

```

library(readr)
> MultReg_22_1 <- read_csv("MultReg_22_1.csv")
Parsed with column specification:
cols(
  .default = col_double(),
  cyclingrate = col_integer()
)
See spec(...) for full column specifications.
> View(MultReg_22_1)
>
> # Rename the data
> multreg1 <- MultReg_22_1
>
> # Run the multiple regression of the cyclingrate on the entire set at once. Summarize the set to view its
> # characteristics.
>
> fit1 <- lm(cyclingrate~., data = multreg1)
> summary(fit1)

```

```

Call:
lm(formula = cyclingrate ~ ., data = multreg1)

```

Residuals:

```

      1      2      3      4      5      6      7
8      9     10     11     12     13     14     15     16     17     18     19
-0.089882 0.264055 -0.101739 0.191536 0.228545 -0.386855 0.310871 -0.3
13562 0.210374 0.461239 -0.083294 -0.077980
      20     21     22     23     24     25
-0.479312 0.021360 0.098372 0.005393 0.096420 -0.046274 0.040859 -0.0
33898 -0.103743 0.073560 0.051021 -0.133193
-0.203874

```

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.277e+02	2.093e+01	6.101	0.0258 *
culturalsocial_1km	2.581e-01	1.237e-01	2.086	0.1723
ALG_15to65	7.718e-01	2.665e-01	2.896	0.1014
hh.children	-1.180e+00	2.295e-01	-5.143	0.0358 *
over65	-8.259e-01	3.052e-01	-2.706	0.1137
cyclespr_dev	-1.814e+00	1.013e+00	-1.791	0.2151
med_stammsdist	8.865e-04	5.503e-04	1.611	0.2485
emp_density.dev	-1.712e-04	5.546e-04	-0.309	0.7867
autobahn_dev	-7.375e-01	1.040e+00	-0.709	0.5517
bldgofdev	-2.573e+01	1.148e+01	-2.241	0.1543
busstops_1km	-4.795e-01	1.255e-01	-3.821	0.0622 .
tertiary_dev	6.537e+00	1.600e+00	4.086	0.0550 .
sbahn_density.dev	1.215e+01	2.480e+00	4.899	0.0392 *
trunkprimary_dev	1.814e-03	6.416e-04	2.827	0.1056
sidestreets_dev	6.222e-01	4.682e-01	1.329	0.3152
med_ubahndist	1.956e-03	8.984e-04	2.177	0.1615
fahrradstrasse_dev	2.549e-04	1.005e-04	2.536	0.1266
job_density.dev	-2.024e-04	1.986e-04	-1.019	0.4153
infraofdev	-1.620e+02	2.181e+01	-7.427	0.0176 *
resofdev	-1.462e+01	1.241e+01	-1.178	0.3598
med_parkdist	-9.128e-02	1.814e-02	-5.033	0.0373 *
pedway_dev	-4.215e-01	1.675e-01	-2.517	0.1282
med_sbahndist	2.294e-04	7.042e-04	0.326	0.7756

```

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

```

Residual standard error: 0.7497 on 2 degrees of freedom
Multiple R-squared: 0.9974, Adjusted R-squared: 0.9684
F-statistic: 34.38 on 22 and 2 DF, p-value: 0.02863

```
>
> # Examine the results and remove the least significant variable from a new CSV spreadsheet, repeat from the first step
> # until all variables in the set are significant.
> multreg2 <- subset(multreg1, select=-c(emp_density.dev))
> view(multreg2)
> view(multreg1)
> fit2 <- lm(cyclingrate~., data = multreg2)
> summary(fit2)
```

Call:
lm(formula = cyclingrate ~ ., data = multreg2)

Residuals:

	1	2	3	4	5	6	7
8	9	10	11	12			
-0.069464	0.318323	-0.140031	0.230487	0.101308	-0.426807	0.320583	-0.310114
0.195386	0.536054	-0.096586	-0.056692				
13	14	15	16	17	18	19	
20	21	22	23	24			
-0.394060	-0.035774	0.122080	0.026724	0.147060	-0.083748	-0.002184	-0.073607
-0.086921	0.063897	0.031271	-0.161748				
25							
-0.155435							

