0 0 1 0 0 0 0 1 0 0 1 0 1 0 0 1 1 0 1 0 1 0
## [4219] 0 0 0 0 0 0 1 1 0 1 0 1 1 0 0 1 1 1 1 0 0 1

```


age model

```
age.model <- lm ( heartRate ~ age )
summary( age.model )
```

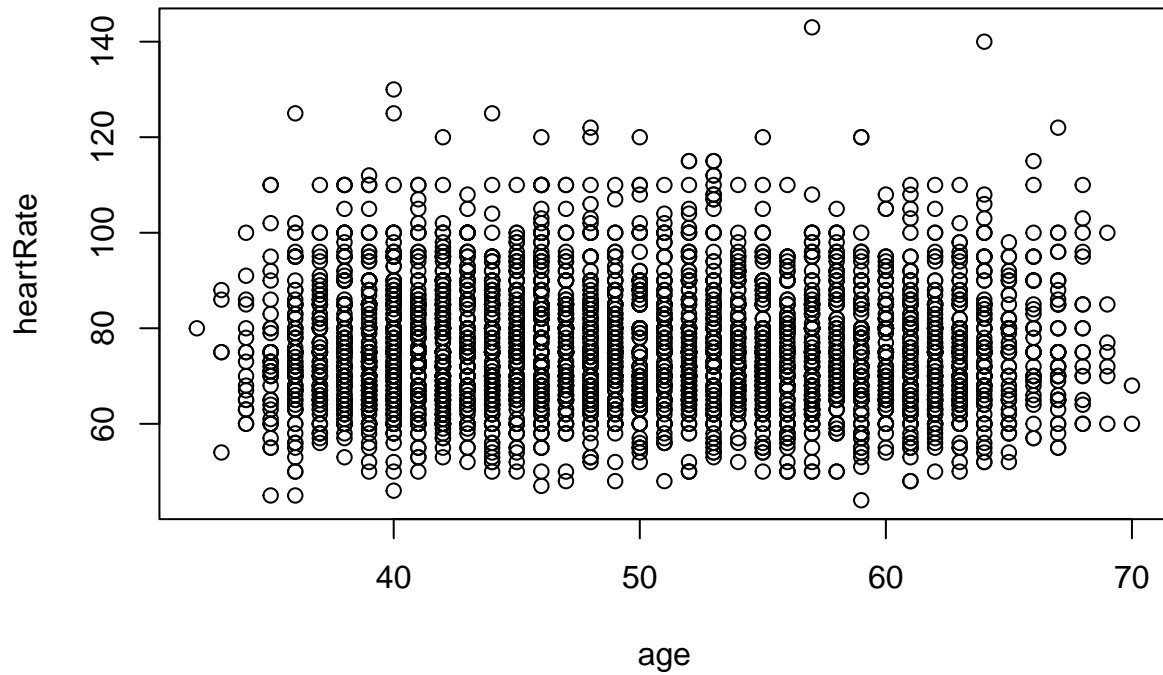
```
##
## Call:
## lm(formula = heartRate ~ age)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.709  -8.016  -0.943   6.984  67.255
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  76.77232    1.08435   70.800  <2e-16 ***
## age         -0.01802    0.02155   -0.836    0.403
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.03 on 4237 degrees of freedom
## (1 observation deleted due to missingness)
## Multiple R-squared:  0.000165, Adjusted R-squared: -7.103e-05
## F-statistic: 0.699 on 1 and 4237 DF, p-value: 0.4032
```

```
anova( age.model )
```

```
## Analysis of Variance Table
##
## Response: heartRate
##              Df Sum Sq Mean Sq F value Pr(>F)
## age              1    101  101.09    0.699  0.4032
## Residuals 4237 612752  144.62
```

plot

```
plot( age, heartRate )
```



try log(hr)

```
log.hr <- log(heartRate)
log.hr
```

```
##      [1] 4.382027 4.553877 4.317488 4.174387 4.442651 4.343805 4.094345 4.369448
##      [9] 4.330733 4.532599 4.317488 4.276666 4.584967 4.174387 4.442651 4.553877
##     [17] 4.158883 4.382027 4.317488 4.442651 4.276666 4.248495 4.248495 4.262680
##     [25] 4.317488 4.127134 4.174387 4.290459 4.442651 4.276666 4.094345 4.317488
##     [33] 4.499810 4.276666 4.564348 4.553877 4.276666 4.317488 4.094345 4.262680
##     [41] 4.219508 4.317488 4.248495 4.317488 4.330733 4.174387 4.499810 4.317488
##     [49] 4.553877 4.382027 4.094345 4.499810 4.382027 4.143135 4.499810 4.477337
##     [57] 4.477337 4.317488 4.174387 4.317488 4.553877 4.094345 4.356709 4.418841
##     [65] 4.317488 4.276666 4.605170 4.174387 4.330733 4.143135 4.248495 4.143135
##     [73] 4.204693 4.442651 4.158883 4.174387 4.418841 4.382027 4.382027 4.442651
##     [81] 4.499810 4.430817 4.477337 4.317488 4.248495 4.248495 4.174387 4.043051
##     [89] 4.605170 4.382027 4.094345 4.317488 4.262680 4.094345 4.382027 4.094345
##     [97] 4.477337 4.094345 4.317488 3.912023 4.174387 4.317488 4.143135 4.304065
##    [105] 4.174387 4.442651 4.174387 4.442651 4.499810 4.330733 4.317488 4.248495
##    [113] 4.454347 4.317488 4.499810 4.317488 4.007333 4.248495 4.262680 4.477337
##    [121] 4.219508 4.317488 4.382027 4.605170 4.248495 4.317488 4.317488 4.094345
##    [129] 4.248495 4.127134 4.477337 4.317488 4.356709 4.521789 4.317488 4.317488
##    [137] 4.605170 4.007333 4.189655 4.532599 4.382027 4.248495 4.382027 4.564348
```

[145] 3.912023 4.465908 4.248495 4.382027 4.094345 4.276666 4.248495 4.382027
 ## [153] 4.262680 4.043051 4.584967 4.248495 4.094345 4.564348 4.356709 4.382027
 ## [161] 4.276666 4.094345 4.700480 4.248495 4.094345 4.127134 4.219508 4.382027
 ## [169] 4.290459 4.276666 4.174387 4.290459 4.382027 4.219508 4.317488 4.499810
 ## [177] 4.382027 4.356709 4.343805 4.382027 4.394449 4.248495 4.564348 4.382027
 ## [185] 4.174387 4.248495 4.219508 4.219508 4.174387 4.276666 4.382027 4.127134
 ## [193] 4.025352 4.317488 4.276666 4.442651 4.174387 4.488636 4.317488 4.406719
 ## [201] 4.499810 4.094345 4.248495 4.248495 4.189655 4.127134 4.605170 4.317488
 ## [209] 4.248495 4.564348 4.343805 3.871201 4.553877 4.290459 4.317488 4.343805
 ## [217] 4.653960 4.477337 4.343805 4.094345 3.912023 4.442651 4.174387 4.442651
 ## [225] 4.605170 4.248495 4.499810 4.406719 4.382027 4.382027 4.094345 4.382027
 ## [233] 4.442651 4.382027 4.276666 4.290459 4.477337 4.317488 4.317488 4.553877
 ## [241] 4.382027 4.343805 4.442651 4.499810 4.174387 4.605170 4.465908 4.110874
 ## [249] 3.988984 4.477337 4.276666 4.234107 4.276666 4.007333 4.094345 3.988984
 ## [257] 4.276666 4.290459 4.406719 4.317488 4.158883 4.290459 4.234107 4.343805
 ## [265] 4.219508 4.317488 4.317488 4.317488 4.442651 4.477337 4.700480 4.499810
 ## [273] 4.143135 4.219508 4.477337 4.465908 4.248495 4.382027 4.204693 4.317488
 ## [281] 4.219508 4.143135 4.174387 4.564348 4.248495 4.204693 4.442651 3.951244
 ## [289] 4.477337 3.912023 4.219508 4.234107 4.248495 4.543295 4.454347 4.382027
 ## [297] 4.442651 4.317488 4.174387 4.317488 4.276666 4.356709 4.499810 3.988984
 ## [305] 4.219508 4.262680 4.317488 4.317488 4.406719 4.219508 4.382027 4.317488
 ## [313] 4.174387 4.110874 4.442651 4.189655 4.442651 4.317488 4.025352 4.330733
 ## [321] 4.248495 4.174387 4.189655 4.477337 4.007333 4.317488 4.290459 4.248495
 ## [329] 4.499810 4.174387 4.382027 4.477337 4.262680 4.605170 4.290459 4.317488
 ## [337] 4.442651 4.290459 4.369448 4.941642 4.442651 4.248495 4.094345 4.521789
 ## [345] 4.094345 4.174387 4.499810 4.382027 4.317488 4.317488 4.317488 4.356709
 ## [353] 4.442651 4.499810 4.248495 4.465908 4.442651 4.248495 4.867534 4.553877
 ## [361] 4.382027 4.143135 4.143135 4.430817 4.442651 4.343805 4.143135 4.060443
 ## [369] 4.317488 4.499810 4.465908 4.317488 4.499810 4.094345 4.382027 4.442651
 ## [377] 4.174387 4.564348 4.276666 4.382027 4.442651 4.605170 4.682131 4.248495
 ## [385] 4.094345 4.127134 4.442651 4.317488 4.276666 4.248495 4.418841 4.174387
 ## [393] 4.248495 4.499810 4.499810 4.127134 4.290459 4.174387 4.174387 4.499810
 ## [401] 4.204693 4.174387 4.143135 4.290459 4.248495 4.204693 4.356709 4.499810
 ## [409] 4.094345 4.644391 4.317488 4.382027 4.204693 4.262680 4.382027 4.276666
 ## [417] 4.317488 4.584967 4.382027 4.343805 4.094345 4.248495 4.454347 4.477337
 ## [425] 4.605170 4.369448 4.330733 4.219508 4.174387 4.174387 4.248495 4.094345
 ## [433] 4.276666 4.700480 4.174387 4.317488 4.276666 4.553877 4.317488 4.499810
 ## [441] 4.317488 4.094345 4.499810 4.499810 4.382027 4.204693 4.174387 4.317488
 ## [449] 4.060443 4.317488 4.262680 4.382027 4.276666 4.442651 4.189655 4.248495
 ## [457] 4.290459 4.007333 4.127134 4.290459 4.317488 4.174387 4.127134 4.317488
 ## [465] 4.356709 4.521789 4.382027 4.276666 4.317488 4.356709 4.394449 4.127134
 ## [473] 4.564348 4.094345 4.543295 4.382027 4.143135 4.094345 4.564348 4.356709
 ## [481] 4.317488 4.521789 4.488636 4.276666 4.553877 4.317488 4.248495 4.262680
 ## [489] 4.553877 4.382027 4.543295 4.219508 4.653960 4.317488 3.912023 4.127134
 ## [497] 4.418841 4.356709 4.094345 4.343805 4.290459 4.317488 4.248495 4.276666
 ## [505] 4.605170 4.330733 4.394449 4.219508 4.143135 4.174387 4.382027 4.406719
 ## [513] 4.521789 4.060443 4.442651 4.317488 4.276666 4.382027 4.276666 4.605170
 ## [521] 4.248495 4.442651 4.248495 4.700480 4.317488 4.060443 4.127134 4.060443
 ## [529] 4.442651 4.143135 4.290459 4.442651 4.382027 4.143135 4.276666 4.442651
 ## [537] 4.510860 4.317488 4.317488 4.442651 4.330733 4.248495 4.382027 4.605170
 ## [545] 4.406719 4.143135 4.094345 4.499810 4.477337 4.317488 4.382027 4.382027
 ## [553] 4.454347 4.394449 4.158883 4.060443 4.382027 4.219508 4.248495 4.317488
 ## [561] 4.488636 4.189655 4.653960 4.442651 4.094345 4.158883 4.234107 4.499810
 ## [569] 4.356709 4.248495 4.276666 4.276666 4.382027 4.276666 4.442651 4.442651

```

## [577] 4.477337 4.442651 4.356709 3.970292 4.317488 4.356709 4.382027 4.465908
## [585] 4.219508 4.406719 4.219508 4.382027 4.248495 4.369448 4.499810 4.204693
## [593] 4.499810 4.543295 4.418841 4.317488 3.970292 4.094345 4.477337 4.189655
## [601] 4.219508 4.442651 4.356709 4.499810 4.442651 4.290459 4.418841 4.219508
## [609] 4.442651 4.653960 4.204693 4.262680 4.382027 4.094345 4.204693 4.356709
## [617] 4.477337 4.343805 4.382027 4.248495 4.234107 4.382027 4.382027 4.174387
## [625] 4.276666 4.499810 4.174387 4.276666 4.442651 4.204693 4.682131 4.060443
## [633] 4.330733 4.369448 4.356709 4.174387 4.094345 4.189655 4.204693 4.653960
## [641] 4.343805 4.143135 4.553877 4.025352 4.290459 4.317488 4.382027 4.060443
## [649] 4.094345 4.382027 4.060443 4.276666 4.007333 4.477337 4.174387 4.330733
## [657] 4.442651 4.430817 4.317488 4.204693 4.499810 4.317488 4.418841 4.276666
## [665] 4.543295 4.442651 4.174387 4.234107 4.442651 4.317488 4.317488 4.276666
## [673] 4.219508 4.356709 4.248495 4.382027 4.094345 4.262680 4.094345 4.454347
## [681] 4.094345 4.317488 4.060443 4.317488 4.442651 4.605170 4.330733 4.219508
## [689] 4.189655 NA 4.454347 4.174387 4.343805 4.465908 4.499810 4.248495
## [697] 4.382027 4.700480 4.382027 4.499810 4.317488 4.127134 4.317488 4.406719
## [705] 4.477337 4.394449 4.330733 4.234107 4.094345 4.219508 4.204693 4.465908
## [713] 4.465908 4.382027 4.317488 4.276666 4.094345 4.382027 4.248495 4.499810
## [721] 4.394449 4.248495 4.663439 4.127134 4.382027 4.317488 4.276666 4.094345
## [729] 4.204693 4.143135 4.174387 4.276666 4.248495 3.951244 4.382027 4.382027
## [737] 4.317488 4.356709 4.442651 4.174387 4.700480 4.219508 4.644391 4.248495
## [745] 4.418841 4.553877 4.418841 4.248495 4.077537 4.158883 4.007333 4.248495
## [753] 4.343805 4.025352 4.317488 4.356709 4.442651 4.382027 4.143135 4.094345
## [761] 4.304065 4.110874 4.174387 4.521789 4.442651 4.317488 4.406719 4.317488
## [769] 4.143135 4.060443 4.276666 4.330733 4.442651 4.330733 4.248495 4.477337
## [777] 4.248495 4.174387 4.219508 4.356709 4.605170 4.290459 4.219508 4.317488
## [785] 4.248495 4.330733 4.276666 4.248495 4.127134 4.219508 4.248495 4.143135
## [793] 4.477337 4.477337 4.442651 4.499810 4.276666 4.382027 4.543295 4.317488
## [801] 4.248495 4.418841 4.605170 4.248495 4.317488 4.094345 4.143135 4.317488
## [809] 4.317488 4.521789 4.204693 4.317488 4.110874 3.931826 3.970292 4.290459
## [817] 4.317488 4.406719 4.442651 4.442651 4.094345 4.276666 4.094345 4.317488
## [825] 4.700480 4.521789 4.317488 4.564348 4.174387 4.248495 4.248495 4.143135
## [833] 4.624973 4.672829 4.262680 4.382027 4.382027 4.317488 4.553877 4.317488
## [841] 4.094345 4.343805 4.499810 4.094345 4.174387 4.219508 4.499810 4.553877
## [849] 4.418841 4.007333 4.290459 4.343805 4.189655 4.477337 4.248495 4.317488
## [857] 4.304065 4.248495 4.234107 4.204693 4.499810 4.234107 4.276666 4.442651
## [865] 4.330733 4.317488 4.276666 4.499810 4.248495 4.174387 4.356709 4.356709
## [873] 4.317488 4.094345 4.248495 4.304065 4.276666 4.094345 4.406719 4.330733
## [881] 3.988984 4.317488 4.382027 4.418841 4.382027 4.330733 4.219508 4.248495
## [889] 4.143135 4.317488 4.382027 4.007333 4.189655 4.382027 4.382027 4.406719
## [897] 4.543295 4.248495 4.330733 4.317488 4.219508 4.382027 4.465908 4.262680
## [905] 4.553877 4.553877 4.317488 4.477337 4.553877 4.682131 4.499810 4.700480
## [913] 4.382027 4.682131 4.442651 4.317488 4.543295 4.060443 4.343805 4.290459
## [921] 4.442651 4.317488 4.219508 4.700480 4.430817 4.382027 4.553877 4.276666
## [929] 4.094345 4.094345 4.382027 4.356709 4.382027 4.382027 4.174387 4.521789
## [937] 4.219508 4.248495 4.276666 4.356709 4.477337 4.317488 4.406719 4.382027
## [945] 4.317488 4.330733 4.317488 4.356709 4.382027 4.143135 4.499810 4.442651
## [953] 4.317488 4.204693 4.276666 4.189655 4.584967 4.317488 4.127134 4.248495
## [961] 4.317488 4.317488 4.219508 4.174387 4.158883 4.382027 4.174387 4.219508
## [969] 4.382027 4.394449 4.317488 4.317488 4.276666 4.317488 4.174387 4.382027
## [977] 4.094345 3.912023 4.521789 4.454347 4.653960 4.248495 4.174387 4.700480
## [985] 4.204693 4.317488 4.262680 3.871201 4.317488 4.343805 4.382027 4.330733
## [993] 4.248495 4.499810 4.343805 4.219508 4.248495 4.174387 4.174387 4.454347
## [1001] 4.094345 4.605170 4.382027 4.248495 4.060443 4.094345 4.110874 4.418841

```

