



MULTIPLE AND LOGISTIC REGRESSION

Italian restaurants in NYC

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Instructor





La Masseria

FOOD	DECOR	SERVICE	COST
23	21	22	\$57

Showgoers tout this "quick-pace" Hell's Kitchen Southern Italian for its "hearty" cooking, "sweet farmhouse" setting and "fast" service that "gets you to the theater on time"; "crowded" conditions and "pricey-but-worth-the-money" tabs complete the overall appealing picture.

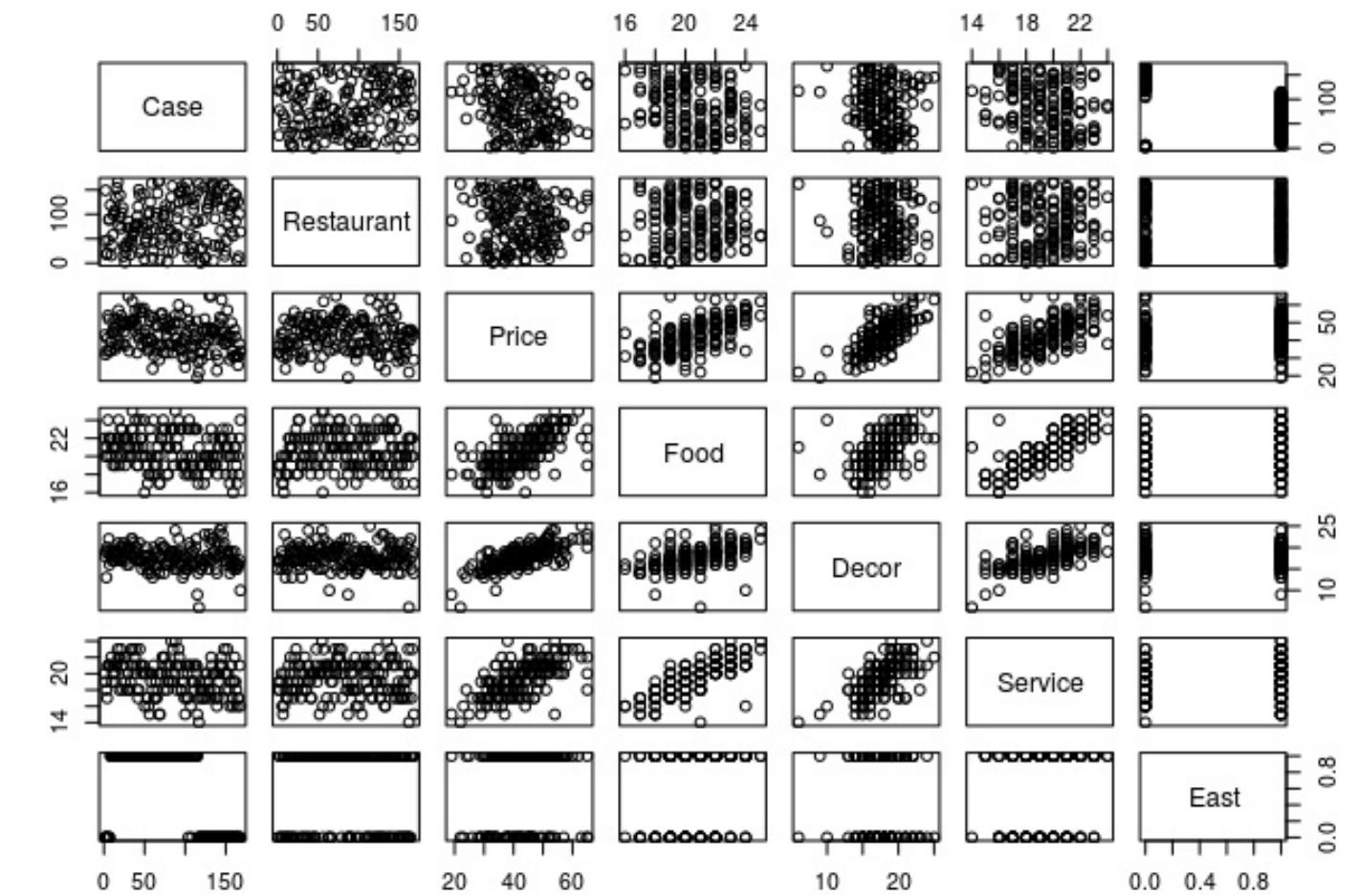
Exploring the data

```
glimpse(nyc)

## # Observations: 168
## # Variables: 7
## # $ Case      <int> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, ...
## # $ Restaurant <fctr> Daniella Ristorante, Tello's Ristorante, Biricchin...
## # $ Price      <int> 43, 32, 34, 41, 54, 52, 34, 34, 39, 44, 45, 47, 52, ...
## # $ Food       <int> 22, 20, 21, 20, 24, 22, 22, 20, 22, 21, 19, 21, 21, ...
## # $ Decor      <int> 18, 19, 13, 20, 19, 22, 16, 18, 19, 17, 17, 19, 19, ...
## # $ Service    <int> 20, 19, 18, 17, 21, 21, 21, 22, 19, 20, 21, 20, ...
## # $ East       <int> 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, ...
```

EDA

```
pairs(nyc)
```





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Let's practice!



