

How can I calculate the adjusted R-squared value in R?

Authored by
stats writer

April 22, 2024

RECOMMENDED CITATION

stats writer (2024). *How can I calculate the adjusted R-squared value in R?*.

PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=137986>

The adjusted R-squared value is a statistical measure that indicates the proportion of variation in a dependent variable that is explained by the independent variables in a regression model. In order to calculate the adjusted R-squared value in R, you can use the function "summary" on a linear regression model object. This function will provide you with the overall R-squared value, as well as the adjusted R-squared value, which takes into account the number of variables in the model. This adjusted value is a more reliable measure of the model's performance, as it penalizes for the addition of unnecessary variables. By using the "summary" function in R, you can accurately evaluate the goodness of fit of your regression model and make informed decisions about the predictive power of your variables.

Calculate Adjusted R-Squared in R

R-squared, often written R^2 , is the proportion of the variance in the response variable that can be explained by the predictor variables in a linear regression model.

The value for R-squared can range from 0 to 1. A value of 0 indicates that the response variable cannot be explained by the predictor variable at all while a value of 1 indicates that the response variable can be perfectly explained without error by the predictor variables.

The adjusted R-squared is a modified version of R-squared that adjusts for the number of predictors in a regression model. It is calculated as:

Adjusted $R^2 = 1 -$

where:

R^2 : The R^2 of the model
 n : The number of observations
 k : The number of predictor variables

Because R^2 always increases as you add more predictors to a model, adjusted R^2 can serve as a metric that tells you how useful a model is, *adjusted for the number of predictors in a model*.

This tutorial explains how to calculate adjusted R^2 for a regression model in R.

What is a Good R-squared Value?

Example: How to Calculate Adjusted R-Squared in R

We can use the following code to build a multiple linear regression model in R using the built-in dataset called `mtcars`:

```
model <- lm(hp ~ mpg + wt + drat + qsec, data=mtcars)
```

And we can use one of the following three methods to find the adjusted R-squared of the model:

Method 1: Use the `summary()` function

We can view both the R-squared and the adjusted R-

squared of the model by simply using the `summary()` function:

```
summary(model)
```

Call:

```
lm(formula = hp ~ mpg + wt + drat + qsec, data = mtcars)
```

Residuals:

Min 1Q Median 3Q Max

-48.801 -16.007 -5.482 11.614 97.338

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 473.779 105.213 4.503 0.000116 ***

mpg -2.877 2.381 -1.209 0.237319

wt 26.037 13.514 1.927 0.064600 .

drat 4.819 15.952 0.302 0.764910

qsec -20.751 3.993 -5.197 1.79e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 32.25 on 27 degrees of freedom

Multiple R-squared: 0.8073, Adjusted R-squared: 0.7787
F-statistic: 28.27 on 4 and 27 DF, p-value: 2.647e-09

At the bottom of the output we can see the following:

Multiple R-squared: 0.8073 Adjusted R-squared: 0.7787

Method 2: Use `summary(model)$adj.r.squared`

If we simply wanted to obtain the adjusted R-squared of the model, we could use the following function:

```
summary(model)$adj.r.squared
```

```
0.7787005
```

Method 3: Use a custom function

Yet another way to find the adjusted R-squared of the model is to write a custom function:

```
#define function to calculate adjusted R-squared
adj_r2 <- function(x) {
  return (1 - ((1 -
    summary(x)$r.squared)*(nobs(x)-1)/(nobs(x)-
    length(x$coefficients)-1)))
}
```

```
}
```

#use function to calculate adjusted R-squared of the model

```
adj_r2(model)
```

```
0.7787005
```

```
numeric(0)
```

Notice that each of the three methods shared here result in the same value for adjusted R-squared.

How to Perform Simple Linear Regression in R

How to Perform Multiple Linear Regression in R

How to Perform Polynomial Regression in R