# STA 521 Final Project

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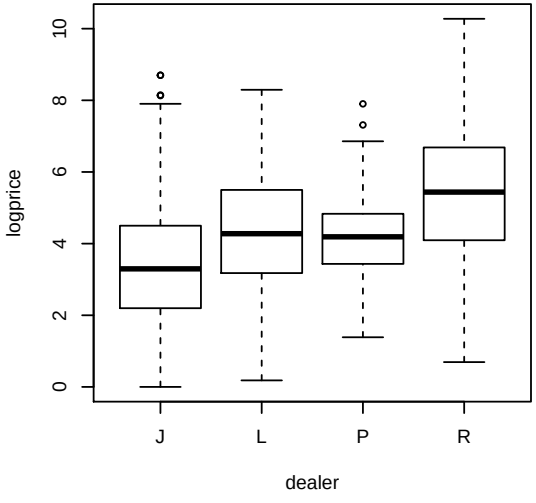
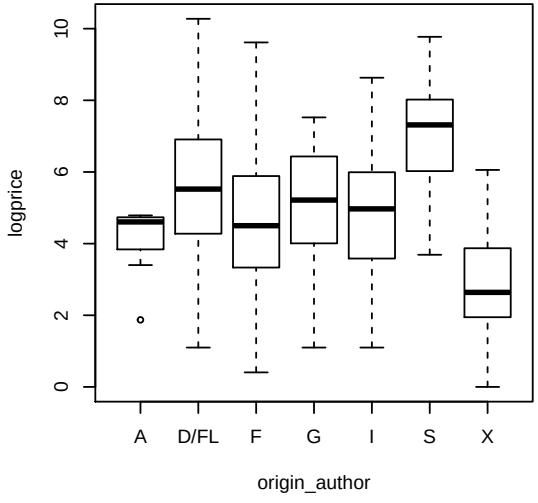
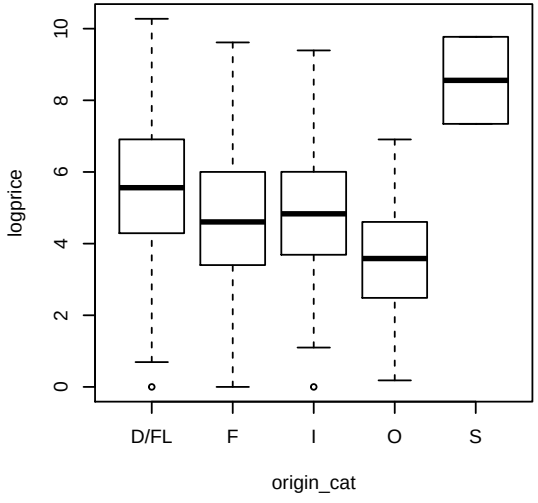
# EDA & Data Cleaning

- Removed variables: `lot`, `sale`, `price`, `count`, `subject`, `authorstandard`, `winningbidder`, `Surface_Rnd`, `Surface_Rect`, `material`, `mat`
- Recoded many categorical variables, for example:
  a. `endbuyer`: "n/a" & "" – "X"
  b. `authorstyle`: "n/a" & "" – 0; others: 1
  c. `materialCat`: "n/a" & "" – "other"



