VET student outcomes
FACT SHEET

How to interpret survey results

The sample for the National Student Outcomes Survey is selected from the National VET Provider and National VET in Schools collections and survey responses are weighted to population benchmarks from these collections. As the estimates from the National Student Outcomes Survey are based on information provided by a sample rather than on a population, they are subject to sampling variability; that is, they may differ from the statistics that would have been produced had all students been included and responded to the survey.

How close the estimate is likely to be to the true population value is reflected in the confidence interval. For this publication we use a confidence level of 95%, which means the probability that the confidence interval contains the true population value is 95%.

The confidence interval can be shown graphically using a black bar around the estimate (see figure A). Smaller bars correspond to more accurate estimates. The confidence interval is sometimes expressed as Estimate +/- margin of error (MOE). That is, the margin of error is half the width of the confidence interval. For example, in figure B, Estimate A is equal to 70% and the margin of error is 5% which means we can be 95% confident the true value is within 5 percentage points (MOE) of the reported value. The relevant confidence interval for this estimate is therefore, 65% to 75%.

Margin of error assesses the precision of a survey's estimates. A smaller margin of error suggests that the survey's results will tend to be close to the correct values. Conversely, a larger margin of error indicates that the survey's estimates can be further away from the population values. A commonly used margin of error is 3 to 5 percentage points at a 95% confidence level. This means that if the survey were repeated 100 times, the results would fall within 3 to 5 percentage points of the reported value in 95 out of 100 cases.

It is important to consider the margin of error when making comparisons between groups and years, particularly when the results are close. Data users are encouraged to use the margin of error to determine if a difference between groups is statistically significant. This can be done either through comparing confidence intervals or using appropriate significance testing as explained below.

Compare estimates using the confidence interval

Confidence interval bars are provided in the *VET student outcomes* publication. Figure B provides an example. In figure B, the black bars (confidence intervals) for *Estimate A* and *Estimate B* do not overlap. This means that it **can** be concluded with a 95% level of confidence that there is a difference between *Estimate A* and *Estimate B*. However, the error bars for *Estimate B* and *Estimate C* do overlap. This means that it **cannot** be concluded with a 95% level of confidence that there is a difference between *Estimate B* and *Estimate C*. It also cannot be concluded that *Estimate B* and *Estimate C* are similar, and further testing needs to be undertaken to determine whether there is a statistically significant difference between the estimates. To determine how to do this see 'Compare estimates using significance testing' on page 2.

This work has been produced by NCVER on behalf of the Australian Government and state and territory governments, with funding provided through the Australian Government Department of Employment and Workplace Relations

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FACT SHEET

Figure A Confidence interval and margins of error

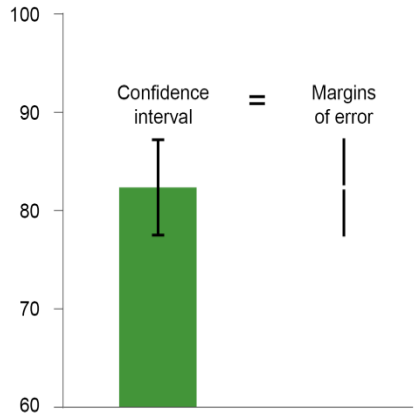
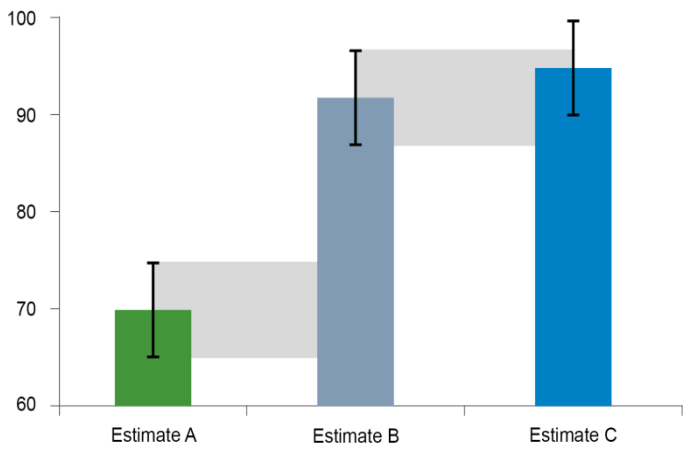


Figure B Confidence intervals



Compare estimates using significance testing

Another way to examine whether the difference between two estimates is statistically significant is through calculating the standard error (SE) of the difference between those estimates (x and y) and comparing that to the difference between the estimates. In NCVER reports, differences between groups and years are only cited when such testing has been conducted and differences between estimates are statistically significant. Where written analysis of trends is not available for estimates of interest, data users can use the margin of error (available for all estimates in the DataBuilder and/or data tables) and the following formulas to conduct a statistical test of difference.

In order to examine the difference, we first define a test-statistic as follows:

Test statistic=|x−y|/SE(x−y)

To calculate the standard error of the difference between two estimates (SE(x−y)), you need to consider the standard errors of the individual estimates. If the estimates are independent, you can use the following formula:

SE of estimate (e.g SE(x) or SE(y))=(MOE/1.96) (based on a confidence level of 95%), and

SE(x-y) =$\sqrt{[SE(x)]^2 + [SE(y)]^2}$

To determine if the difference between the estimates is statistically significant, you can compare the test statistic to a critical value, or calculate the corresponding p-value. The critical value or p-value depends on the specific statistical test you are using and the desired significance level. If the test statistic is greater than the critical value (for a one-tailed test) or if the p-value is less than the significance level (commonly 0.05), it suggests a statistically significant difference between the estimates.

NCVER uses the Z-test for the critical value and in the context of a Z-test, a 95% confidence level is associated with a critical value of 1.96. This means that if the test statistic calculated above is larger than 1.96, it would suggest a significant difference between the two estimates.

For further technical details about the National Student Outcomes Survey, please refer to the technical notes supporting document available from the publication page on NCVER's website at: <https://www.ncver.edu.au/research-and-statistics/collection/student-outcomes/vet-student-outcomes>.

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