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How to Find the Chi-Square Critical Value in R

When you conduct a Chi-Square test, you will get a test statistic as a result.

To determine if the results of the Chi-Square test are statistically significant, you can compare the test statistic to a **Chi-Square critical value**.

If the test statistic is greater than the Chi-Square critical value, then the results of the test are statistically significant.

The Chi-Square critical value can be found by using a **Chi-Square distribution table** or by using statistical software.

To find the Chi-Square critical value, you need:

- A significance level (common choices are 0.01, 0.05, and 0.10)
- Degrees of freedom

Using these two values, you can determine the Chi-Square value to be compared with the test statistic.

How to Find the Chi-Square Critical Value in R

To find the Chi-Square critical value in R, you can use the `qchisq()` function, which uses the following syntax:

`qchisq(p, df, lower.tail=TRUE)`

where:

- **p**: The significance level to use
- **df**: The degrees of freedom
- **lower.tail**: If TRUE, the probability to the left of **p** in the F distribution is returned. If FALSE, the probability to the right is returned. Default is TRUE.

This function returns the critical value from the Chi-Square distribution based on the significance level and degrees of freedom provided.

For example, suppose we would like to find the Chi-Square critical value for a significance level of 0.05 and degrees of freedom = 11.

```
#find Chi-Square critical value
qchisq(p=.05, df=11, lower.tail=FALSE)

[1] 19.67514
```

The Chi-Square critical value for a significance level of 0.05 and degrees of freedom = 11 is **19.67514**.

Thus, if we're conducting some type of Chi-Square test then we can compare the Chi-Square test statistic to **19.67514**.

If the test statistic is greater than 19.67514, then the results of the test are statistically significant.

Note that smaller values of alpha will lead to larger Chi-Square critical values. For example, consider the Chi-Square critical value for a significance level of **0.01**, and degrees of freedom = 11.

```
#find Chi-Square critical value  
qchisq(p=.01, df=11, lower.tail=FALSE)  
  
[1] 24.72497
```

And consider the Chi-Square critical value with the exact same degrees of freedom, but with a significance level of **0.005**:

```
#find Chi-Square critical value  
qchisq(p=.005, df=11, lower.tail=FALSE)  
  
[1] 26.75685
```

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