Parameter being tested

mean→$H_0 : \mu = \mu_0$									proportion→$H_0 : \pi = \pi_0$				
1-sample				2-sample					1-sample		2-sample		
↓		↓		Indpt				Dpt	↓		Indpt		Dpt
Normal		Nonnormal		Normal		Nonnormal		↓	$n\pi, n(1-\pi) \geq 10$		$n\pi, n(1-\pi) \geq 10$		↓
σ^2	σ^2?	$n < 30$	$n > 30$	$\sigma_1^2 = \sigma_2^2$	$\sigma_1^2 \neq \sigma_2^2$	$n < 30$	$n > 30$	↓	Yes	No	Yes	No	↓
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1	2	NP	3	8	9	NP	9	10	6	5	11	STOP	STOP

1-sample z-test 1 $\Rightarrow$ $z = \frac{\overline{x}-\mu_0}{\sigma/\sqrt{n}}$

1-sample t-test 2 $\Rightarrow$ $t_{n-1} = \frac{\overline{x}-\mu_0}{s/\sqrt{n}}$

approximate z-test 3 $\Rightarrow$ $t_{n-1} \approx z = \frac{\overline{x}-\mu_0}{s/\sqrt{n}}$

5 $\Rightarrow$ exact Binomial

normal approximation 6 $\Rightarrow$ $z = \frac{p-\pi_0}{\sqrt{\pi_0(1-\pi_0)/n}}$

pooled t-test 8 $\Rightarrow$ $t_{n_1+n_2-2} = \frac{\overline{x_1}-\overline{x_2}-(\mu_1-\mu_2)}{\sqrt{s_p^2(1/n_1+1/n_2)}}$

$s_p^2 = \frac{s_1^2(n_1-1)+s_2^2(n_2-1)}{n_1+n_2-2}$

2-sample t-test 9 $\Rightarrow$ $t_{df} \approx z = \frac{\overline{x_1}-\overline{x_2}-(\mu_1-\mu_2)}{\sqrt{s_1^2/n_1+s_2^2/n_2}}$

$df = \min\{n_1-1, n_2-1\}$

paired t-test 10 $\Rightarrow$ $t_{n_d-1} = \frac{\overline{x}_d-\mu_{d_0}}{s_d/\sqrt{n_d}}$

2-sample proportions 11 $\Rightarrow$ $z = \frac{p_1-p_2}{\sqrt{p_c(1-p_c)(1/n_1+1/n_2)}}$

NP $\Rightarrow$ non-parametric test

Multiples

Means: $H_0 : \mu_1 = \mu_2 = ... = \mu_k$

H_0 : there is no effect

$F_{k-1,n-k} = \frac{MSG}{MSE}$

Proportions: $H_0 : \pi_1 = \pi_2 = ... = \pi_k$

H_0 : row and column variables are independent

$\chi^2_{(r-1)\times(c-1)} = \sum \frac{(observed-expected)^2}{expected}$

Assumptions

1 - Each of the k population or group distributions is normal

2 - Distributions have identical variances

3 - Each of the k samples is a random and independant sample

1 - Expected cell count is ≥ 5, with individual expected counts ≥ 1

2 - For 2x2 tables, all expected counts ≥ 5