```

## [1009] 4.718499 4.025352 4.499810 4.499810 4.317488 4.343805 4.543295 4.317488
## [1017] 4.219508 4.043051 4.442651 4.317488 4.317488 4.605170 4.828314 4.127134
## [1025] 4.094345 4.007333 4.394449 4.276666 4.060443 4.094345 4.382027 4.262680
## [1033] 4.330733 4.442651 4.143135 4.189655 4.553877 4.143135 4.094345 4.317488
## [1041] 4.499810 4.276666 4.204693 4.127134 4.060443 4.356709 4.499810 4.276666
## [1049] 3.988984 4.290459 4.317488 4.499810 3.970292 4.510860 4.317488 4.248495
## [1057] 4.543295 4.356709 4.454347 4.382027 4.382027 4.174387 4.143135 4.499810
## [1065] 4.430817 4.369448 4.248495 4.382027 4.094345 4.189655 4.369448 4.330733
## [1073] 4.418841 4.634729 4.477337 4.330733 4.174387 4.204693 4.174387 4.317488
## [1081] 4.382027 4.356709 4.406719 4.521789 4.304065 4.317488 4.442651 4.317488
## [1089] 4.248495 4.442651 4.499810 4.248495 4.382027 4.248495 4.442651 4.343805
## [1097] 4.442651 4.276666 4.369448 4.204693 4.317488 4.442651 4.382027 4.382027
## [1105] 4.442651 4.553877 4.418841 4.234107 4.143135 4.406719 4.174387 4.356709
## [1113] 4.234107 4.234107 4.406719 4.499810 4.276666 4.356709 4.219508 4.584967
## [1121] 4.356709 4.234107 4.454347 4.174387 4.248495 4.442651 4.234107 4.477337
## [1129] 4.094345 4.369448 4.454347 4.060443 4.465908 4.418841 4.553877 4.189655
## [1137] 4.158883 4.219508 4.219508 4.219508 4.317488 4.276666 4.276666 4.158883
## [1145] 4.143135 4.094345 4.382027 4.477337 4.330733 4.094345 4.248495 4.317488
## [1153] 4.290459 4.248495 4.406719 4.499810 4.317488 4.564348 4.406719 4.248495
## [1161] 4.276666 4.094345 4.094345 4.158883 4.532599 4.382027 4.060443 4.248495
## [1169] 4.248495 4.382027 4.174387 4.143135 4.094345 4.369448 4.382027 4.077537
## [1177] 4.174387 4.219508 4.442651 4.094345 4.060443 4.219508 4.700480 4.189655
## [1185] 4.634729 4.317488 4.248495 4.442651 4.499810 4.442651 4.521789 4.276666
## [1193] 4.276666 4.025352 4.248495 4.394449 4.219508 4.317488 4.204693 4.382027
## [1201] 4.605170 4.276666 4.442651 4.605170 4.584967 4.219508 4.356709 4.317488
## [1209] 4.442651 4.158883 4.174387 4.127134 4.248495 4.248495 4.290459 4.317488
## [1217] 4.382027 4.043051 4.189655 4.317488 4.382027 4.317488 4.094345 4.442651
## [1225] 4.605170 4.094345 4.499810 4.290459 4.317488 4.382027 4.317488 4.060443
## [1233] 4.317488 3.784190 4.007333 4.007333 4.248495 4.317488 4.553877 4.317488
## [1241] 4.248495 4.382027 4.060443 4.317488 4.248495 4.317488 4.442651 4.605170
## [1249] 4.330733 4.406719 4.317488 4.442651 4.094345 4.382027 4.418841 4.174387
## [1257] 4.276666 4.094345 4.094345 4.382027 4.356709 4.418841 4.382027 4.248495
## [1265] 4.605170 4.317488 4.317488 4.553877 4.317488 4.356709 4.418841 4.276666
## [1273] 4.394449 4.382027 4.276666 4.605170 4.553877 4.290459 4.382027 4.276666
## [1281] 4.094345 4.276666 4.143135 4.317488 4.276666 4.094345 4.276666 4.382027
## [1289] 4.454347 4.382027 4.477337 4.219508 4.499810 3.912023 4.488636 4.317488
## [1297] 4.234107 4.553877 4.248495 4.317488 4.499810 4.317488 4.465908 4.262680
## [1305] 4.605170 4.234107 4.290459 4.605170 4.382027 4.204693 4.317488 4.430817
## [1313] 4.248495 4.454347 4.127134 4.317488 4.317488 4.499810 4.382027 4.094345
## [1321] 4.317488 4.094345 4.382027 4.317488 4.094345 4.143135 4.204693 4.143135
## [1329] 4.406719 4.418841 4.442651 4.317488 4.605170 4.127134 4.276666 4.174387
## [1337] 4.382027 4.189655 4.532599 4.382027 4.605170 4.248495 4.382027 4.553877
## [1345] 4.290459 4.317488 4.317488 4.317488 4.174387 4.317488 4.143135 4.219508
## [1353] 4.094345 3.988984 4.248495 4.219508 4.317488 4.248495 4.382027 4.290459
## [1361] 4.406719 4.317488 4.382027 4.499810 4.553877 4.094345 4.248495 4.290459
## [1369] 4.219508 4.543295 4.007333 4.317488 4.094345 4.094345 4.248495 4.394449
## [1377] 4.248495 4.442651 4.406719 4.317488 4.369448 4.317488 4.499810 4.382027
## [1385] 4.248495 4.442651 4.317488 4.189655 4.317488 4.317488 4.276666 4.025352
## [1393] 4.317488 4.060443 4.382027 4.276666 4.382027 4.356709 4.204693 4.406719
## [1401] 4.499810 4.406719 4.248495 4.382027 4.248495 4.189655 4.465908 4.248495
## [1409] 4.143135 4.317488 4.060443 4.442651 4.317488 4.174387 4.605170 4.382027
## [1417] 4.189655 4.248495 4.382027 4.317488 4.158883 4.317488 4.406719 4.248495
## [1425] 4.276666 4.605170 4.219508 4.499810 4.382027 4.248495 4.174387 4.382027
## [1433] 4.248495 4.356709 4.248495 4.276666 4.248495 4.317488 4.477337 4.442651

```

[1441] 4.382027 4.189655 4.317488 4.499810 4.382027 4.330733 4.317488 4.406719
 ## [1449] 4.605170 4.442651 4.499810 4.553877 4.077537 4.060443 4.317488 4.127134
 ## [1457] 4.317488 4.382027 4.158883 4.276666 4.094345 4.204693 4.653960 4.382027
 ## [1465] 4.158883 4.553877 4.174387 4.094345 4.442651 4.304065 4.718499 4.382027
 ## [1473] 4.248495 4.317488 4.382027 4.143135 4.382027 4.382027 4.007333 4.499810
 ## [1481] 4.248495 4.382027 4.248495 4.234107 4.094345 4.499810 4.317488 4.219508
 ## [1489] 4.477337 4.276666 4.094345 4.007333 4.382027 4.356709 4.304065 3.951244
 ## [1497] 4.094345 4.248495 4.204693 4.248495 4.248495 4.276666 4.219508 4.317488
 ## [1505] 4.406719 4.499810 4.553877 3.912023 4.094345 4.290459 4.174387 4.276666
 ## [1513] 4.174387 4.248495 4.276666 4.276666 4.304065 4.317488 4.248495 4.553877
 ## [1521] 4.605170 4.682131 4.442651 4.532599 4.317488 4.248495 4.553877 4.356709
 ## [1529] 4.234107 4.317488 4.290459 4.248495 4.143135 4.276666 4.343805 4.382027
 ## [1537] 4.248495 4.219508 4.317488 4.356709 4.143135 4.189655 4.094345 4.564348
 ## [1545] 4.499810 4.158883 4.276666 4.499810 4.356709 4.553877 4.174387 4.382027
 ## [1553] 4.276666 4.248495 4.317488 4.499810 4.304065 4.189655 4.499810 4.276666
 ## [1561] 4.382027 4.442651 4.488636 4.317488 4.094345 4.477337 4.317488 4.204693
 ## [1569] 3.912023 4.356709 4.700480 4.060443 4.219508 4.317488 4.158883 4.248495
 ## [1577] 4.356709 4.094345 4.343805 4.382027 4.248495 4.219508 4.499810 4.356709
 ## [1585] 4.317488 4.094345 4.465908 3.970292 4.143135 4.290459 4.564348 4.219508
 ## [1593] 4.317488 4.382027 4.317488 4.317488 4.317488 4.174387 4.605170 4.204693
 ## [1601] 4.043051 4.605170 4.382027 4.060443 4.248495 4.418841 4.499810 4.442651
 ## [1609] 4.060443 4.564348 4.634729 4.382027 4.382027 3.951244 4.605170 4.094345
 ## [1617] 4.189655 4.700480 4.382027 4.369448 4.317488 4.465908 4.477337 4.276666
 ## [1625] 4.219508 4.499810 4.219508 3.850148 4.499810 4.369448 4.174387 4.317488
 ## [1633] 4.094345 4.204693 4.248495 4.499810 4.094345 4.317488 4.219508 4.158883
 ## [1641] 4.060443 4.127134 4.025352 4.430817 4.007333 4.369448 4.317488 4.382027
 ## [1649] 4.382027 4.219508 4.189655 4.356709 4.174387 4.248495 4.317488 4.276666
 ## [1657] 4.382027 4.290459 4.317488 4.330733 4.248495 4.317488 4.276666 4.158883
 ## [1665] 4.382027 4.276666 4.248495 4.382027 4.077537 4.317488 4.143135 4.248495
 ## [1673] 4.317488 4.418841 4.248495 4.442651 4.219508 4.499810 4.158883 4.174387
 ## [1681] 4.477337 4.007333 4.158883 4.094345 4.406719 4.025352 4.454347 4.317488
 ## [1689] 4.248495 4.094345 4.454347 4.317488 4.234107 4.553877 4.382027 4.418841
 ## [1697] 4.317488 3.912023 4.382027 4.605170 4.317488 4.276666 4.143135 4.317488
 ## [1705] 4.317488 4.564348 4.219508 4.204693 4.174387 4.276666 4.442651 4.382027
 ## [1713] 4.317488 4.382027 4.290459 4.442651 4.442651 3.988984 4.382027 4.094345
 ## [1721] 4.317488 4.248495 4.204693 4.317488 4.248495 4.189655 4.094345 4.094345
 ## [1729] 4.700480 4.356709 4.442651 4.174387 4.060443 4.174387 4.317488 4.219508
 ## [1737] 4.330733 4.356709 4.330733 4.276666 4.248495 4.499810 4.317488 4.262680
 ## [1745] 4.317488 4.248495 4.317488 4.382027 4.442651 4.219508 4.043051 4.605170
 ## [1753] 4.094345 4.158883 4.442651 4.127134 4.317488 4.454347 4.317488 4.234107
 ## [1761] 4.317488 4.317488 4.382027 4.499810 4.532599 4.189655 4.442651 4.248495
 ## [1769] 4.143135 4.543295 4.174387 4.127134 3.912023 4.317488 4.248495 4.382027
 ## [1777] 4.127134 4.174387 4.276666 4.499810 4.382027 4.356709 4.406719 4.653960
 ## [1785] 4.094345 4.174387 4.382027 4.189655 4.204693 4.382027 4.700480 3.970292
 ## [1793] 4.276666 4.248495 4.158883 4.234107 4.276666 4.060443 4.317488 4.025352
 ## [1801] 4.406719 4.442651 4.317488 4.248495 4.304065 4.060443 4.553877 4.700480
 ## [1809] 4.356709 4.605170 3.988984 4.174387 4.094345 4.248495 4.430817 4.477337
 ## [1817] 4.094345 4.094345 4.317488 4.317488 4.369448 4.248495 4.382027 4.094345
 ## [1825] 4.174387 4.174387 4.094345 4.418841 4.158883 3.912023 4.499810 4.317488
 ## [1833] 4.248495 4.553877 4.262680 4.219508 4.189655 4.442651 4.204693 4.174387
 ## [1841] 4.553877 4.094345 4.248495 4.382027 3.806662 4.143135 4.290459 4.094345
 ## [1849] 4.234107 4.248495 4.574711 4.317488 4.499810 4.189655 4.276666 4.442651
 ## [1857] 4.143135 4.317488 4.094345 4.442651 4.605170 4.189655 4.317488 3.951244
 ## [1865] 4.521789 4.442651 4.094345 4.605170 4.382027 4.454347 4.276666 4.248495

[1873] 4.553877 4.382027 4.330733 4.248495 4.382027 4.382027 4.219508 4.330733