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	1.280e+02	1.746e+01	7.333	0.00524	**
culturalsocial_1km	2.577e-01	1.034e-01	2.492	0.08830	.
ALG_15to65	7.538e-01	2.173e-01	3.468	0.04039	*
hh.children	-1.146e+00	1.675e-01	-6.842	0.00639	**
over65	-7.617e-01	1.866e-01	-4.082	0.02656	*
cyclespr_dev	-1.661e+00	7.378e-01	-2.251	0.10980	
med_stammsdist	8.757e-04	4.590e-04	1.908	0.15241	
autobahn_dev	-8.031e-01	8.508e-01	-0.944	0.41482	
bldgofdev	-2.589e+01	9.587e+00	-2.700	0.07377	.
busstops_1km	-4.773e-01	1.047e-01	-4.559	0.01979	*
tertiary_dev	6.396e+00	1.281e+00	4.992	0.01546	*
sbahn_density.dev	1.216e+01	2.072e+00	5.867	0.00988	**
trunkprimary_dev	1.885e-03	5.010e-04	3.762	0.03284	*
sidestreets_dev	6.156e-01	3.909e-01	1.575	0.21339	
med_ubahndist	1.981e-03	7.476e-04	2.650	0.07697	.
fahrradstrasse_dev	2.321e-04	5.698e-05	4.074	0.02669	*
job_density.dev	-2.107e-04	1.644e-04	-1.281	0.29017	
infraofdev	-1.647e+02	1.659e+01	-9.928	0.00217	**
resofdev	-1.665e+01	8.794e+00	-1.894	0.15457	
med_parkdist	-9.346e-02	1.396e-02	-6.695	0.00680	**
pedway_dev	-4.465e-01	1.225e-01	-3.644	0.03565	*
med_sbahndist	1.686e-04	5.651e-04	0.298	0.78486	

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

Residual standard error: 0.6265 on 3 degrees of freedom
Multiple R-squared: 0.9972, Adjusted R-squared: 0.9779
F-statistic: 51.57 on 21 and 3 DF, p-value: 0.003787

```
> multreg3 <- subset(multreg2, select=-c(med_sbahndist))
```

```
> View(multreg3)
> fit3 <- lm(cyclingrate~., data = multreg3)
> summary(fit3)
```

```
Call:
lm(formula = cyclingrate ~ ., data = multreg3)
```

```
Residuals:
    1      2      3      4      5      6
    7      8      9     10     11     12
-0.0582400  0.3237216 -0.1731651  0.2893300  0.0543005 -0.4258019  0.29076
32 -0.2934610  0.1542916  0.4949453 -0.0575445
    13     14     15     16     17
    18     19     20     21     22
-0.0546162 -0.4690036  0.0234655  0.1705173 -0.0166539  0.1633758 -0.09748
82  0.0451534 -0.0590725 -0.0622389  0.0857353
    23     24     25
-0.0006216 -0.2090479 -0.1186444
```

```
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.265e+02  1.461e+01   8.656  0.00098 ***
culturalsocial_1km  2.409e-01  7.618e-02   3.162  0.03411 *
ALG_15to65      7.235e-01  1.688e-01   4.286  0.01278 *
hh.children     -1.127e+00  1.359e-01  -8.293  0.00115 **
over65         -7.416e-01  1.530e-01  -4.846  0.00836 **
cyclespr_dev    -1.559e+00  5.750e-01  -2.712  0.05343 .
med_stammsdist  8.007e-04  3.374e-04   2.373  0.07657 .
autobahn_dev    -5.968e-01  4.359e-01  -1.369  0.24279
bldgofdev      -2.574e+01  8.415e+00  -3.060  0.03768 *
busstops_1km   -4.740e-01  9.149e-02  -5.181  0.00660 **
tertiary_dev    6.650e+00  8.414e-01   7.904  0.00139 **
sbahn_density.dev  1.190e+01  1.655e+00   7.189  0.00198 **
trunkprimary_dev  1.806e-03  3.740e-04   4.828  0.00847 **
sidestreets_dev  6.476e-01  3.303e-01   1.961  0.12144
med_ubahndist   1.806e-03  4.058e-04   4.450  0.01125 *
fahrradstrasse_dev  2.408e-04  4.299e-05   5.602  0.00498 **
job_density.dev -1.701e-04  8.134e-05  -2.092  0.10464
infraofdev     -1.644e+02  1.455e+01 -11.300  0.00035 ***
resofdev       -1.648e+01  7.710e+00  -2.137  0.09943 .
med_parkdist    -9.184e-02  1.130e-02  -8.127  0.00125 **
pedway_dev     -4.196e-01  7.292e-02  -5.754  0.00453 **
---
```

