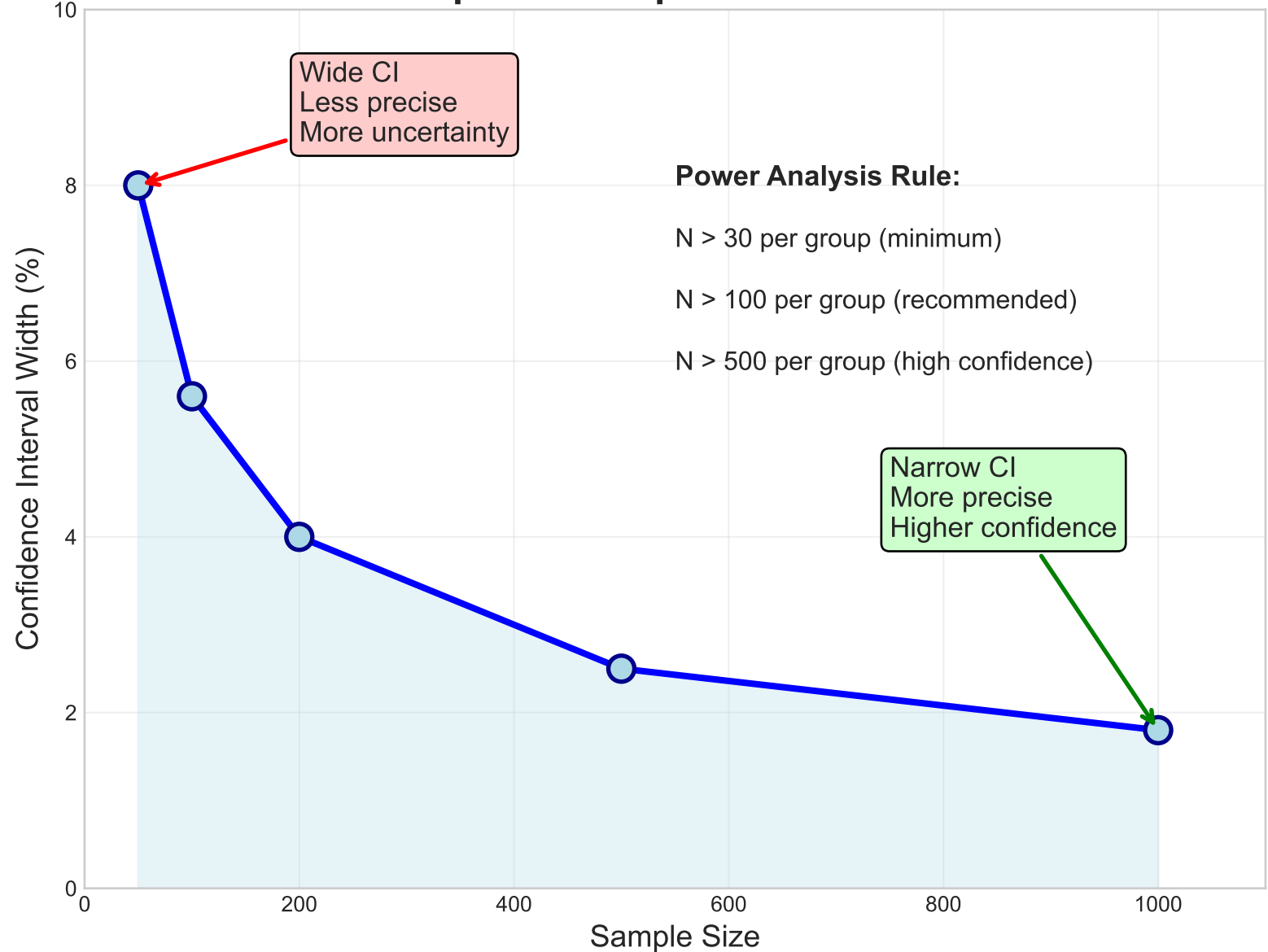


# Statistical Significance: Sample Size and Error Types

## Sample Size Impact on Precision



## Type I vs Type II Errors: The Trade-off

	Reality: No Effect	Reality: Effect Exists
Test Says: Significant	Type I Error (False Positive) $\alpha = 5\%$	Correct! (True Positive) Power = 80%
Test Says: Not Significant	Correct! (True Negative) 95% confidence	Type II Error (False Negative) $\beta = 20\%$

**Type I ( $\alpha$ ):** Saying there IS an effect when there is NOT

**Type II ( $\beta$ ):** Saying there is NO effect when there IS

**Power ( $1-\beta$ ):** Correctly detecting a real effect

**Key Insight:** Reducing Type I errors increases Type II errors