Modeling in R and Tidying Results

linear models and broom

2023-08-03

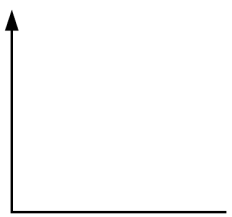
⚠️ *This is not a course in a regression*

Modeling in R

```
lm(y ~ x + z, data = df)
```

Modeling in R

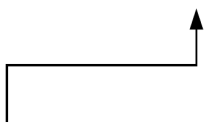
```
lm(y ~ x + z, data = df)
```



model function

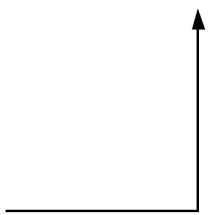
Modeling in R

```
lm(y ~ x + z, data = df)
```



variables in your data

your data



Modeling in R

```
lm(y ~ x + z, data = df)
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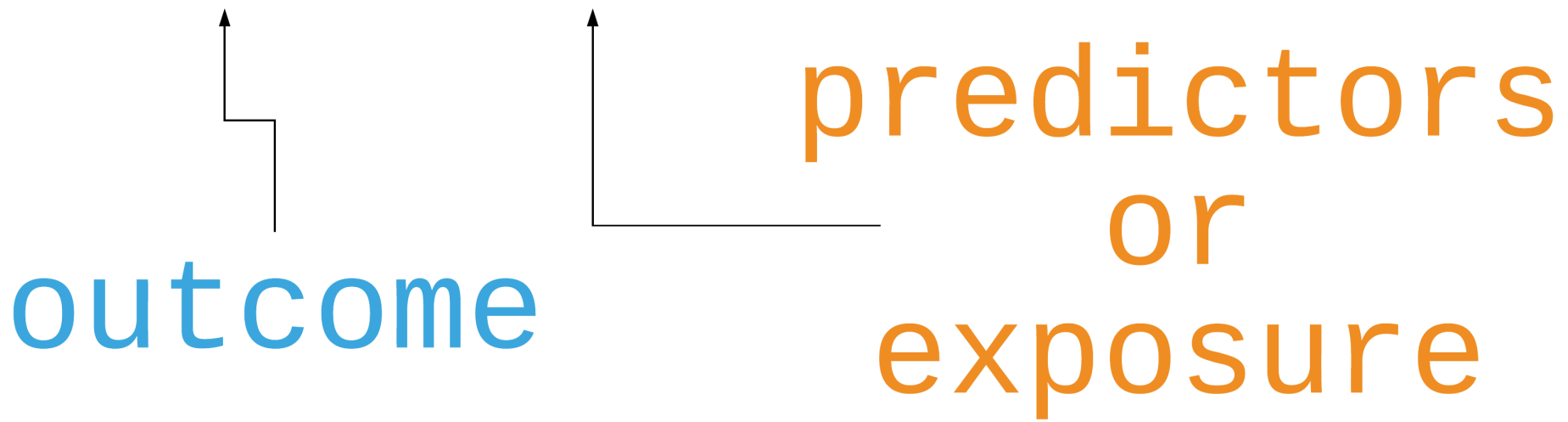

Modeling in R

`lm()` = *Linear Regression (OLS)*

`glm()` = *Generalized Linear Model (default family = Gaussian)*

Modeling in R

```
1  lm(price ~ carat, data = diamonds)
```

```
Call:
lm(formula = price ~ carat, data = diamonds)

Coefficients:
(Intercept)        carat
      -2256         7756
```

Modeling in R

```r
lm(price ~ carat, data = diamonds) |>
  summary()
```

```
Call:
lm(formula = price ~ carat, data = diamonds)

Residuals:
     Min       1Q   Median       3Q      Max
-18585.3   -804.8    -18.9    537.4  12731.7

Coefficients:
             Estimate Std. Error t value             Pr(>|t|)
(Intercept) -2256.36      13.06  -172.8 <0.0000000000000002 ***
carat        7756.43      14.07   551.4 <0.0000000000000002 ***
---
```

`broom`: tidy models

`tidy()`

`glance()`

`augment()`

`broom`: tidy models

`tidy()` = *model coefficients*

`glance()`

`augment()`

`broom`: tidy models

`tidy()`

`glance()` = *model fit*

`augment()`

`broom`: tidy models

`tidy()`

`glance()`

`augment()` = *model predictions*

`broom`: tidy models

`tidy()`

`glance()`

`augment()`

NOT a core member of the tidyverse. Need to load with `library(broom)`

Modeling in R

```r
library(broom)
lm(price ~ carat, data = diamonds) |>
  tidy()
```

```
# A tibble: 2 × 5
  term        estimate std.error statistic p.value
  <chr>          <dbl>     <dbl>     <dbl>   <dbl>
1 (Intercept)   -2256.      13.1     -173.       0
2 carat          7756.      14.1      551.       0
```

Modeling in R

```
lm(price ~ carat, data = diamonds) |>
  glance()
```

```
# A tibble: 1 × 12
  r.squared adj.r.squared sigma statistic p.value    df
      <dbl>         <dbl> <dbl>     <dbl>   <dbl> <dbl>
1     0.849         0.849 1549.   304051.       0     1
# ℹ 6 more variables: logLik <dbl>, AIC <dbl>, BIC <dbl>,
#   deviance <dbl>, df.residual <int>, nobs <int>
```

Modeling in R

```
lm(price ~ carat, data = diamonds) |>
  augment()
```

```
# A tibble: 53,940 × 8
   price carat .fitted .resid      .hat .sigma     .cooksd
   <int> <dbl>   <dbl>  <dbl>     <dbl>  <dbl>       <dbl>
 1   326  0.23 -472.     798. 0.0000452  1549. 0.00000600
 2   326  0.21 -628.     954. 0.0000471  1549. 0.00000892
 3   327  0.23 -472.     799. 0.0000452  1549. 0.00000602
 4   334  0.29   -7.00   341. 0.0000398  1549. 0.000000966
 5   335  0.31  148.     187. 0.0000382  1549. 0.000000278
 6   336  0.24 -395.     731. 0.0000442  1549. 0.00000493
 7   336  0.24 -395.     731. 0.0000442  1549. 0.00000493
 8   337  0.26 -240.     577. 0.0000424  1549. 0.00000294
 9   337  0.22 -550.     887. 0.0000461  1549. 0.00000756
10   338  0.23 -472.     810. 0.0000452  1549. 0.00000618
# ℹ 53,930
```

Try it yourself

Work your way through the exercises. If anything in particular is giving you trouble, we'll work through it together.

Resources

Tidy Models with R: a deeper dive into tidymodels. Free online. Focused on machine learning and prediction.

Causal Inference in R: Causal modeling in R. Free online.

UCLA IDRE: Useful resources on modeling in R and other languages