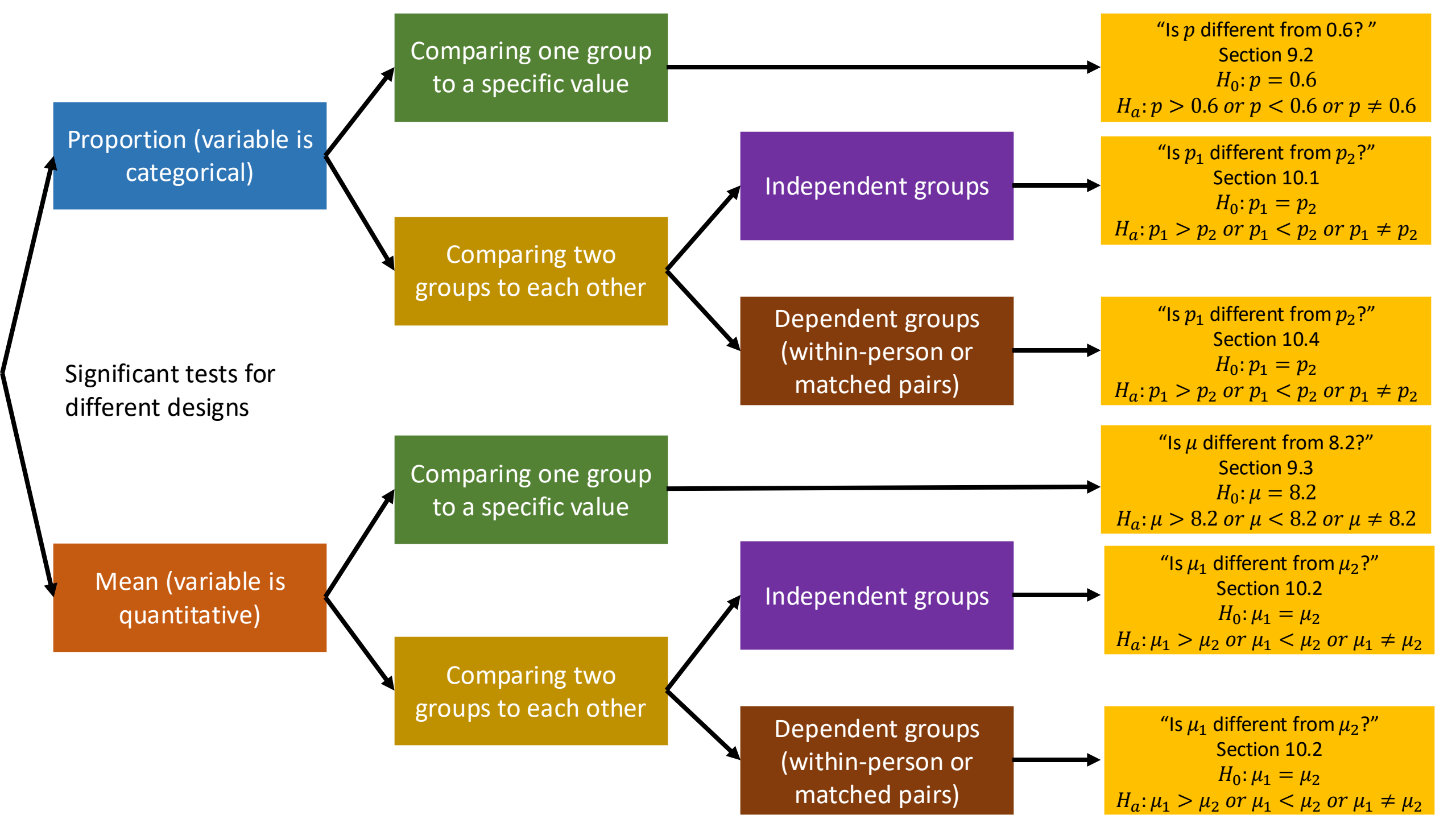
Significant tests for different designs
Proportion (variable is categorical)
Comparing one group to a specific value
"Is p different from 0.6? "
Section 9.2
$H_0: p = 0.6$
$H_a: p > 0.6$ or $p < 0.6$ or $p \neq 0.6$
Comparing two groups to each other
Independent groups
"Is p_1 different from p_2?"
Section 10.1
$H_0: p_1 = p_2$
$H_a: p_1 > p_2$ or $p_1 < p_2$ or $p_1 \neq p_2$
Dependent groups (within-person or matched pairs)
"Is p_1 different from p_2?"
Section 10.4
$H_0: p_1 = p_2$
$H_a: p_1 > p_2$ or $p_1 < p_2$ or $p_1 \neq p_2$
Mean (variable is quantitative)
Comparing one group to a specific value
"Is μ different from 8.2?"
Section 9.3
$H_0: \mu = 8.2$
$H_a: \mu > 8.2$ or $\mu < 8.2$ or $\mu \neq 8.2$
Comparing two groups to each other
Independent groups
"Is μ_1 different from μ_2?"
Section 10.2
$H_0: \mu_1 = \mu_2$
$H_a: \mu_1 > \mu_2$ or $\mu_1 < \mu_2$ or $\mu_1 \neq \mu_2$
Dependent groups (within-person or matched pairs)
"Is μ_1 different from μ_2?"
Section 10.2
$H_0: \mu_1 = \mu_2$
$H_a: \mu_1 > \mu_2$ or $\mu_1 < \mu_2$ or $\mu_1 \neq \mu_2$