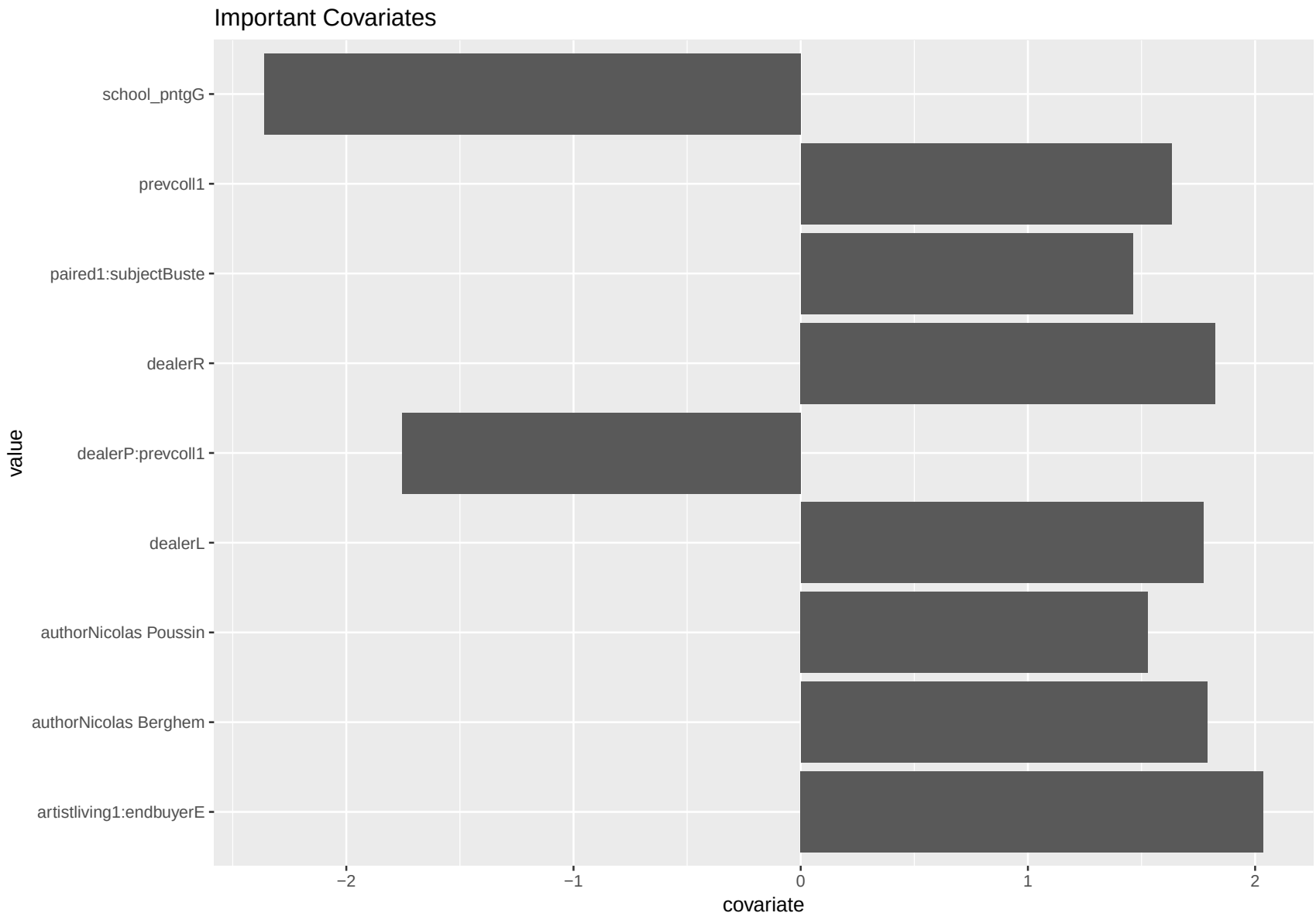
# BMA + AIC

| author | sum |
|---|---|
| David Teniers | 46 |
| Philippe Wouvermans | 27 |
| Francois Boucher | 26 |

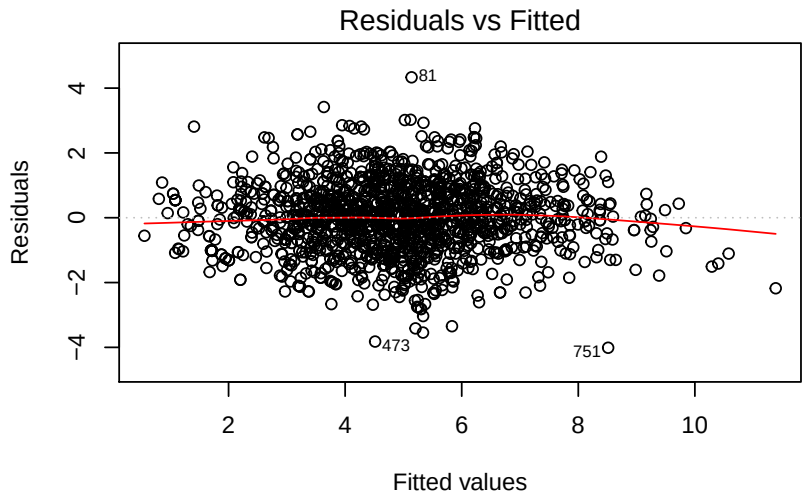
| subject | sum |
|---|---|
| Paysage | 324 |
| People | 194 |
| Saint | 121 |