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

```
Residual standard error: 0.5506 on 4 degrees of freedom
Multiple R-squared:  0.9972, Adjusted R-squared:  0.9829
F-statistic: 70.11 on 20 and 4 DF, p-value: 0.0004375
```

```
> multreg4 <- subset(multreg3, select=-c(autobahn_dev))
> View(multreg4)
> fit4 <- lm(cyclingrate~., data = multreg4)
> summary(fit4)
```

```
Call:
lm(formula = cyclingrate ~ ., data = multreg4)
```

```
Residuals:
    1      2      3      4      5      6      7
    8      9     10     11     12
-0.036668  0.326574 -0.021852  0.063844 -0.210010 -0.329697  0.051390 -0.2
27652  0.394604  0.729896 -0.137237 -0.270672
```

	13	14	15	16	17	18	19
20	21	22	23	24			
-0.531055	0.180596	0.113189	-0.082583	0.313312	-0.085129	0.285508	-0.139755
	0.085406	0.022918	0.001838	-0.183668			
	25						
	-0.313095						

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.153e+02	1.312e+01	8.783	0.000317 ***
culturalsocial_1km	2.248e-01	8.158e-02	2.755	0.040067 *
ALG_15to65	6.797e-01	1.796e-01	3.784	0.012840 *
hh.children	-1.033e+00	1.270e-01	-8.129	0.000457 ***
over65	-6.674e-01	1.551e-01	-4.303	0.007696 **
cyclespr_dev	-1.365e+00	6.039e-01	-2.260	0.073339 .
med_stammsdist	5.055e-04	2.813e-04	1.797	0.132298
bldgofdev	-2.091e+01	8.280e+00	-2.526	0.052806 .
busstops_1km	-4.268e-01	9.187e-02	-4.646	0.005602 **
tertiary_dev	6.772e+00	9.069e-01	7.468	0.000680 ***
sbahn_density.dev	1.107e+01	1.671e+00	6.627	0.001178 **
trunkprimary_dev	1.574e-03	3.616e-04	4.354	0.007333 **
sidestreets_dev	6.406e-01	3.580e-01	1.790	0.133551
med_ubahndist	1.397e-03	2.975e-04	4.694	0.005365 **
fahrradstrasse_dev	2.543e-04	4.536e-05	5.607	0.002494 **
job_density.dev	-1.032e-04	7.048e-05	-1.465	0.202922
infraofdev	-1.549e+02	1.387e+01	-11.169	0.000100 ***
resofdev	-1.418e+01	8.157e+00	-1.738	0.142662
med_parkdist	-8.785e-02	1.183e-02	-7.423	0.000699 ***
pedway_dev	-3.834e-01	7.366e-02	-5.204	0.003455 **

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

Residual standard error: 0.5968 on 5 degrees of freedom
Multiple R-squared: 0.9958, Adjusted R-squared: 0.9799
F-statistic: 62.73 on 19 and 5 DF, p-value: 0.0001107

```
> view(multreg1)
> multreg5 <- subset(multreg4, select=-c(job_density.dev))
> view(multreg5)
>
> fit5 <- lm(cyclingrate~., data = multreg5)
> summary(fit5)
```

Call:
lm(formula = cyclingrate ~ ., data = multreg5)

Residuals:

Min	1Q	Median	3Q	Max
-0.63435	-0.26783	-0.02821	0.25414	0.52932

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.172e+02	1.425e+01	8.225	0.000174 ***
culturalsocial_1km	2.441e-01	8.785e-02	2.779	0.032057 *
ALG_15to65	5.562e-01	1.731e-01	3.213	0.018288 *
hh.children	-1.020e+00	1.383e-01	-7.377	0.000318 ***
over65	-6.813e-01	1.690e-01	-4.033	0.006859 **
cyclespr_dev	-1.475e+00	6.539e-01	-2.256	0.064914 .
med_stammsdist	5.148e-04	3.069e-04	1.677	0.144470
bldgofdev	-2.587e+01	8.246e+00	-3.137	0.020135 *
busstops_1km	-4.559e-01	9.788e-02	-4.658	0.003475 **
tertiary_dev	6.906e+00	9.846e-01	7.014	0.000419 ***

sbahn_density.dev	1.101e+01	1.823e+00	6.037	0.000934	***
trunkprimary_dev	1.582e-03	3.945e-04	4.011	0.007033	**
sidestreets_dev	5.454e-01	3.842e-01	1.420	0.205468	
med_ubahndist	1.395e-03	3.247e-04	4.296	0.005117	**
fahrradstrasse_dev	2.605e-04	4.928e-05	5.287	0.001854	**
infraofdev	-1.544e+02	1.513e+01	-10.206	5.16e-05	***
resofdev	-8.184e+00	7.699e+00	-1.063	0.328730	
med_parkdist	-8.803e-02	1.291e-02	-6.817	0.000489	***
pedway_dev	-3.463e-01	7.550e-02	-4.587	0.003742	**

