Lab 2

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Learning Objectives

By the end of this lab, you will be able to:

- Specify and justify priors for linear regression parameters
- Use prior predictive simulation to check if priors are reasonable
- Fit linear models using quap()
- Interpret regression coefficients in terms of associations
- Make predictions with uncertainty for new observations
- Use posterior predictive checks to assess model fit

Introduction: Predicting Height from Weight

In this lab, we'll build a linear model to predict adult height from weight using the !Kung San census data.

Key concepts:

- α (alpha): Average height when weight = mean weight
- (beta): Change in height per 1 kg increase in weight
- (sigma): Standard deviation around the line
- Centering weight makes alpha interpretable and improves computation

```r
# be sure `rethinking` is loaded
data(Howell1)
d <- Howell1
d2 <- d[ d$age >= 18 , ] # adults only # Adults only
# Summary
cat("Number of adults:", nrow(d2), "\n")
```

```
## Number of adults: 352
```

```r
cat("Weight range:", min(d2$weight), "to", max(d2$weight), "kg\n")
```

```
## Weight range: 31.07105 to 62.99259 kg
```

```r
cat("Height range:", min(d2$height), "to", max(d2$height), "cm\n")
```

```
## Height range: 136.525 to 179.07 cm
```

Prior Predictive Simulation