 ## [1881] 4.158883 4.700480 4.094345 4.248495 4.442651 4.382027 4.382027 4.442651
 ## [1889] 4.248495 4.382027 4.304065 4.127134 4.499810 4.219508 4.343805 4.553877
 ## [1897] 4.174387 4.317488 4.248495 4.204693 4.442651 4.219508 4.653960 4.174387
 ## [1905] 4.382027 4.248495 4.174387 4.290459 4.189655 4.204693 4.219508 4.382027
 ## [1913] 4.317488 4.158883 4.094345 4.094345 4.290459 3.912023 4.174387 4.499810
 ## [1921] 4.094345 4.317488 4.499810 4.219508 4.406719 4.477337 4.317488 4.317488
 ## [1929] 4.553877 4.343805 4.248495 4.189655 4.624973 4.189655 4.248495 4.382027
 ## [1937] 4.094345 4.356709 4.499810 3.951244 4.317488 4.219508 4.127134 4.442651
 ## [1945] 4.094345 4.174387 4.094345 3.951244 4.442651 4.499810 4.189655 4.094345
 ## [1953] 4.060443 4.343805 4.276666 4.465908 4.219508 4.189655 4.204693 4.317488
 ## [1961] 4.219508 4.499810 4.430817 4.418841 4.317488 4.382027 4.276666 4.317488
 ## [1969] 4.276666 4.382027 4.382027 4.304065 4.127134 4.276666 3.912023 4.330733
 ## [1977] 3.970292 4.442651 4.382027 4.127134 4.143135 4.418841 4.276666 4.382027
 ## [1985] 4.158883 4.174387 4.382027 4.043051 4.290459 4.317488 4.276666 4.248495
 ## [1993] 4.276666 4.234107 4.605170 4.007333 4.143135 4.465908 4.219508 4.382027
 ## [2001] 4.499810 4.465908 4.189655 4.248495 4.317488 4.605170 4.189655 4.553877
 ## [2009] 4.276666 4.465908 4.248495 4.317488 4.454347 3.912023 4.605170 4.276666
 ## [2017] 4.094345 4.174387 4.317488 4.276666 4.442651 4.234107 4.442651 4.330733
 ## [2025] 4.465908 4.418841 4.382027 4.382027 4.369448 4.317488 4.382027 4.094345
 ## [2033] 4.356709 4.343805 4.317488 4.276666 4.317488 4.110874 4.442651 4.276666
 ## [2041] 4.248495 4.700480 4.356709 4.317488 4.317488 4.248495 4.343805 4.127134
 ## [2049] 4.094345 4.382027 4.158883 4.442651 4.330733 4.204693 4.317488 4.442651
 ## [2057] 4.143135 4.382027 4.317488 3.912023 4.189655 4.465908 4.521789 4.262680
 ## [2065] 4.317488 4.584967 4.382027 4.454347 4.382027 4.317488 4.143135 4.369448
 ## [2073] 4.276666 4.330733 4.248495 4.317488 4.219508 4.499810 4.094345 4.343805
 ## [2081] 4.248495 4.317488 4.317488 4.317488 4.317488 4.406719 4.219508 4.094345
 ## [2089] 4.276666 4.248495 4.219508 4.219508 4.418841 4.430817 4.317488 4.290459
 ## [2097] 4.564348 4.499810 4.499810 4.248495 4.007333 4.317488 4.317488 4.094345
 ## [2105] 4.317488 4.406719 4.174387 4.043051 4.094345 4.262680 4.564348 4.276666
 ## [2113] 4.060443 4.189655 4.382027 4.143135 4.248495 4.248495 4.418841 4.094345
 ## [2121] 4.406719 4.477337 4.442651 4.317488 4.317488 4.317488 4.317488 3.970292
 ## [2129] 4.564348 4.382027 4.248495 4.094345 4.189655 4.330733 4.317488 4.262680
 ## [2137] 4.406719 4.317488 4.060443 4.219508 4.317488 4.442651 4.060443 4.553877
 ## [2145] 4.174387 4.174387 4.094345 4.276666 4.248495 4.276666 4.356709 4.025352
 ## [2153] 4.094345 4.605170 4.317488 4.174387 4.094345 4.043051 4.248495 4.290459
 ## [2161] 4.382027 4.219508 4.700480 4.276666 4.248495 4.406719 4.094345 4.317488
 ## [2169] 4.477337 4.317488 4.499810 4.406719 4.418841 4.442651 4.276666 4.317488
 ## [2177] 4.317488 4.521789 4.276666 4.477337 4.700480 4.304065 4.248495 4.248495
 ## [2185] 4.204693 4.499810 4.382027 4.499810 4.204693 4.276666 4.454347 4.276666
 ## [2193] 4.442651 4.499810 4.382027 4.234107 4.094345 4.248495 4.521789 4.094345
 ## [2201] 4.317488 4.248495 4.276666 4.094345 4.304065 4.158883 4.584967 4.262680
 ## [2209] 4.317488 4.382027 4.406719 4.317488 4.276666 4.143135 4.219508 4.174387
 ## [2217] 4.543295 4.442651 4.276666 4.454347 4.442651 4.382027 4.382027 4.521789
 ## [2225] 4.094345 4.094345 4.442651 4.564348 4.248495 4.174387 4.219508 4.204693
 ## [2233] 4.219508 4.382027 4.290459 4.007333 4.276666 4.804021 4.276666 4.204693
 ## [2241] 4.499810 4.356709 4.700480 4.442651 4.317488 4.605170 4.382027 4.382027
 ## [2249] 4.174387 4.317488 4.189655 4.219508 4.317488 4.499810 4.330733 4.382027
 ## [2257] 4.442651 4.382027 4.317488 4.317488 4.290459 4.276666 4.382027 4.317488
 ## [2265] 4.317488 4.317488 4.127134 4.143135 4.248495 4.143135 4.605170 4.174387
 ## [2273] 4.382027 4.304065 4.317488 4.700480 4.317488 4.043051 4.158883 4.317488
 ## [2281] 4.317488 4.234107 4.248495 4.290459 4.442651 4.317488 4.317488 4.094345
 ## [2289] 4.248495 3.951244 4.454347 4.499810 4.262680 4.219508 4.317488 4.343805
 ## [2297] 4.543295 4.174387 4.204693 4.663439 4.094345 4.553877 4.262680 4.382027

[2305] 4.553877 4.189655 4.553877 4.219508 4.521789 4.248495 4.127134 4.499810
 ## [2313] 4.204693 4.317488 4.276666 4.276666 4.442651 4.248495 4.248495 4.219508
 ## [2321] 4.356709 4.174387 4.317488 4.204693 4.317488 4.317488 4.382027 4.442651
 ## [2329] 4.234107 4.248495 4.204693 4.234107 4.382027 4.564348 4.532599 4.521789
 ## [2337] 4.304065 4.382027 4.204693 4.394449 4.317488 4.219508 4.356709 4.343805
 ## [2345] 3.951244 4.248495 4.369448 4.465908 4.204693 4.219508 4.382027 4.317488
 ## [2353] 4.276666 4.317488 4.094345 4.605170 4.499810 4.382027 4.406719 4.382027
 ## [2361] 4.454347 4.499810 4.219508 4.499810 4.174387 4.382027 4.382027 4.442651
 ## [2369] 4.317488 4.382027 4.553877 4.406719 4.060443 4.094345 4.477337 4.204693
 ## [2377] 4.174387 4.605170 4.477337 4.317488 3.988984 4.248495 4.700480 4.317488
 ## [2385] 4.219508 4.382027 4.248495 4.143135 4.700480 4.369448 4.605170 4.418841
 ## [2393] 4.248495 4.454347 4.382027 4.304065 4.219508 4.317488 4.127134 4.477337
 ## [2401] 4.248495 4.189655 4.276666 4.532599 4.094345 4.276666 4.442651 4.521789
 ## [2409] 4.499810 4.189655 4.158883 4.174387 4.127134 4.143135 4.382027 4.510860
 ## [2417] 4.553877 4.418841 4.248495 4.094345 4.127134 4.382027 4.174387 4.382027
 ## [2425] 4.499810 4.356709 4.248495 4.110874 4.477337 3.871201 4.158883 4.442651
 ## [2433] 4.317488 4.174387 4.672829 4.025352 4.189655 4.564348 4.343805 4.605170
 ## [2441] 4.219508 4.442651 4.510860 4.317488 4.248495 4.276666 3.912023 4.477337
 ## [2449] 4.219508 4.276666 4.382027 4.317488 4.219508 4.262680 4.204693 4.317488
 ## [2457] 4.442651 4.204693 4.248495 4.672829 4.094345 4.382027 4.276666 4.094345
 ## [2465] 4.317488 4.204693 4.189655 4.248495 4.317488 4.624973 4.317488 4.418841
 ## [2473] 4.382027 4.248495 4.418841 4.174387 4.442651 4.382027 4.219508 4.317488
 ## [2481] 4.382027 4.290459 4.787492 4.317488 4.174387 4.499810 4.356709 4.499810
 ## [2489] 4.605170 4.248495 4.248495 4.094345 4.787492 4.094345 4.553877 4.248495
 ## [2497] 4.430817 4.442651 4.382027 4.317488 4.234107 4.317488 4.127134 4.248495
 ## [2505] 4.442651 4.382027 4.553877 4.276666 4.189655 4.204693 4.605170 4.382027
 ## [2513] 4.094345 4.127134 4.094345 4.442651 4.174387 4.248495 4.234107 4.094345
 ## [2521] 4.248495 4.317488 4.382027 4.553877 