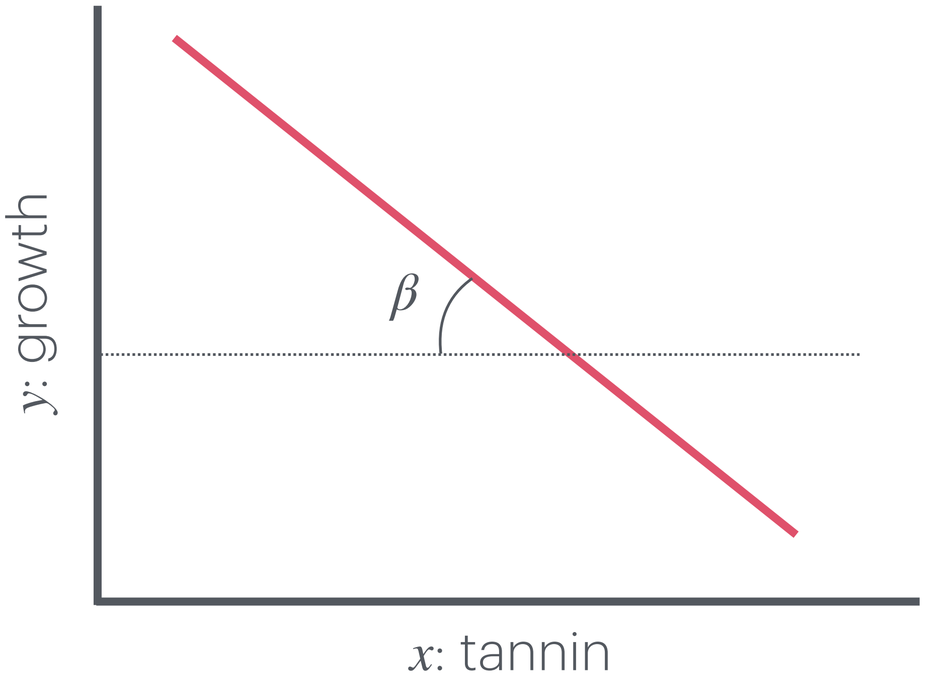
Lets ask a question

Do leaf chemical compounds reduce the growth of caterpillars?

- Our model

$$y_i \sim N(\mu_i, \sigma)$$
$$\mu_i = \alpha + \beta x_i$$
$$\alpha \sim N(0,1)$$
$$\beta \sim N(0,1)$$
$$\sigma \sim Exp(1)$$

The relation between growth and tannins is given by the slope parameter β



Model in the computer

Centering both variables is always a good idea

```
df <- data.frame(growth = c(12, 10, 8, 11, 6, 7, 2, 3, 3),
                 tannin = c(0, 1, 2, 3, 4, 5, 6, 7, 8))
df$tannin = scale(df$tannin, scale = FALSE)
df$growth = scale(df$growth, scale = FALSE)

fit  = ulam(alist(growth ~ normal(mu, sigma),
                  mu <- a + b*tannin,
                  a ~ normal(0, 1),
                  b ~ normal(0, 1),
                  sigma ~ exponential(1)),
            data = df)
```

$$
\begin{aligned}
y_i &\sim N(\mu_i, \sigma) \\
\mu_i &= \alpha + \beta x_i \\
\alpha &\sim N(0,1) \\
\beta &\sim N(0,1) \\
\sigma &\sim Exp(1)
\end{aligned}
$$