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0.1 Pseudo-R Squared

Cox and Snell R Square and Nagelkerke R Square - These are pseudo R-squares. Logistic regression does not have an equivalent to the R-squared that is found in OLS regression; however, many people have tried to come up with one.

There are a wide variety of pseudo-R-square statistics (these are only two of them). Because this statistic does not mean what R-squared means in OLS regression (the proportion of variance explained by the predictors), we suggest interpreting this statistic with great caution.

0.2 Psuedo R Squared Values

Cox & Snell R Square and Nagelkerke R Square are two measures from the **pseudo R-squares** family of measures.

There are a wide variety of pseudo-R-square statistics (these are only two of them). Because this statistic does not mean what R-squared means in OLS regression (the proportion of variance explained by the predictors), we suggest interpreting this statistic with great caution.

0.3 Pseudo R-squares

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Because this statistic does not mean what R-squared means in OLS regression (the proportion of variance explained by the predictors), we suggest interpreting this statistic with great caution.

0.3.1 Cox & Snell R Square

Cox and Snell's R-Square is an attempt to imitate the interpretation of multiple R-Square based on the likelihood, but its maximum can be (and usually is) less than 1.0, making it difficult to interpret. It is part of SPSS output.

0.3.2 Nagelkerke's R-Square

Nagelkerke's R-Square is a further modification of the Cox and Snell coefficient to assure that it can vary from 0 to 1. Nagelkerke's R-Square will normally be higher than the Cox and Snell measure. It is part of SPSS output and is the most-reported of the R-squared estimates.

1 R Squared Diagnostics

- In order to understand how much variation in the dependent variable can be explained by the model (the equivalent of R^2 in multiple regression), you should consult ***Model Summary*** statistics.
- Logistic regression does not have an equivalent to the R-squared that is found in OLS regression; however, many researchers have tried to come up with one.
- The SPSS output table below contains the *Cox & Snell R Square* and *Nagelkerke R Square* values, which are both methods of calculating the explained variation. These values are sometimes referred to as pseudo R^2 values (and will have lower values than in multiple regression).
- However, they are interpreted in the same manner, but with more caution. Therefore, the explained variation in the dependent variable based on our model ranges from 24.0% to 33.0%, depending on whether you reference the Cox & Snell R^2 or Nagelkerke R^2 methods, respectively.

- Nagelkerke R^2 is a modification of Cox & Snell R^2, the latter of which cannot achieve a value of 1. For this reason, it is preferable to report the Nagelkerke R^2 value.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	102.088[a]	.240	.330

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Figure 1: SPSS output

- Although there is no close analogous statistic in logistic regression to the coefficient of determination R^2 the Model Summary Table provides some approximations. Cox and Snells R-Square attempts to imitate multiple R-Square based on likelihood, but its maximum can be (and usually is) less than 1.0, making it difficult to interpret.
- Here it is indicating that 55.2% of the variation in the DV is explained by the logistic model.
- Logistic regression does not have an equivalent to the R-squared that is found in OLS regression; however, many people have tried to come up with one. Cox and Snell R Square and Nagelkerke R Square - These are pseudo R-squares.
- Nagelkerke's R-Square is a further modification of the Cox and Snell coefficient to assure that it can vary from 0 to 1. Nagelkerke's R-Square will normally be higher than the Cox and Snell measure. It is part of SPSS output and is the most-reported of the R-squared estimates.
- The Nagelkerke modification that does range from 0 to 1 is a more reliable measure of the relationship. Nagelkerkes R^2 will normally be higher than the Cox and Snell measure.
- **Cox and Snell's R-Square** is an attempt to imitate the interpretation of multiple R-Square based on the likelihood, but its maximum can be (and usually is) less than 1.0, making it difficult to interpret. It is part of SPSS output.

1.0.1 Nagelkerke's R-Square

- Nagelkerkes R^2 is part of SPSS output in the Model Summary table and is the most-reported of the R-squared estimates.
- In our case it is 0.737, indicating a moderately strong relationship of 73.7% between the predictors and the prediction.

1.1 Pseudo R-squares

Cox & Snell R Square and Nagelkerke R Square are two measures from the **pseudo R-squares** family of measures.

There are a wide variety of pseudo-R-square statistics (these are only two of them). Because this statistic does not mean what R-squared means in OLS regression (the proportion of variance explained by the predictors), we suggest interpreting this statistic with great caution.

2 R Squared Diagnostics

- In order to understand how much variation in the dependent variable can be explained by the model (the equivalent of R^2 in multiple regression), you should consult ***Model Summary*** statistics.
- Logistic regression does not have an equivalent to the R-squared that is found in OLS regression; however, many researchers have tried to come up with one.
- The SPSS output table below contains the *Cox & Snell R Square* and *Nagelkerke R Square* values, which are both methods of calculating the explained variation. These values are sometimes referred to as pseudo R^2 values (and will have lower values than in multiple regression).
- However, they are interpreted in the same manner, but with more caution. Therefore, the explained variation in the dependent variable based on our model ranges from 24.0% to 33.0%, depending on whether you reference the Cox & Snell R^2 or Nagelkerke R^2 methods, respectively.
- Nagelkerke R^2 is a modification of Cox & Snell R^2, the latter of which cannot achieve a value of 1. For this reason, it is preferable to report the Nagelkerke R^2 value.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	102.088[a]	.240	.330

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Figure 2: SPSS output

- Although there is no close analogous statistic in logistic regression to the coefficient of determination R^2 the Model Summary Table provides some approximations. Cox and Snells

R-Square attempts to imitate multiple R-Square based on likelihood, but its maximum can be (and usually is) less than 1.0, making it difficult to interpret.

- Here it is indicating that 55.2% of the variation in the DV is explained by the logistic model.
- Logistic regression does not have an equivalent to the R-squared that is found in OLS regression; however, many people have tried to come up with one. Cox and Snell R Square and Nagelkerke R Square - These are pseudo R-squares.
- Nagelkerke's R-Square is a further modification of the Cox and Snell coefficient to assure that it can vary from 0 to 1. Nagelkerke's R-Square will normally be higher than the Cox and Snell measure. It is part of SPSS output and is the most-reported of the R-squared estimates.
- The Nagelkerke modification that does range from 0 to 1 is a more reliable measure of the relationship. Nagelkerkes R^2 will normally be higher than the Cox and Snell measure.
- **Cox and Snell's R-Square** is an attempt to imitate the interpretation of multiple R-Square based on the likelihood, but its maximum can be (and usually is) less than 1.0, making it difficult to interpret. It is part of SPSS output.

2.0.1 Nagelkerke's R-Square

- Nagelkerkes R^2 is part of SPSS output in the Model Summary table and is the most-reported of the R-squared estimates.
- In our case it is 0.737, indicating a moderately strong relationship of 73.7% between the predictors and the prediction.