4.382027 4.356709 4.442651 4.174387
 ## [2529] 4.204693 4.330733 4.248495 4.317488 4.219508 4.189655 4.317488 4.317488
 ## [2537] 4.204693 4.442651 4.276666 4.369448 4.317488 4.317488 4.127134 4.276666
 ## [2545] 4.158883 4.189655 4.276666 4.343805 4.605170 4.406719 4.189655 4.356709
 ## [2553] 4.521789 4.060443 4.276666 4.248495 4.317488 4.317488 4.248495 4.219508
 ## [2561] 4.174387 4.356709 4.605170 4.499810 4.174387 4.477337 4.158883 4.382027
 ## [2569] 4.442651 4.094345 4.060443 4.276666 4.317488 4.442651 4.248495 4.521789
 ## [2577] 4.290459 4.317488 4.317488 4.382027 4.382027 4.382027 4.317488 4.276666
 ## [2585] 4.564348 4.442651 4.290459 4.276666 4.330733 4.094345 4.442651 4.248495
 ## [2593] 4.406719 3.970292 3.951244 4.418841 4.382027 4.317488 4.143135 4.317488
 ## [2601] 4.189655 4.382027 4.174387 4.418841 4.143135 4.442651 4.248495 4.317488
 ## [2609] 4.521789 4.564348 4.317488 4.290459 4.442651 4.127134 4.499810 4.094345
 ## [2617] 4.127134 4.382027 4.204693 4.317488 4.406719 4.248495 4.127134 4.007333
 ## [2625] 4.317488 4.442651 4.406719 4.094345 4.276666 4.595120 4.276666 4.521789
 ## [2633] 4.248495 4.521789 4.418841 4.317488 4.094345 4.174387 4.094345 4.143135
 ## [2641] 4.317488 4.430817 4.317488 4.094345 4.248495 4.317488 4.682131 4.174387
 ## [2649] 4.543295 4.276666 4.553877 4.499810 4.094345 4.521789 4.317488 4.219508
 ## [2657] 4.317488 4.499810 4.499810 4.094345 4.174387 4.465908 4.430817 4.787492
 ## [2665] 4.189655 4.553877 3.951244 4.317488 4.219508 4.553877 4.248495 4.204693
 ## [2673] 4.382027 4.418841 4.276666 4.158883 4.219508 4.204693 4.094345 4.094345
 ## [2681] 4.442651 4.605170 4.204693 4.276666 4.219508 4.204693 4.317488 4.317488
 ## [2689] 4.290459 4.605170 4.174387 4.356709 4.262680 4.317488 4.276666 4.219508
 ## [2697] 4.553877 4.317488 4.553877 4.094345 4.189655 4.343805 4.442651 4.356709
 ## [2705] 4.248495 4.317488 4.174387 4.094345 4.276666 4.248495 4.248495 4.317488
 ## [2713] 4.317488 4.143135 4.430817 4.317488 4.143135 4.369448 4.499810 4.605170
 ## [2721] 4.382027 4.605170 4.077537 4.521789 4.317488 4.276666 4.276666 4.330733
 ## [2729] 4.219508 4.317488 4.543295 4.454347 4.317488 4.744932 4.454347 4.382027

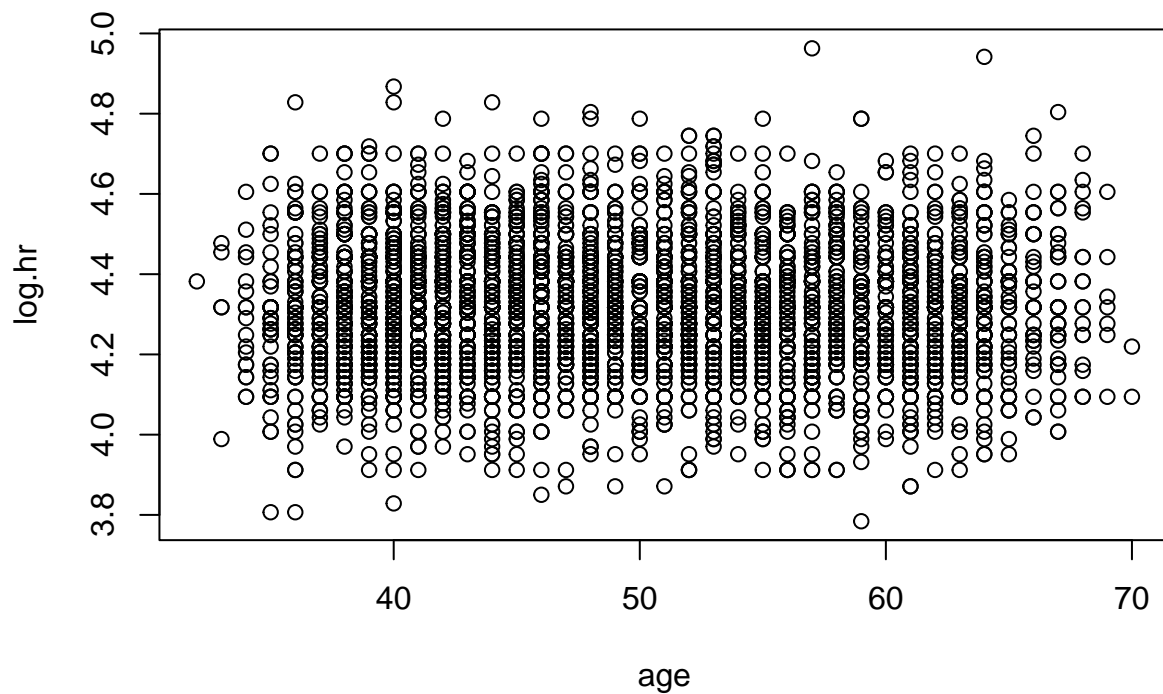
[2737] 4.499810 4.094345 4.442651 4.382027 4.343805 4.234107 4.158883 4.094345
 ## [2745] 4.219508 4.521789 4.442651 4.174387 4.143135 4.204693 4.700480 4.553877
 ## [2753] 4.158883 4.499810 4.276666 4.356709 4.521789 4.204693 4.204693 4.290459
 ## [2761] 4.060443 4.317488 4.276666 4.094345 4.317488 4.430817 4.605170 4.094345
 ## [2769] 4.276666 3.912023 4.248495 4.317488 4.382027 4.248495 4.369448 4.234107
 ## [2777] 4.174387 4.276666 4.382027 4.317488 4.317488 4.174387 4.406719 4.174387
 ## [2785] 4.290459 4.007333 4.248495 4.234107 4.317488 4.127134 4.442651 4.276666
 ## [2793] 4.624973 4.382027 4.382027 4.382027 4.248495 4.521789 4.143135 4.317488
 ## [2801] 4.382027 4.406719 4.248495 4.219508 4.317488 4.317488 4.605170 4.219508
 ## [2809] 4.248495 4.543295 4.564348 4.317488 4.304065 4.553877 4.204693 4.369448
 ## [2817] 4.127134 4.442651 4.382027 4.189655 4.442651 4.248495 4.634729 4.605170
 ## [2825] 4.262680 4.276666 3.970292 4.430817 4.174387 4.127134 4.382027 4.189655
 ## [2833] 4.276666 4.317488 4.382027 4.499810 4.442651 4.317488 4.143135 4.204693
 ## [2841] 4.605170 4.442651 4.276666 4.317488 4.189655 4.248495 4.442651 4.276666
 ## [2849] 4.317488 4.317488 4.605170 4.564348 4.174387 4.094345 4.317488 4.317488
 ## [2857] 4.499810 4.317488 4.158883 4.406719 4.317488 4.248495 4.317488 4.317488
 ## [2865] 4.094345 4.317488 4.248495 4.304065 4.158883 4.317488 4.189655 4.564348
 ## [2873] 4.382027 4.382027 4.234107 4.317488 3.970292 4.442651 4.454347 4.382027
 ## [2881] 4.317488 4.007333 4.356709 4.382027 4.290459 4.025352 4.204693 4.553877
 ## [2889] 4.219508 4.248495 4.442651 3.951244 4.060443 4.382027 4.317488 4.499810
 ## [2897] 4.317488 4.521789 4.382027 4.442651 4.248495 4.262680 4.317488 4.553877
 ## [2905] 4.174387 4.174387 4.454347 4.521789 4.304065 4.317488 4.584967 4.356709
 ## [2913] 4.317488 4.605170 4.605170 4.317488 4.317488 4.174387 4.219508 4.276666
 ## [2921] 4.174387 4.276666 4.787492 4.499810 4.094345 4.248495 4.317488 4.189655
 ## [2929] 4.094345 4.143135 4.605170 4.406719 4.127134 4.248495 4.204693 4.330733
 ## [2937] 4.127134 4.406719 4.382027 4.382027 4.605170 4.317488 4.060443 4.406719
 ## [2945] 4.553877 4.317488 4.382027 4.356709 4.382027 4.317488 4.094345 4.499810
 ## [2953] 4.276666 4.382027 4.317488 4.605170 4.465908 4.317488 4.248495 4.219508
 ## [2961] 4.564348 4.382027 4.248495 4.304065 4.317488 4.158883 4.442651 4.330733
 ## [2969] 4.204693 4.094345 4.430817 4.248495 4.290459 4.382027 4.382027 4.343805
 ## [2977] 4.317488 4.369448 4.248495 4.442651 4.442651 4.219508 4.143135 4.624973
 ## [2985] 4.521789 4.584967 4.248495 4.442651 4.499810 4.317488 4.317488 4.174387
 ## [2993] 4.219508 4.127134 4.605170 4.262680 4.143135 4.204693 3.951244 4.234107
 ## [3001] 4.276666 4.356709 4.454347 4.418841 4.248495 4.382027 4.317488 4.127134
 ## [3009] 4.584967 4.317488 4.143135 4.143135 4.430817 4.127134 4.248495 4.219508
 ## [3017] 4.499810 4.330733 4.382027 4.442651 4.317488 4.060443 4.382027 4.454347
 ## [3025] 4.317488 4.248495 4.553877 4.317488 4.094345 4.317488 4.276666 4.276666
 ## [3033] 3.951244 3.951244 4.382027 3.988984 4.605170 4.653960 4.094345 4.219508
 ## [3041] 4.127134 4.158883 4.499810 4.094345 4.317488 4.248495 4.234107 4.174387
 ## [3049] 4.605170 4.317488 4.174387 4.158883 4.382027 4.143135 4.248495 4.605170
 ## [3057] 4.553877 4.174387 4.406719 4.499810 4.317488 4.382027 4.521789 4.406719
 ## [3065] 4.477337 4.174387 4.234107 3.912023 4.094345 4.382027 4.127134 4.094345
 ## [3073] 4.219508 4.234107 4.454347 4.317488 4.343805 4.499810 4.442651 4.276666
 ## [3081] 4.317488 4.248495 4.025352 4.158883 4.382027 4.158883 4.418841 4.094345
 ## [3089] 4.276666 4.521789 4.219508 4.356709 4.418841 4.330733 4.382027 4.317488
 ## [3097] 4.442651 4.248495 4.700480 4.442651 4.499810 4.317488 4.174387 4.382027
 ## [3105] 4.219508 4.158883 4.499810 4.584967 4.442651 4.382027 4.276666 4.290459
 ## [3113] 4.653960 4.382027 4.276666 4.317488 4.343805 4.382027 4.605170 4.442651
 ## [3121] 4.553877 4.330733 4.330733 4.317488 4.330733 4.158883 4.317488 4.442651
 ## [3129] 4.442651 4.094345 4.094345 4.276666 4.356709 3.988984 4.499810 4.174387
 ## [3137] 4.521789 4.094345 4.248495 4.553877 4.382027 4.442651 4.962845 4.356709
 ## [3145] 4.189655 4.564348 4.499810 4.615121 4.094345 4.356709 4.605170 4.174387
 ## [3153] 4.442651 4.174387 4.262680 4.276666 4.174387 4.477337 4.382027 4.317488
 ## [3161] 4.553877 4.007333 4.219508 4.276666 4.700480 4.553877 4.007333 4.553877

[3169] 4.204693 4.382027 4.248495 4.248495 4.382027 4.317488 4.219508 4.317488
