Example 2: A recent poll by Angus Reid[1] involved the random selection of $n_m = 680$ men and $n_w = 692$ females was taken, each being asked the following question: "In your working life, have you ever been subject to unwanted contact at your work or at a workplace function?"'

Sixty-one (61) of the 680 males responded 'Yes'; 138 of the 692 females responded 'Yes'. Find a 95% confidence interval for the difference between the proportion of Canadian women who have been the subject of unwanted contact at your work and the percentage of men who have been the subject of unwanted contact.

$\hat{p}_m = \frac{61}{680} \approx 0.0897$ $\quad \hat{p}_w = \frac{138}{692} \approx 0.1994$ Is 0.0897 sig close to 0.1994?

$$(\hat{p}_m - \hat{p}_w) \pm z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}_m(1-\hat{p}_m)}{n_m} + \frac{\hat{p}_w(1-\hat{p}_w)}{n_w}}$$

$$\Rightarrow \left(\frac{61}{680} - \frac{138}{692}\right) \pm 1.96 \sqrt{\frac{\frac{61}{680}\left(1-\frac{61}{680}\right)}{680} + \frac{\frac{138}{692}\left(1-\frac{138}{692}\right)}{692}}$$

$$\Rightarrow [-0.1464254\underline{6}, -0.0730067\underline{1}]$$

Small - Big

Zero Not contained in interval! $\Rightarrow$ Negative

Based on these samples, we are 95% confident Prop of women receiving unwanted contact at work is significantly higher than prop of men.

[1] http://angusreid.org/wp-content/uploads/2014/12/2014.12.05-Sexual-Harassment-at-work.pdf