CONFIDENCE AND STANDARD ERRORS

The deal is ... it is NOT the standard error that determines the amount of confidence that a specific CI has in including or capturing the parameter. It is the number of error units you add and subtract from the statistic that determines this. To show this, consider another example similar to the book ... where the standard error is about .4. What I did below was to make a similar situation where the standard error was about half of that ... I did this by sampling from a population where the population standard deviation was 1 ... this would make the approximate standard error be: 1 / \sqrt{25} = 1/5 = .2. Look at the Minitab simulation.

MTB > rand 200 c1-c25;
SUBC> norm 60 1.
MTB > rmean c1-c25, c26
MTB > name c26='Mean'
MTB > dotp c26

+---------+---------+---------+---------+-Mean
59.50     59.75     60.00     60.25     60.50

MTB > desc c26

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Note that the standard error of the mean in this simulation is about half the previous one ... = .186. I put that in k1.

MTB > let k1=.186
MTB > let c28=c26-k1
MTB > let c30=c26+k1
MTB > set c29
DATA> 200(60)
DATA> end
MTB > let c31=(c28 lt c29) and (c30 gt c29)
In this simulation, about 65 percent of the CI's contained the parameter of 60. The fact is, it is not the standard error that drives confidence. I cut the standard error more than in half yet the confidence or percentage is still about 68.

The confusion is between width of the CI and amount of confidence. A CI in this case would look like ...

\[
\text{Mean } +/- \text{ (# err units)} \times \text{(Stan err)}
\]

Clearly, the width of the CI will be affected by both the size of the stan err AND the number of units of err you go on either side of the mean. Bigger or smaller widths can be achieved by changing either # of err units OR size of stan err. However, what determines how many intervals will tend to capture the parameter is the number of err units ... NOT the stand err. While smaller stand errors will necessarily make narrower CI's
... that does not mean that narrower CI's yield more confidence!!!!!!!!!!!!!!!!!!! How close the statistic is to the real parameter is a function to the standard error but ... that is NOT the same question one is addressing when asking what is the likelihood that the CI itself contains the parameter.