 ## [3177] 4.248495 4.158883 4.382027 4.248495 4.248495 4.543295 4.543295 4.442651
 ## [3185] 4.276666 4.356709 4.454347 4.189655 4.276666 4.262680 4.382027 4.025352
 ## [3193] 4.532599 4.276666 4.700480 4.605170 3.951244 4.276666 4.060443 4.094345
 ## [3201] 4.465908 4.094345 4.499810 4.276666 4.317488 4.382027 4.317488 4.248495
 ## [3209] 4.605170 4.248495 4.189655 4.553877 4.406719 4.477337 4.094345 4.234107
 ## [3217] 4.543295 4.290459 4.553877 4.521789 4.553877 4.248495 4.382027 4.382027
 ## [3225] 4.317488 4.787492 4.382027 4.317488 4.442651 4.442651 4.143135 4.700480
 ## [3233] 4.442651 4.744932 4.442651 4.442651 4.499810 4.094345 4.248495 4.248495
 ## [3241] 4.317488 4.584967 4.744932 4.382027 4.382027 3.912023 3.871201 4.317488
 ## [3249] 4.382027 4.543295 4.382027 4.317488 4.189655 4.406719 4.276666 4.174387
 ## [3257] 4.317488 4.007333 4.174387 4.317488 4.094345 4.060443 4.442651 4.219508
 ## [3265] 4.317488 4.406719 3.912023 4.317488 4.158883 4.418841 4.248495 4.382027
 ## [3273] 4.174387 4.317488 4.317488 4.382027 4.025352 4.605170 4.317488 4.442651
 ## [3281] 4.317488 4.442651 4.499810 4.317488 4.204693 4.382027 4.248495 4.317488
 ## [3289] 4.499810 4.317488 4.060443 4.304065 4.454347 4.317488 4.317488 4.406719
 ## [3297] 4.442651 4.488636 4.418841 4.248495 4.060443 4.094345 4.382027 4.248495
 ## [3305] 4.174387 4.043051 4.094345 4.317488 4.276666 4.394449 4.394449 4.094345
 ## [3313] 4.248495 4.174387 4.174387 4.356709 4.248495 4.174387 4.248495 4.143135
 ## [3321] 4.304065 4.510860 4.276666 4.356709 4.317488 4.317488 4.204693 4.442651
 ## [3329] 4.317488 4.094345 4.094345 4.317488 4.317488 4.174387 4.406719 4.317488
 ## [3337] 4.204693 4.158883 4.442651 4.382027 4.174387 4.442651 4.382027 4.644391
 ## [3345] 4.343805 4.094345 4.442651 4.382027 4.382027 4.060443 4.276666 4.317488
 ## [3353] 4.248495 4.127134 4.290459 4.174387 4.343805 4.290459 4.356709 4.204693
 ## [3361] 4.442651 4.553877 4.174387 4.276666 4.605170 4.418841 4.382027 4.248495
 ## [3369] 4.276666 4.174387 4.369448 4.248495 4.262680 4.143135 4.317488 4.382027
 ## [3377] 4.317488 4.219508 4.454347 4.174387 4.382027 4.094345 4.382027 4.382027
 ## [3385] 4.553877 4.382027 4.454347 4.025352 4.248495 4.234107 4.158883 4.653960
 ## [3393] 4.382027 4.276666 4.584967 4.605170 4.276666 4.317488 4.189655 4.219508
 ## [3401] 4.317488 4.382027 4.499810 4.007333 4.330733 4.276666 4.382027 4.317488
 ## [3409] 4.564348 4.584967 4.317488 4.304065 4.317488 4.276666 4.317488 4.418841
 ## [3417] 4.248495 4.174387 4.442651 4.204693 4.553877 4.317488 4.174387 4.553877
 ## [3425] 4.430817 4.653960 4.317488 4.317488 4.317488 4.043051 4.356709 4.317488
 ## [3433] 4.234107 4.174387 4.418841 4.317488 4.477337 4.174387 4.174387 4.499810
 ## [3441] 4.094345 4.317488 4.219508 4.605170 4.330733 4.317488 4.204693 4.605170
 ## [3449] 4.174387 4.499810 4.406719 4.219508 4.430817 4.317488 4.143135 4.605170
 ## [3457] 4.700480 4.317488 4.330733 4.330733 4.343805 4.553877 4.304065 4.382027
 ## [3465] 4.382027 4.248495 4.219508 4.454347 4.219508 4.094345 4.043051 4.406719
 ## [3473] 4.382027 4.248495 4.499810 4.025352 4.317488 4.317488 4.219508 4.499810
 ## [3481] 4.382027 4.234107 4.127134 4.317488 4.317488 4.477337 4.317488 4.369448
 ## [3489] 4.564348 4.564348 4.304065 4.317488 4.553877 4.382027 4.219508 4.672829
 ## [3497] 4.317488 4.143135 4.442651 4.317488 4.290459 4.317488 4.043051 4.499810
 ## [3505] 4.488636 4.653960 4.174387 4.189655 4.406719 4.624973 4.584967 4.521789
 ## [3513] 4.543295 4.262680 4.382027 4.143135 4.317488 4.369448 4.219508 4.174387
 ## [3521] 4.499810 4.382027 4.477337 4.174387 4.317488 4.174387 4.442651 4.382027
 ## [3529] 4.127134 4.174387 4.248495 4.369448 4.290459 4.219508 4.189655 4.304065
 ## [3537] 4.189655 4.382027 4.094345 4.317488 4.276666 4.382027 4.382027 4.382027
 ## [3545] 4.094345 4.127134 4.356709 4.143135 4.317488 4.605170 4.343805 4.499810
 ## [3553] 4.499810 4.634729 4.189655 4.553877 4.564348 4.499810 4.442651 4.276666
 ## [3561] 4.356709 4.276666 4.174387 4.317488 4.317488 4.317488 4.219508 4.465908
 ## [3569] 4.094345 4.276666 4.382027 4.442651 4.094345 4.700480 4.094345 4.248495
 ## [3577] 4.605170 4.204693 4.477337 4.189655 4.174387 4.343805 4.276666 4.499810
 ## [3585] 4.521789 4.744932 4.276666 4.248495 4.127134 4.276666 4.382027 4.219508
 ## [3593] 4.442651 4.204693 4.442651 4.442651 4.094345 4.276666 4.521789 4.442651

[3601] 4.276666 4.605170 4.442651 4.174387 4.007333 4.499810 4.317488 4.605170
 ## [3609] 4.248495 4.369448 4.382027 4.564348 4.382027 4.394449 4.189655 4.418841
 ## [3617] 4.532599 4.488636 4.477337 4.442651 4.248495 4.007333 4.510860 4.406719
 ## [3625] 4.605170 4.317488 4.442651 4.406719 4.317488 4.442651 4.406719 4.174387
 ## [3633] 4.219508 4.248495 4.317488 4.174387 4.204693 4.521789 4.317488 4.276666
 ## [3641] 4.248495 4.317488 4.317488 4.143135 4.094345 4.174387 4.158883 4.043051
 ## [3649] 4.442651 4.025352 4.025352 4.477337 4.317488 4.248495 4.317488 4.043051
 ## [3657] 4.442651 4.605170 4.442651 4.382027 4.317488 4.317488 4.382027 4.317488
 ## [3665] 4.204693 4.234107 4.382027 4.234107 4.330733 4.248495 4.499810 4.094345
 ## [3673] 4.382027 4.382027 4.343805 4.382027 4.317488 4.094345 4.499810 4.499810
 ## [3681] 4.454347 4.369448 4.317488 4.174387 4.317488 4.343805 4.317488 4.454347
 ## [3689] 4.317488 4.442651 4.356709 4.219508 4.094345 4.127134 4.564348 4.174387
 ## [3697] 4.465908 4.510860 4.418841 4.094345 4.317488 4.094345 4.499810 4.317488
 ## [3705] 4.477337 4.605170 4.094345 4.248495 4.382027 4.406719 4.174387 4.317488
 ## [3713] 4.317488 4.276666 4.043051 4.553877 4.234107 4.276666 4.094345 4.382027
 ## [3721] 4.007333 4.406719 4.317488 4.174387 4.317488 4.127134 4.382027 4.317488
 ## [3729] 4.094345 4.025352 4.382027 4.499810 4.442651 4.465908 4.174387 4.094345
 ## [3737] 4.143135 4.454347 4.276666 4.317488 3.806662 4.094345 4.430817 4.174387
 ## [3745] 4.127134 4.317488 4.248495 4.787492 4.189655 4.356709 4.605170 4.317488
 ## [3753] 4.454347 4.248495 4.248495 4.094345 4.521789 4.189655 4.317488 4.189655
 ## [3761] 4.317488 4.382027 4.174387 4.442651 4.317488 4.174387 4.204693 4.248495
 ## [3769] 4.174387 4.330733 4.382027 4.262680 4.219508 4.682131 4.442651 4.382027
 ## [3777] 4.060443 4.382027 4.382027 4.143135 4.356709 4.406719 4.418841 4.553877
 ## [3785] 4.382027 4.382027 4.317488 4.276666 4.382027 4.499810 4.382027 4.317488
 ## [3793] 4.382027 4.174387 4.499810 4.204693 4.317488 4.330733 4.356709 4.521789
 ## [3801] 4.700480 4.442651 4.007333 4.317488 4.174387 4.499810 4.317488 4.143135
 ## [3809] 4.317488 4.382027 4.317488 4.382027 4.174387 4.317488 4.248495 4.406719
 ## [3817] 4.382027 4.219508 4.624973 4.744932 4.248495 4.234107 4.442651 4.442651
 ## [3825] 4.158883 4.248495 4.262680 4.025352 4.382027 4.276666 4.477337 4.499810
 ## [3833] 4.276666 4.317488 4.204693 4.189655 4.499810 4.343805 4.317488 4.204693
 ## [3841] 4.174387 4.564348 4.174387 4.499810 4.700480 4.094345 4.143135 4.369448
 ## [3849] 4.382027 4.317488 4.234107 4.248495 4.094345 4.060443 4.094345 4.219508
 ## [3857] 4.143135 4.382027 4.317488 4.605170 4.317488 4.248495 4.804021 4.276666
 ## [3865] 4.219508 4.477337 4.174387 4.553877 4.553877 4.382027 4.454347 4.317488
 ## [3873] 4.356709 4.094345 4.442651 4.700480 4.276666 4.605170 3.871201 4.406719
 ## [3881] 4.174387 4.430817 4.564348 4.553877 4.499810 4.343805 4.189655 4.477337
 ## [3889] 4.317488 4.605170 4.382027 4.499810 4.094345 4.143135 4.369448 4.406719
 ## [3897] 4.430817 4.317488 4.442651 4.248495 4.174387 4.787492 4.276666 4.317488
 ## [3905] 4.290459 4.382027 4.317488 4.369448 4.605170 4.553877 4.442651 4.382027
 ## [3913] 4.682131 4.442651 4.127134 4.499810 4.382027 4.605170 4.127134 4.143135
 ## [3921] 4.317488 4.219508 4.304065 4.317488 4.553877 4.442651 4.158883 4.382027
 ## [3929] 4.276666 4.499810 4.304065 4.499810 4.317488 4.304065 4.369448 4.248495
 ## [3937] 4.317488 4.521789 4.477337 4.477337 4.499810 4.094345 4.007333 4.276666
 ## [3945] 4.624973 4.356709 4.317488 4.276666 4.442651 4.219508 4.304065 4.290459
 ## [3953] 4.317488 4.382027 4.276666 4.127134 4.382027 4.700480 4.204693 4.248495
 ## [3961] 4.174387 4.499810 4.382027 4.317488 4.700480 4.276666 4.158883 4.406719
 ## [3969] 4.382027 4.442651 4.189655 4.553877 4.406719 4.158883 4.442651 4.477337
 ## [3977] 4.543295 4.477337 4.343805 4.094345 4.442651 4.382027 4.382027 4.442651
 ## [3985] 4.060443 4.007333 4.624973 4.465908 4.382027 4.290459 4.276666 4.094345
 ## [3993] 4.369448 4.454347 4.521789 4.290459 4.219508 4.276666 4.174387 4.499810
 ## [4001] 4.248495 4.406719 4.143135 4.219508 4.143135 4.454347 4.219508 4.418841
 ## [4009] 4.553877 4.317488 4.317488 4.465908 4.276666 4.369448 4.442651 4.248495
 ## [4017] 4.290459 4.204693 4.317488 4.499810 4.276666 4.290459 4.143135 4.317488
 ## [4025] 4.317488 4.204693 4.382027 4.143135 4.143135 4.442651 4.094345 4.477337

