Confidence Intervals for Proportions

Opinion Poll: 88% support Alderman Brown with a margin of error of ±3%

Translation: somewhere between 85% and 91% of the population support Alderman Brown

Example: Candidate Green is running for mayor and wants you to determine what portion of the vote he can expect to receive.

Survey 200 likely voters and discover that 55% intend to vote for him.

$$CI = P \pm Z(S_p)$$

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P = the proportion

Z = z score of confidence level desired (e.i., 95%)

S_p = standard error of the proportion

$= \sqrt{[(P(1-P)/n]}$ where n = number in sample

$CI = 0.55 \pm 1.96(\sqrt{[(0.55)(0.45)/200]})$

$= 0.55 \pm 1.96(\sqrt{[0.2475/200]})$

$= 0.55 \pm 1.96(\sqrt{[0.0012375]})$

$= 0.55 \pm 1.96(0.035)$

$= 0.55 \pm 0.0686$

CI = 0.55 ± 0.0686

CI = 0.4814 to 0.6186

CI = 48.14% to 61.86% 95 times/ 100

MARGIN OF ERROR

Polls typically report as 55% ± 6.86%, hence

55% support Candidate Green with a margin of error of ±6.86%

Not very comforting!

Increase the sample size to reduce the margin of error

Same as before except sample size = 750

CI = .55 ± 0.0353

Hence, based on a sample of 750 individuals we project a vote of 55% with a margin of error of 3.53%

(51.47% to 58.53%)