

## 7.8: Cohen's Standards for Small, Medium, and Large Effect Sizes

**Cohen's  $d$**  is a measure of "effect size" based on the differences between two means. Cohen's  $d$ , named for United States statistician Jacob Cohen, measures the relative strength of the differences between the means of two populations based on sample data. The calculated value of effect size is then compared to Cohen's standards of small, medium, and large effect sizes.

Table 10.2 Cohen's Standard Effect Sizes

Size of effect	$d$
Small	0.2
Medium	0.5
Large	0.8

Cohen's  $d$  is the measure of the difference between two means divided by the pooled standard deviation:  $d = \frac{\bar{x}_1 - \bar{x}_2}{s_{pooled}}$  where  $s_{pooled} = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$

It is important to note that Cohen's  $d$  does not provide a level of confidence as to the magnitude of the size of the effect comparable to the other tests of hypothesis we have studied. The sizes of the effects are simply indicative.

### ? Exercise 7.8.1

Calculate Cohen's  $d$  for [example 10.2.2](#). Is the size of the effect small, medium, or large? Explain what the size of the effect means for this problem.

#### Answer

$$\begin{aligned}\bar{x}_1 &= 4s_1 = 1.5n_1 = 11 \\ \bar{x}_2 &= 3.5s_2 = 1n_2 = 9 \\ d &= 0.384\end{aligned}\tag{7.8.1}$$

The effect is small because 0.384 is between Cohen's value of 0.2 for small effect size and 0.5 for medium effect size. The size of the differences of the means for the two companies is small indicating that there is not a significant difference between them.

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