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

Residual standard error: 0.6512 on 6 degrees of freedom
Multiple R-squared: 0.994, Adjusted R-squared: 0.9761
F-statistic: 55.5 on 18 and 6 DF, p-value: 3.387e-05

```
> multreg6 <- subset(multreg5, select=-c(resofdev))
> View(multreg6)
> fit6 <- lm(cyclingrate~., data = multreg6)
> summary(fit6)
```

Call:

```
lm(formula = cyclingrate ~ ., data = multreg6)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.72716	-0.23369	-0.03842	0.23251	0.64223

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	1.198e+02	1.417e+01	8.457	6.38e-05	***
culturalsocial_1km	3.270e-01	4.080e-02	8.014	9.02e-05	***
ALG_15to65	5.545e-01	1.747e-01	3.174	0.015613	*
hh.children	-9.927e-01	1.371e-01	-7.240	0.000171	***
over65	-7.022e-01	1.694e-01	-4.146	0.004317	**
cyclespr_dev	-1.528e+00	6.580e-01	-2.323	0.053191	.
med_stammsdist	5.457e-04	3.084e-04	1.770	0.120067	
bldgofdev	-2.826e+01	8.006e+00	-3.530	0.009601	**
busstops_1km	-4.809e-01	9.590e-02	-5.014	0.001540	**
tertiary_dev	6.195e+00	7.291e-01	8.496	6.20e-05	***
sbahn_density.dev	1.113e+01	1.836e+00	6.062	0.000510	***
trunkprimary_dev	1.860e-03	2.984e-04	6.233	0.000431	***
sidestreets_dev	2.304e-01	2.467e-01	0.934	0.381326	
med_ubahndist	1.478e-03	3.181e-04	4.646	0.002353	**
fahrradstrasse_dev	2.629e-04	4.969e-05	5.291	0.001134	**
infraofdev	-1.553e+02	1.525e+01	-10.181	1.90e-05	***
med_parkdist	-9.234e-02	1.237e-02	-7.462	0.000142	***
pedway_dev	-3.863e-01	6.605e-02	-5.848	0.000632	***

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

Residual standard error: 0.6572 on 7 degrees of freedom
Multiple R-squared: 0.9929, Adjusted R-squared: 0.9757
F-statistic: 57.63 on 17 and 7 DF, p-value: 7.054e-06

```
> multreg7 <- subset(multreg6, select=-c(sidestreets_dev))
> View(multreg7)
>
> fit7 <- lm(cyclingrate~., data = multreg7)
> summary(fit7)
```

Call:

```
lm(formula = cyclingrate ~ ., data = multreg7)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.86056	-0.31417	-0.04913	0.26528	0.68555

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	1.123e+02	1.159e+01	9.694	1.07e-05	***
culturalsocial_1km	3.290e-01	4.042e-02	8.138	3.86e-05	***
ALG_15to65	5.494e-01	1.732e-01	3.172	0.013159	*
hh.children	-9.228e-01	1.140e-01	-8.096	4.01e-05	***
over65	-5.629e-01	7.980e-02	-7.054	0.000107	***
cyclespr_dev	-1.098e+00	4.660e-01	-2.356	0.046256	*
med_stammsdist	3.229e-04	1.939e-04	1.666	0.134340	
bldgofdev	-2.273e+01	5.344e+00	-4.253	0.002789	**
busstops_1km	-4.418e-01	8.559e-02	-5.161	0.000862	***
tertiary_dev	5.848e+00	6.226e-01	9.393	1.35e-05	***
sbahn_density.dev	1.043e+01	1.662e+00	6.274	0.000239	***
trunkprimary_dev	1.829e-03	2.942e-04	6.217	0.000255	***
med_ubahndist	1.267e-03	2.223e-04	5.699	0.000455	***
fahrradstrasse_dev	2.496e-04	4.721e-05	5.286	0.000741	***
infraofdev	-1.490e+02	1.361e+01	-10.953	4.28e-06	***
med_parkdist	-8.921e-02	1.182e-02	-7.548	6.62e-05	***
pedway_dev	-4.100e-01	6.051e-02	-6.775	0.000141	***

