Grammar of Graphics

Data visualizations are made up of layers. Each layer consists of three parts:

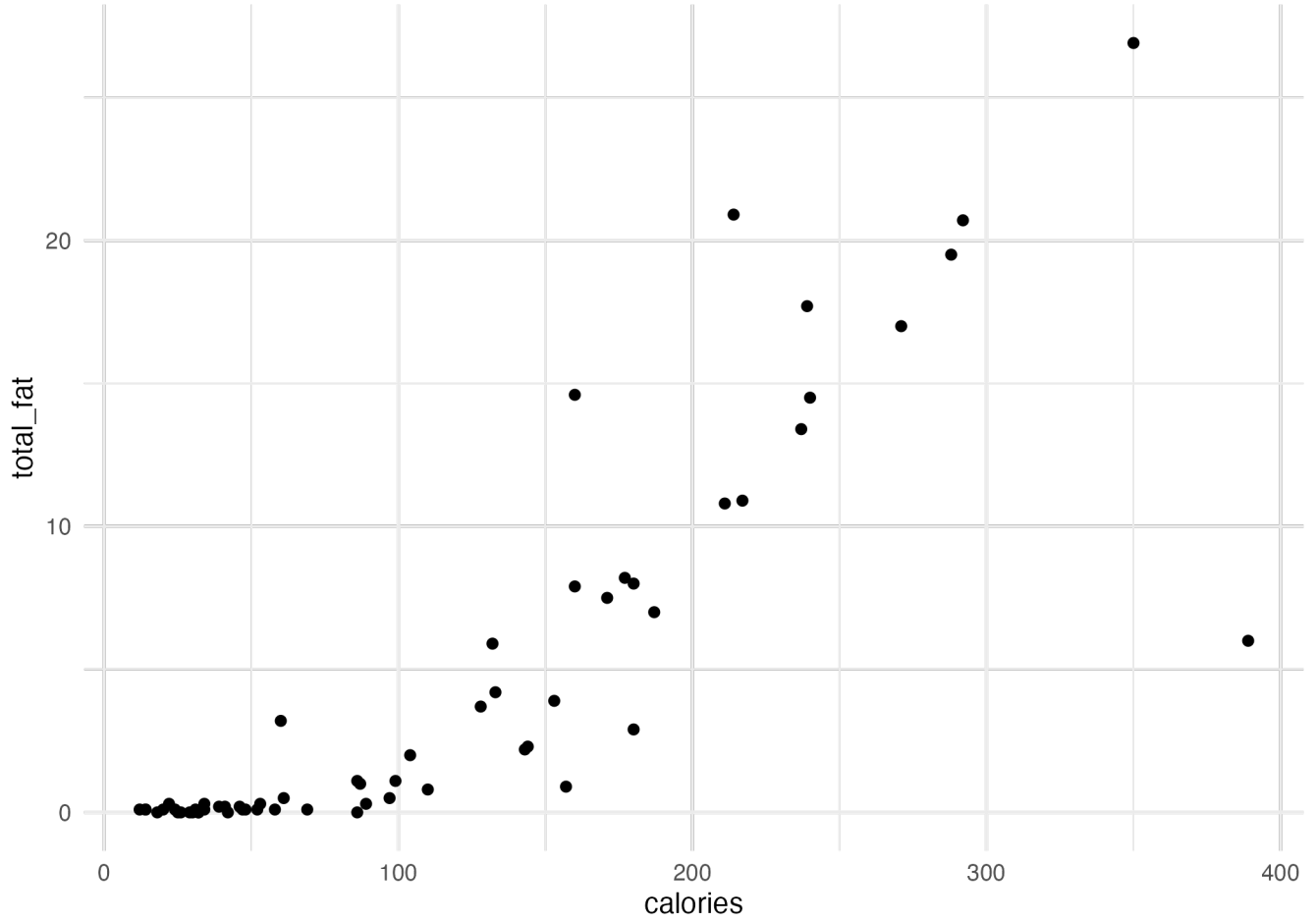
data	**tabular dataset** associated with the layer
geom	graphical element associated with each **observation**
aesthetics (aes)	mappings from properties of the plot that associate **features** in the dataset with elements of the geometry

Complex plots can be constructed by putting together multiple layers.