```
## [4033] 4.356709 4.564348 4.564348 4.317488 4.605170 4.189655 4.248495 4.442651
## [4041] 4.605170 4.317488 4.553877 4.382027 4.442651 4.094345 4.094345 4.406719
## [4049] 4.369448 4.248495 4.382027 4.382027 4.174387 4.828314 4.060443 4.219508
## [4057] 4.382027 4.248495 4.204693 4.094345 4.094345 3.988984 4.382027 4.477337
## [4065] 4.499810 4.290459 4.317488 4.094345 4.454347 4.094345 4.828314 4.477337
## [4073] 4.204693 4.248495 4.382027 4.382027 4.219508 4.317488 4.356709 4.248495
## [4081] 4.477337 4.382027 4.317488 4.406719 4.204693 4.060443 4.499810 4.499810
## [4089] 4.564348 4.219508 4.382027 4.317488 4.158883 4.189655 4.343805 4.382027
## [4097] 4.499810 4.317488 4.442651 4.290459 4.248495 4.007333 4.248495 4.382027
## [4105] 4.406719 4.248495 4.442651 4.276666 4.499810 4.605170 4.248495 4.442651
## [4113] 4.219508 4.330733 4.174387 4.543295 4.234107 4.189655 4.543295 4.406719
## [4121] 4.382027 4.276666 4.276666 4.584967 3.912023 4.219508 4.143135 4.317488
## [4129] 4.007333 4.442651 4.317488 4.343805 4.442651 4.158883 4.382027 4.382027
## [4137] 4.189655 4.317488 4.276666 4.317488 4.430817 4.276666 4.382027 4.317488
## [4145] 4.499810 4.248495 4.204693 4.382027 4.442651 4.442651 4.060443 4.382027
## [4153] 4.174387 4.382027 4.248495 4.219508 4.317488 4.219508 4.094345 4.442651
## [4161] 4.276666 4.343805 4.234107 3.951244 4.718499 4.477337 4.276666 4.317488
## [4169] 4.317488 4.317488 4.465908 4.317488 4.234107 4.219508 4.248495 4.406719
## [4177] 4.174387 4.369448 4.219508 4.143135 4.094345 4.521789 4.248495 4.248495
## [4185] 4.477337 4.248495 4.094345 4.521789 4.521789 4.382027 4.317488 4.143135
## [4193] 4.174387 4.317488 4.553877 3.828641 4.317488 4.369448 4.276666 4.499810
## [4201] 4.174387 4.317488 4.442651 4.317488 4.143135 4.317488 4.488636 4.007333
## [4209] 4.248495 4.248495 4.442651 4.174387 4.430817 4.317488 4.330733 4.356709
## [4217] 4.248495 4.553877 4.276666 4.174387 4.317488 4.382027 4.248495 4.499810
## [4225] 4.317488 4.418841 4.204693 4.382027 4.442651 4.317488 4.043051 4.382027
## [4233] 4.094345 4.189655 4.174387 4.430817 4.454347 4.382027 4.204693 4.442651
```