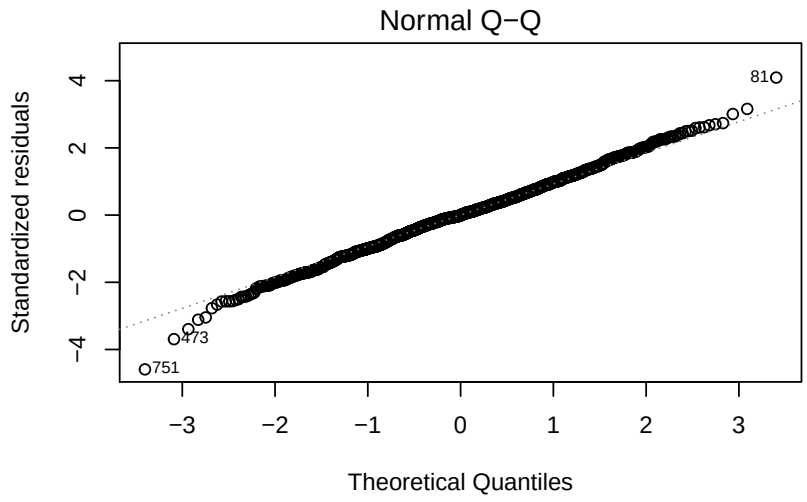
- BMA: used BPM in BMA to choose base variables that have higher posterior density and good for prediction.
- AIC: generated all possible interactions and applied AIC to choose important features.
- Final model: 19 base vairables; 24 interactions;

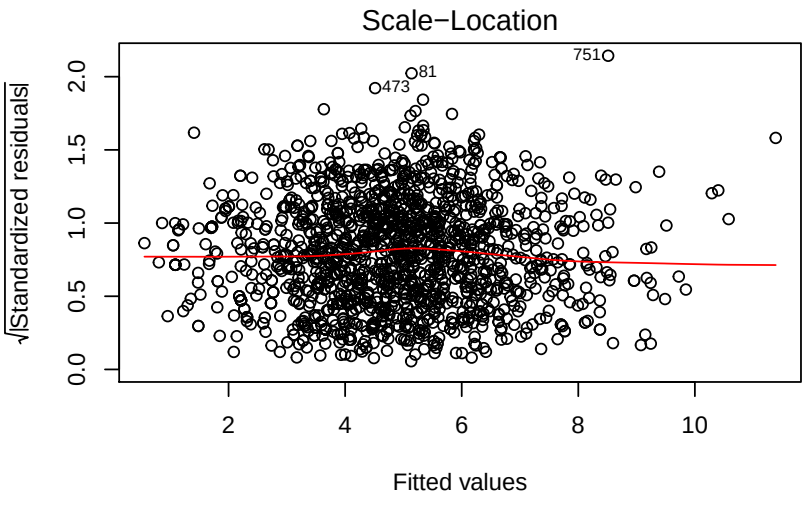
# Important Features

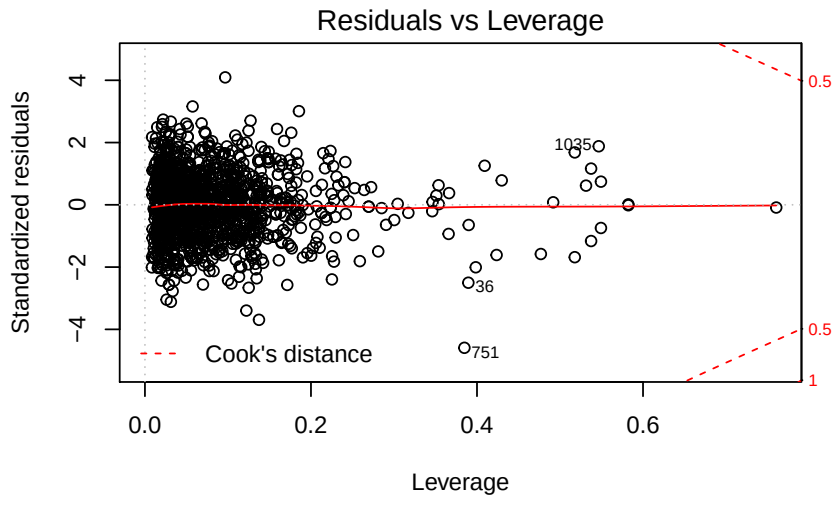


# Model Diagnostics



# Interesting Finding

- The most expensive five paintings predicted from the validation set all come from the same artist: Nicolaes Pieterszoon Berchem;
- Most of the more expensive paintings are auctioned from the deal 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 are doesn't mean high price;
- This painting is an example of highly priced paintings:

# Artist

# Painting 1

Figure 2: Pieterszoon's Painting

# Painting 2