



Tests for Testing Model Assumptions

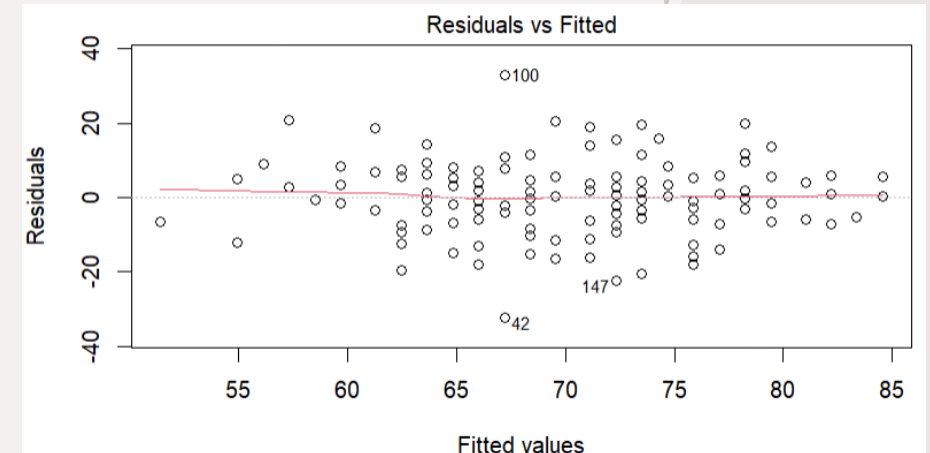
PSY 612

Testing Model Assumptions

- Inspecting a residuals plots is a great way of seeing how the residuals of one's model are distributed and if there is a systematic pattern that appears to violate one of the model assumptions:
 - Correct form
 - Normally distributed residuals
 - Homogeneity of variances
 - Independence
- However, when examining these residuals plots for the first time, it can be difficult to tell what is a "big enough" diversion from one of these assumptions that it warrants being addressed
 - Especially with regards to the normality and homogeneity of variances assumptions as these are robust to some degree of violation.

Testing Model Assumptions

- In addition to a visual examination of the residuals, it can be helpful to also run a test of each of these assumptions that provides a test statistic and corresponding p -value.
- For tests of model assumptions, it is desirable for the test to produce a non-significant p -value as a significant p -value typically means that the residuals significantly diverge from the model assumption.



Testing the **Normality Assumption** using the Shapiro-Wilk Test

- Use the ``shapiro.test()`` function from the ``stats`` package
- Pass the function your model's standardized residuals
- Example:
 - `shapiro.test(rstandard(model))`
- A significant p -value suggests the model's residuals *significantly diverge* from being normally distributed (aka, the normality assumption is violated, the residuals are non-normally distributed)

Testing the **Homogeneity of Variances Assumption** using the Breusch-Pagan Test

- Use the `ncvTest()` function from the `'car'` package
- Pass the function your model
- Example:
 - `ncvTest(model)`
- A significant p -value suggests the model's residuals *significantly diverge* from being homoscedastic (aka, the homogeneity of variances assumption is violated, heteroskedasticity is present)

Testing the Independence Assumption using the Durbin-Watson Test

- Use the ``durbinWatsonTest()`` function from the ``car`` package
- Pass the function your model
- Example:
 - `durbinWatsonTest(model)`
- A significant p -value suggests the model's residuals *significantly diverge* from being independent (aka, the independence assumption is violated, the residuals are autocorrelated)