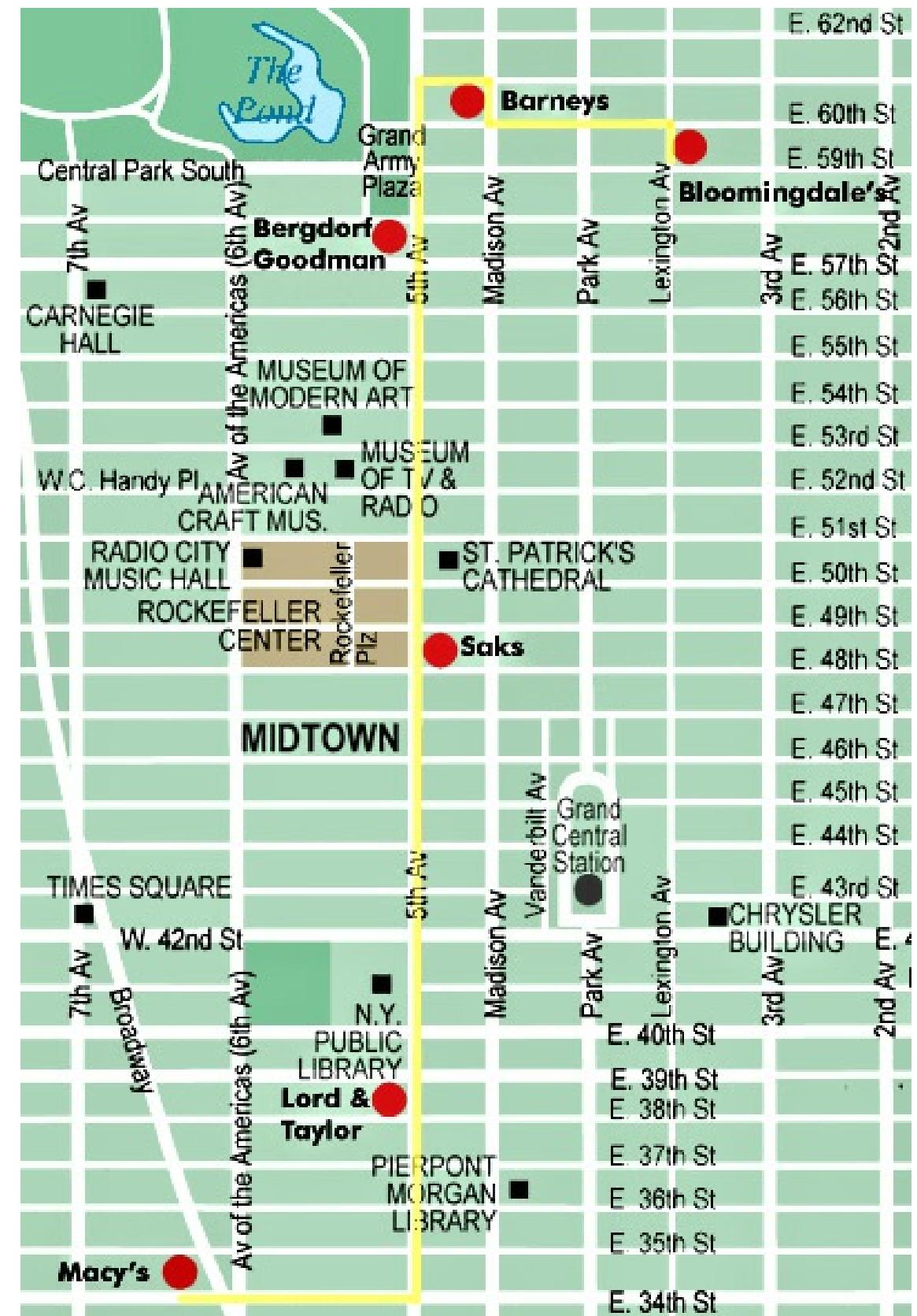
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Incorporating another variable

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The price of location

```
nyc %>%
  group_by(East) %>%
  summarize(mean_price = mean(Price))

# A tibble: 2 x 2
  East   mean_price
  <int>     <dbl>
1     0     40.43548
2     1     44.01887
```





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Higher dimensions

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Building a full model

- Response variable:
 - Price
- Explanatory variables
 - Food
 - Service
 - Decor
 - East (categorical)
- Unusable
 - Case
 - Restaurant

Collinearity

```
nyc %>%
  mutate(Price_cents = Price / 100) %>%
  summarize(cor_collinear = cor(Price, Price_cents))

##   cor_collinear
## 1              1
```

Multicollinearity

- Explanatory variables are highly correlated
- Unstable coefficient estimates
- Doesn't affect R^2
- Be skeptical of surprising results



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Wrap-up

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