```
plot( age, log.hr )
```



not much better :(

gender model

```
gender.model <- lm( heartRate ~ is.female )
summary( gender.model )
```

```
##
## Call:
## lm(formula = heartRate ~ is.female)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.098  -8.257  -2.098   6.902  65.902
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  74.2573     0.2801  265.153 < 2e-16 ***
## is.female     2.8406     0.3707   7.664 2.22e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.94 on 4237 degrees of freedom
## (1 observation deleted due to missingness)
```

```
## Multiple R-squared:  0.01367,    Adjusted R-squared:  0.01344
## F-statistic: 58.74 on 1 and 4237 DF,  p-value: 2.222e-14
```

```
anova( gender.model )
```

```
## Analysis of Variance Table
##
## Response: heartRate
##              Df Sum Sq Mean Sq F value    Pr(>F)
## is.female     1   8380  8379.5   58.736 2.222e-14 ***
## Residuals 4237 604473   142.7
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#plot <- (is.female, heartRate )
```

bmi model

```
BMI.model <- lm( heartRate ~ BMI )
summary(BMI.model)
```

```
##
## Call:
## lm(formula = heartRate ~ BMI)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.755  -8.229  -0.988   6.820  68.731
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  70.74697    1.18313   59.797 < 2e-16 ***
## BMI           0.19888    0.04529    4.391 1.16e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12 on 4218 degrees of freedom
## (20 observations deleted due to missingness)
## Multiple R-squared:  0.00455,    Adjusted R-squared:  0.004314
## F-statistic: 19.28 on 1 and 4218 DF,  p-value: 1.158e-05
```

```
anova(BMI.model)
```

```
## Analysis of Variance Table
##
## Response: heartRate
##              Df Sum Sq Mean Sq F value    Pr(>F)
## BMI           1   2778 2777.71  19.278 1.158e-05 ***
## Residuals 4218 607756   144.09
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
diabetes.model <- lm( heartRate ~ diabetes )
summary(diabetes.model)
```

```
##
## Call:
## lm(formula = heartRate ~ diabetes)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.783  -7.783  -0.783   7.217  67.217
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  75.7833     0.1869  405.435 < 2e-16 ***
## diabetes      3.7213     1.1657   3.192  0.00142 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.01 on 4237 degrees of freedom
## (1 observation deleted due to missingness)
## Multiple R-squared:  0.0024, Adjusted R-squared:  0.002164
## F-statistic: 10.19 on 1 and 4237 DF,  p-value: 0.001421
```

```
anova(diabetes.model)
```

```
## Analysis of Variance Table
##
## Response: heartRate
##           Df Sum Sq Mean Sq F value    Pr(>F)
## diabetes    1  1471  1470.6   10.192 0.001421 **
## Residuals 4237 611382   144.3
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

glu. model

```
glucose.model <- lm( heartRate ~ glucose )
summary(glucose.model)
```

```
##
## Call:
## lm(formula = heartRate ~ glucose)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.832  -8.170  -0.782   6.594  67.594
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept) 71.875266 0.682222 105.355 < 2e-16 ***
## glucose 0.047075 0.007989 5.892 4.14e-09 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.88 on 3849 degrees of freedom
## (389 observations deleted due to missingness)
## Multiple R-squared: 0.008939, Adjusted R-squared: 0.008682
## F-statistic: 34.72 on 1 and 3849 DF, p-value: 4.14e-09
```

```
anova( glucose.model)
```

```
## Analysis of Variance Table
##
## Response: heartRate
##          Df Sum Sq Mean Sq F value    Pr(>F)
## glucose    1  4897  4896.7   34.717 4.14e-09 ***
## Residuals 3849 542890   141.0
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
cigar.model <- lm( heartRate ~ cigsPerDay )
summary(cigar.model)
```

```
##
## Call:
## lm(formula = heartRate ~ cigsPerDay)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.322  -8.180  -0.865   6.820  67.820
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 75.17976    0.23148  324.777 < 2e-16 ***
## cigsPerDay  0.07617    0.01549   4.916 9.18e-07 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.99 on 4208 degrees of freedom
## (30 observations deleted due to missingness)
## Multiple R-squared: 0.00571, Adjusted R-squared: 0.005474
## F-statistic: 24.17 on 1 and 4208 DF, p-value: 9.176e-07
```

```
anova(cigar.model)
```

```
## Analysis of Variance Table
##
## Response: heartRate
##          Df Sum Sq Mean Sq F value    Pr(>F)
## cigsPerDay    1  3471  3471.4   24.166 9.176e-07 ***
## Residuals 4208 604477   143.6
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```


sysBP

```
sysBP.model <- lm( heartRate ~ sysBP )
summary(sysBP.model)
```

```
##
## Call:
## lm(formula = heartRate ~ sysBP)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -29.850  -8.149  -1.016   6.614  67.056
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 62.718059   1.106422   56.69  <2e-16 ***
## sysBP        0.099444   0.008247   12.06  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.83 on 4237 degrees of freedom
## (1 observation deleted due to missingness)
## Multiple R-squared:  0.03318,    Adjusted R-squared:  0.03295
## F-statistic: 145.4 on 1 and 4237 DF,  p-value: < 2.2e-16
```

```
anova(sysBP.model)
```

```
## Analysis of Variance Table
##
## Response: heartRate
##              Df Sum Sq Mean Sq F value    Pr(>F)
## sysBP          1  20335  20334.8   145.41 < 2.2e-16 ***
## Residuals    4237  592518    139.8
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

smoking

```
smoking.model <- lm ( heartRate ~ is.smoker )
summary( smoking.model )
```

```
##
## Call:
## lm(formula = heartRate ~ is.smoker)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.642  -8.134  -1.642   6.866  67.866
```

```
##
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept)  75.1343      0.2592 289.906 < 2e-16 ***
## is.smoker    1.5076      0.3687   4.088 4.42e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12 on 4237 degrees of freedom
## (1 observation deleted due to missingness)
## Multiple R-squared:  0.00393,    Adjusted R-squared:  0.003694
## F-statistic: 16.72 on 1 and 4237 DF,  p-value: 4.424e-05
```

```
anova( smoking.model )
```

```
## Analysis of Variance Table
##
## Response: heartRate
##           Df Sum Sq Mean Sq F value    Pr(>F)
## is.smoker   1   2408  2408.21  16.715 4.424e-05 ***
## Residuals 4237 610445   144.07
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

chol

```
chol.model <- lm( heartRate ~ totChol )
summary(chol.model)
```

```
##
## Call:
## lm(formula = heartRate ~ totChol)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.661  -8.227  -1.128   6.789  66.650
##
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) 70.028228   1.000602  69.986 < 2e-16 ***
## totChol      0.024598   0.004154   5.921 3.45e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.99 on 4187 degrees of freedom
## (51 observations deleted due to missingness)
## Multiple R-squared:  0.008304,    Adjusted R-squared:  0.008067
## F-statistic: 35.06 on 1 and 4187 DF,  p-value: 3.453e-09
```

```
anova(chol.model)
```

```
## Analysis of Variance Table
```

```
##
```

```
## Response: heartRate
```

```
##           Df Sum Sq Mean Sq F value    Pr(>F)
```

```
## totChol      1    5039   5039.4    35.06 3.453e-09 ***
```

```
## Residuals 4187 601817    143.7
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```