Assignment 6: Under (blood) pressure

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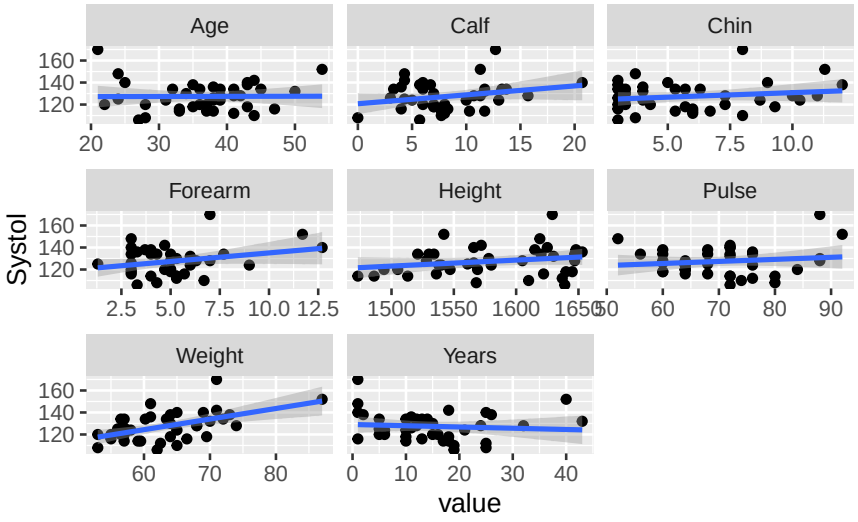
2025-10-01

Exercise 1

```
## `geom_smooth()` using formula = 'y ~ x'
```



Exercise 2

i) Years graph, the blue regression line tilts slightly down. Therefore, there is a weak negative correlation between Years and Systol.

ii) Forearm and Calf also show positive slopes, but Weight is the largest and most pronounced. Therefore, the answer is Weight.

Exercise 3

```
blood_pressure_updated <- blood_pressure %>%
  mutate(urban_frac_life = Years / Age)
```

Exercise 4

```
systol_urban_frac_model <- lm(Systol ~ urban_frac_life, data = blood_pressure_updated)
```

Exercise 5

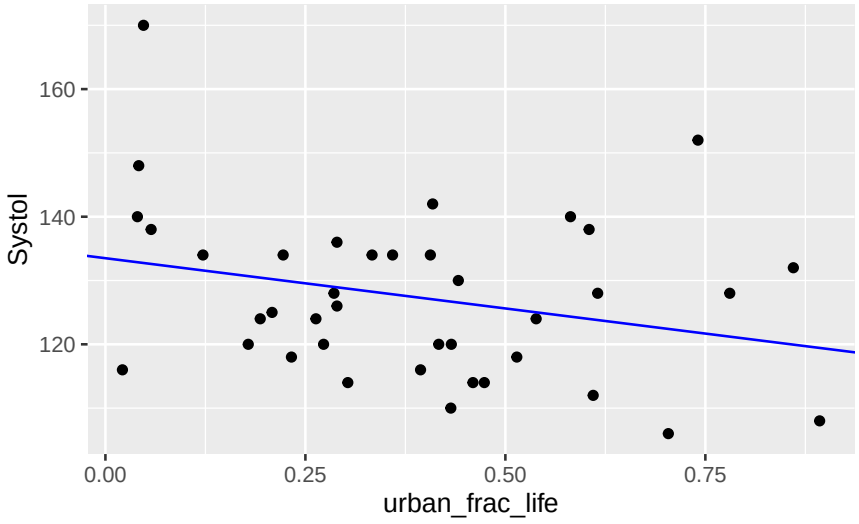
term	estimate	std.error	statistic	p.value
(Intercept)	133.49572	4.038011	33.059770	0.0000000
urban_frac_life	-15.75182	9.012962	-1.747686	0.0888139

r.squared	adj.r.squared	sigma	statistic	p.value	df	logLik	AIC	BIC	deviance	df.residual	nobs
0.0762564	0.0512904	12.76966	3.054406	0.08881391		-153.6478	313.2957	318.2864	6033.372	37	39

Exercise 6

```
systol_urban_frac_df <- blood_pressure_updated %>%
  add_predictions(systol_urban_frac_model) %>%
  add_residuals(systol_urban_frac_model)
```

Exercise 7



Exercise 8

Yes, the volatility seems almost constant, so this model seems to meet the third condition.

Exercise 9

i) The residuals are roughly symmetrical around zero.
ii) Histograms indicate that the residuals are nearly normal, therefore the conditions for near-normal residuals are reasonably met.

Exercise 10

When comparing the two models, the model using the Weight model had a higher R^2 value than the model using the Urban_frac_life model. This means that the Weight model predicts systolic blood pressure better. Therefore, systol_weight_model seems to explain the data better and be more useful for this analysis.

Exercise 11

The scatterplot of Systol and Weight shows a clear positive linear trend, and the residual histogram is quite symmetric around zero. The scatterplot is consistent, so the assumptions of linearity, normal residuals, and constant variability are reasonably satisfied.

Exercise 12

Academic Integrity statement