

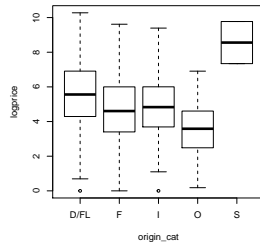
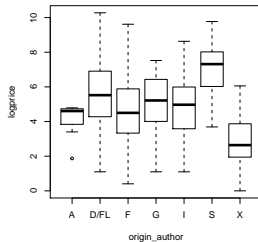
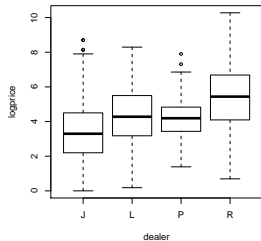
# STA 521 Final Project

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# EDA & Data Cleaning

- ▶ Removed variables: lot, sale, price, count, subject, authorstandard, winningbidder, Surface\_Rnd, Surface\_Rect, material, mat
- ▶ Recoded many categorical variables, for example:
  - endbuyer: "n/a" & "" – "X"
  - authorstyle: "n/a" & "" – 0; others: 1
  - materialCat: "n/a" & "" – "other"



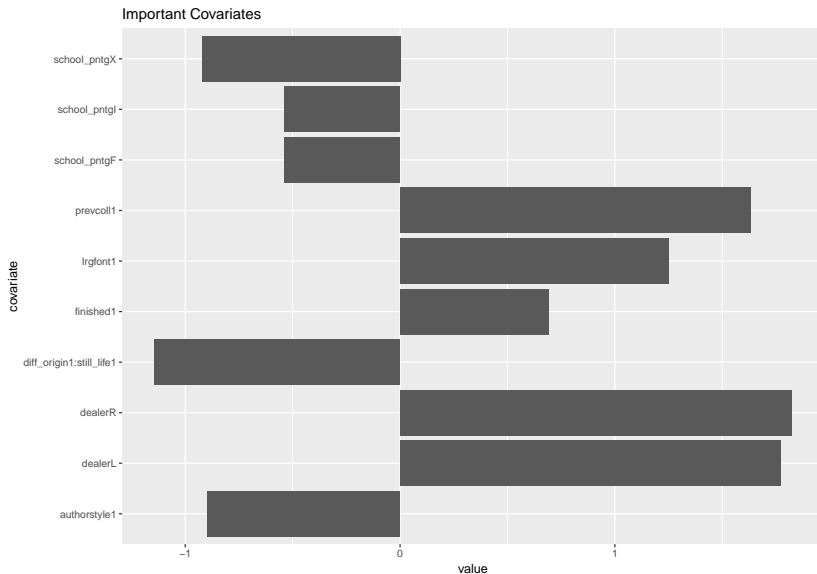
## BMA + AIC

author	sum
David Teniers	46
Philippe Wouvermans	27
Francois Boucher	26

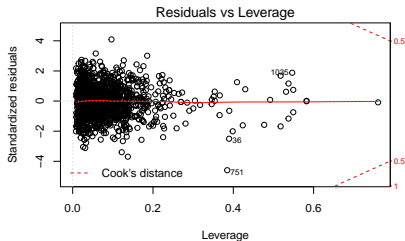
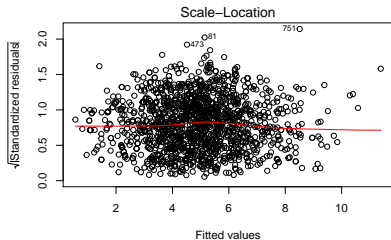
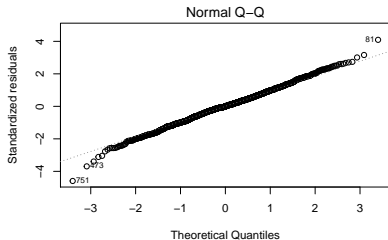
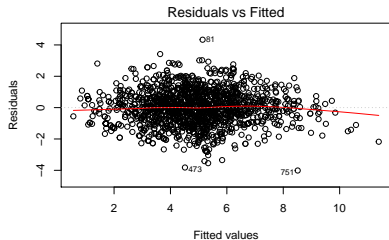
subject	sum
Paysage	324
People	194
Saint	121

- ▶ BMA: used BPM in BMA to choose base variables that have higher posterior density and good for prediction.
- ▶ AIC: generated all possible interactions and applied AIC to choose important features.
- ▶ Final model: 19 base variables; 24 interactions.

# Important Features



# Model Diagnostics



## Interesting Findings

- ▶ The most expensive five paintings predicted from the validation set all come from the same artist: Nicolaes Pieterszoon Berghem.
- ▶ Most of the more expensive paintings are auctioned from the dealer with initial "R".
- ▶ The endbuyer of these expensive paintings are, instead of a buyer or a dealer who may serve as an intermediary, collectors themselves.
- ▶ Extremely large surface area doesn't always mean high price.

## The Artist



## Painting 1: Pieterszoon Berghem



Figure 2: Pieterszoon's Painting



## Painting 2: Pricey



## Image Sources

1. [https://upload.wikimedia.org/wikipedia/commons/e/e0/David\\_Teniers\\_the\\_Younger\\_-\\_The\\_Feast\\_of\\_the\\_Prodigoal\\_Son.jpg](https://upload.wikimedia.org/wikipedia/commons/e/e0/David_Teniers_the_Younger_-_The_Feast_of_the_Prodigoal_Son.jpg)
2. [https://upload.wikimedia.org/wikipedia/commons/e/e8/Berchem%2C\\_Nicolaes\\_-\\_Landscape\\_with\\_Herdsman\\_Gathering\\_Sticks%2C\\_early\\_1650s%2C\\_oil\\_on\\_panel%2C\\_private\\_collection%2C\\_New\\_York.jpg](https://upload.wikimedia.org/wikipedia/commons/e/e8/Berchem%2C_Nicolaes_-_Landscape_with_Herdsman_Gathering_Sticks%2C_early_1650s%2C_oil_on_panel%2C_private_collection%2C_New_York.jpg)
3. [https://en.wikipedia.org/wiki/Nicolaes\\_Pieterszoon\\_Berchem#/media/File:Portrait\\_of\\_Nicolaes\\_Berchem\\_by\\_Jan\\_Stolker.jpg](https://en.wikipedia.org/wiki/Nicolaes_Pieterszoon_Berchem#/media/File:Portrait_of_Nicolaes_Berchem_by_Jan_Stolker.jpg)