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

Residual standard error: 0.652 on 8 degrees of freedom

Multiple R-squared: 0.992, Adjusted R-squared: 0.9761

F-statistic: 62.17 on 16 and 8 DF, p-value: 1.278e-06

```
> multreg8 <- subset(multreg7, select=-c(med_stammsdist))
```

```
> View(multreg8)
```

```
>
```

```
> fit8 <- lm(cyclingrate~., data = multreg8)
```

```
> summary(fit8)
```

Call:

```
lm(formula = cyclingrate ~ ., data = multreg8)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.74002	-0.31148	-0.04803	0.24882	1.10214

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	9.929e+01	9.354e+00	10.614	2.17e-06	***
culturalsocial_1km	3.081e-01	4.205e-02	7.327	4.44e-05	***
ALG_15to65	5.022e-01	1.870e-01	2.686	0.024952	*
hh.children	-7.725e-01	7.620e-02	-10.138	3.19e-06	***
over65	-4.926e-01	7.410e-02	-6.648	9.39e-05	***
cyclespr_dev	-5.674e-01	3.723e-01	-1.524	0.161783	
bldgofdev	-1.718e+01	4.575e+00	-3.756	0.004513	**
busstops_1km	-3.454e-01	6.902e-02	-5.004	0.000735	***
tertiary_dev	5.248e+00	5.555e-01	9.447	5.73e-06	***
sbahn_density.dev	8.792e+00	1.467e+00	5.994	0.000204	***
trunkprimary_dev	1.675e-03	3.056e-04	5.481	0.000389	***
med_ubahndist	1.077e-03	2.090e-04	5.156	0.000599	***
fahrradstrasse_dev	2.093e-04	4.438e-05	4.716	0.001095	**
infraofdev	-1.359e+02	1.214e+01	-11.195	1.39e-06	***
med_parkdist	-8.051e-02	1.160e-02	-6.941	6.75e-05	***

```
pedway_dev          -4.217e-01  6.576e-02  -6.414 0.000123 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 0.7134 on 9 degrees of freedom
Multiple R-squared:  0.9893, Adjusted R-squared:  0.9713
F-statistic: 55.24 on 15 and 9 DF, p-value: 5.318e-07
```

```
> multreg9 <- subset(multreg8, select=-c(cyclespr_dev))
> view(multreg9)
>
> fit9 <- lm(cyclingrate~., data = multreg9)
> summary(fit9)
```

```
Call:
lm(formula = cyclingrate ~ ., data = multreg9)
```

```
Residuals:
    Min       1Q   Median       3Q      Max
-1.35419 -0.23350 -0.03099  0.35952  0.94073
```

```
Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)   9.256e+01  8.777e+00  10.546 9.74e-07 ***
culturalsocial_1km 2.814e-01  4.070e-02   6.915 4.12e-05 ***
ALG_15to65     4.428e-01  1.946e-01   2.276 0.046120 *
hh.children    -7.379e-01  7.740e-02  -9.534 2.46e-06 ***
over65         -4.565e-01  7.470e-02  -6.111 0.000114 ***
bldgofdev      -1.594e+01  4.790e+00  -3.328 0.007649 **
busstops_1km   -2.868e-01  6.100e-02  -4.701 0.000840 ***
tertiary_dev    5.180e+00  5.892e-01   8.791 5.11e-06 ***
sbahn_density.dev 7.805e+00  1.401e+00   5.573 0.000236 ***
trunkprimary_dev 1.553e-03  3.139e-04   4.949 0.000580 ***
med_ubahndist   9.786e-04  2.114e-04   4.629 0.000938 ***
fahrradstrasse_dev 1.788e-04  4.215e-05   4.242 0.001711 **
infraofdev     -1.282e+02  1.173e+01 -10.928 7.01e-07 ***
med_parkdist    -7.332e-02  1.128e-02  -6.502 6.88e-05 ***
pedway_dev     -4.199e-01  6.996e-02  -6.002 0.000132 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 0.7591 on 10 degrees of freedom
Multiple R-squared:  0.9865, Adjusted R-squared:  0.9676
F-statistic: 52.12 on 14 and 10 DF, p-value: 1.949e-07
```

```
> write.csv((multreg9), file = "MultipleRegression_ResultVar.csv")
```

```
> cormultreg <- cor(multreg9)
> corrplot(cormultreg, method = "number")
> corrplot(cormultreg, method = "circle")
> write.csv((cormultreg), file = "MultipleRegression_CorrMatrix.csv")
```