

Exercise – SEM (Standard Error of Measurement)

Psyc 402 – Spring 2021 – Dr. Diehr

This is for practice and is not scored for points

Goal: Calculate the SEM, use it to compute a Confidence Interval (CI), and use the CI to make a decision.

Definitions:

$r =$	reliability of test (Pearson's product-moment correlation)
$S =$	standard deviation (SD) of test
$SEM =$	$S\sqrt{1-r}$
$Z =$	Calculate from the Confidence Level: use Table 1 and double the area found
$CI =$	$Z*SEM$
True Score Range =	Measured Score \pm CI

Question 1:

Your boss has told you to only hire people with an IQ of over 115 (one standard deviation above the mean). An applicant for the job has an IQ of 125. Your boss says to be 99% sure of the decision. Should you decide yes or no? Assume the IQ test has a standard deviation of 15 and a reliability of 0.90.

First, compute SEM

SEM =

Next, convert your confidence level into the associated Z score (see Table 1, next page)

Confidence Level =

Z score =

Compute the confidence interval

CI =

Use the CI to compute the range of likely scores:

True score range =

At the 99% confidence level, does the measured IQ of 125 represent a True score above the cutoff of 115?

Question 2:

Frustrated with the results of the job search, your boss relaxes the 99% confidence level and simply says to be "more sure than not" that the result is correct.

Convert your confidence level into the associated Z score (see next page)

Confidence Level =

Z score =

Compute the confidence interval

CI =

Use the CI to compute the range of likely scores:

True score range =

Does the measured IQ score of 125 "more surely than not" represent a True score above the cutoff of 115?

Question 3:

All things being equal, what does choosing a lower confidence level do to the confidence interval?

Table 1:

Area of normal curve between a Z score of 0.0 and a Z score of ____

Z Score	Area above Mean	Area above and below the mean	Proportion converted to percentage (%)
0.00	0.000		0%
0.13	0.051		
0.67	0.249		
1.00	0.341	0.682	68%
1.64	0.449		
1.96	0.477		95%
2.57	0.495		

Please fill in all empty cells.

Example: Converting from Confidence Level of 68% to a Z-score:

