Designing a Study

- Material that is not in the text.
- Sample size needed to get a specified α and β.
- Prior Result (stated without proof)

$$\sqrt{n} \geq \frac{\sigma_0 \mid z_\alpha \mid + \sigma_1 \mid z_\beta \mid}{\mid E_1 - E_0 \mid}.$$

Extending Results to Other Situations

- Today, we will prove the result.
- Extend it to two independent samples.
- Extend it to univariate linear regression.

One Sample Problem

- Test: H_0: $E(Y)=E_0$.
- Alternative: H_1: $E(Y)>E_0$.
- The distribution of Y is normal under both null and alternative.
- Under null, $var(Y)=\sigma_0^2$.
- Under alternative, $E(Y)=E_1>E_0$, and $var(Y)=\sigma_1^2$.