Comparing one group to a specific proportion → "Is p different from 0.6? " $\rightarrow p_0 = 0.6$ → Test-statistic, Use z-distribution:

$$z = \frac{\hat{p} - p_0}{se_0}, se_0 = \sqrt{\frac{p_0(1-p_0)}{n}}$$

Comparing independent groups proportions → "Is p_1 different from p_2?" → Test-statistic, Use z-distribution:

$$z = \frac{\widehat{p_1} - \widehat{p_2} - 0}{se_0}, se_0 = \sqrt{\frac{\hat{p}(1-\hat{p})}{n_1} + \frac{\hat{p}(1-\hat{p})}{n_2}},$$

$\hat{p}$=pooled estimate, see p471-472

Comparing dependent groups proportions → "Is p_1 different from p_2?" → Test-statistic, use z-distribution:

McNemar test (pp503-504):

$z = \frac{f_{10} - f_{01}}{\sqrt{f_{10} + f_{01}}}$, f_{01} = frequency of pairs scoring 0,1; f_{10}=freq. of pairs that score 1,0 (see slides lecture 17)

Comparing one group to a specific mean → "Is μ different from 8.2?" $\rightarrow \mu_0 = 8.2$ → Test-statistic, Use t-distribution:

$$t = \frac{\bar{x} - \mu_0}{se}, se = \frac{s}{\sqrt{n}}, \text{ with df=n-1}$$

Comparing independent groups means → "Is μ_1 different from μ_2?" → Test-statistic, Use t-distribution:

$$t = \frac{\overline{x_1} - \overline{x_2} - 0}{se}, se = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}},$$

With df = $n_1 + n_2 - 2$

Comparing dependent groups means → "Is μ_1 different from μ_2?" → Test-statistic, Use t-distribution:

$$t = \frac{\overline{x_d} - 0}{se}, se = \frac{s_d}{\sqrt{n}}, \text{ with df=n-1}$$

$\overline{x_d}$ is the mean of the difference scores, See p.498

These give you a test-statistic. The next step to get a p-value is to calculate a tail probability using:

Z-value, Left tail probability:
=norm.dist(z-value;0;1;true)
or
Z-value, Right tail probability:
=1-norm.dist(z-value;0;1;true)

T-value, Left tail probability:
=t.dist(t-value;df;true)
or
T-value, Right tail probability:
=1-t.dist(t-value;df;true)

If H_a is directed (one-sided test): Calculate left or right tail depending on direction of H_a

If H_a is undirected (two-sided test): Calculate smaller tail (that is left tail for negative z-value or t-value, or right tail for positive z-value or t-value) and then double it!