Scatter Plot Example

data: food
geom: point
aes: { x: calories, y: total_fat }

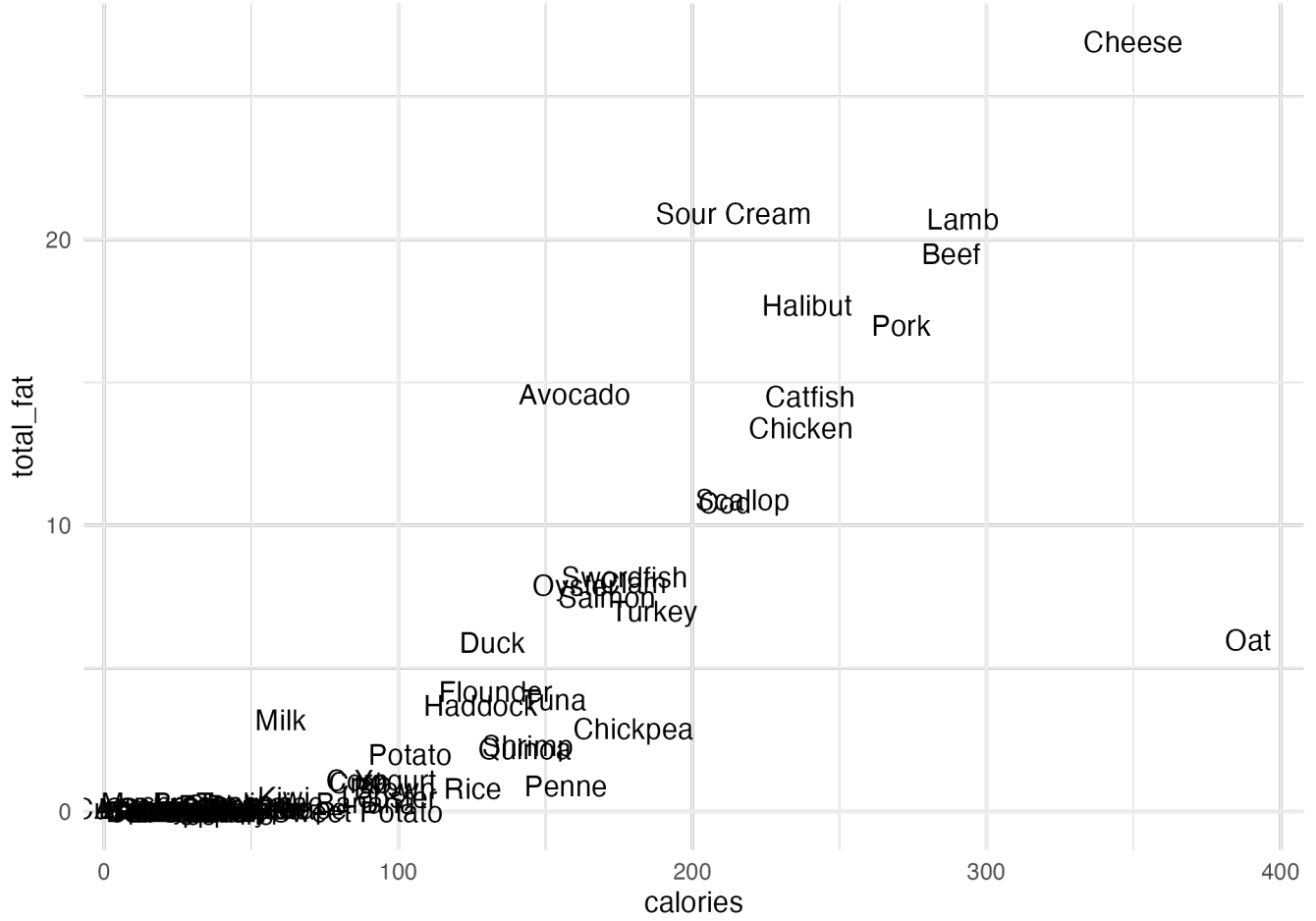
each **observation** in the food dataset is represented by a point



Text Plot Example

data: food
geom: text
aes: { x: calories,
y: saturated_fat
label: item }

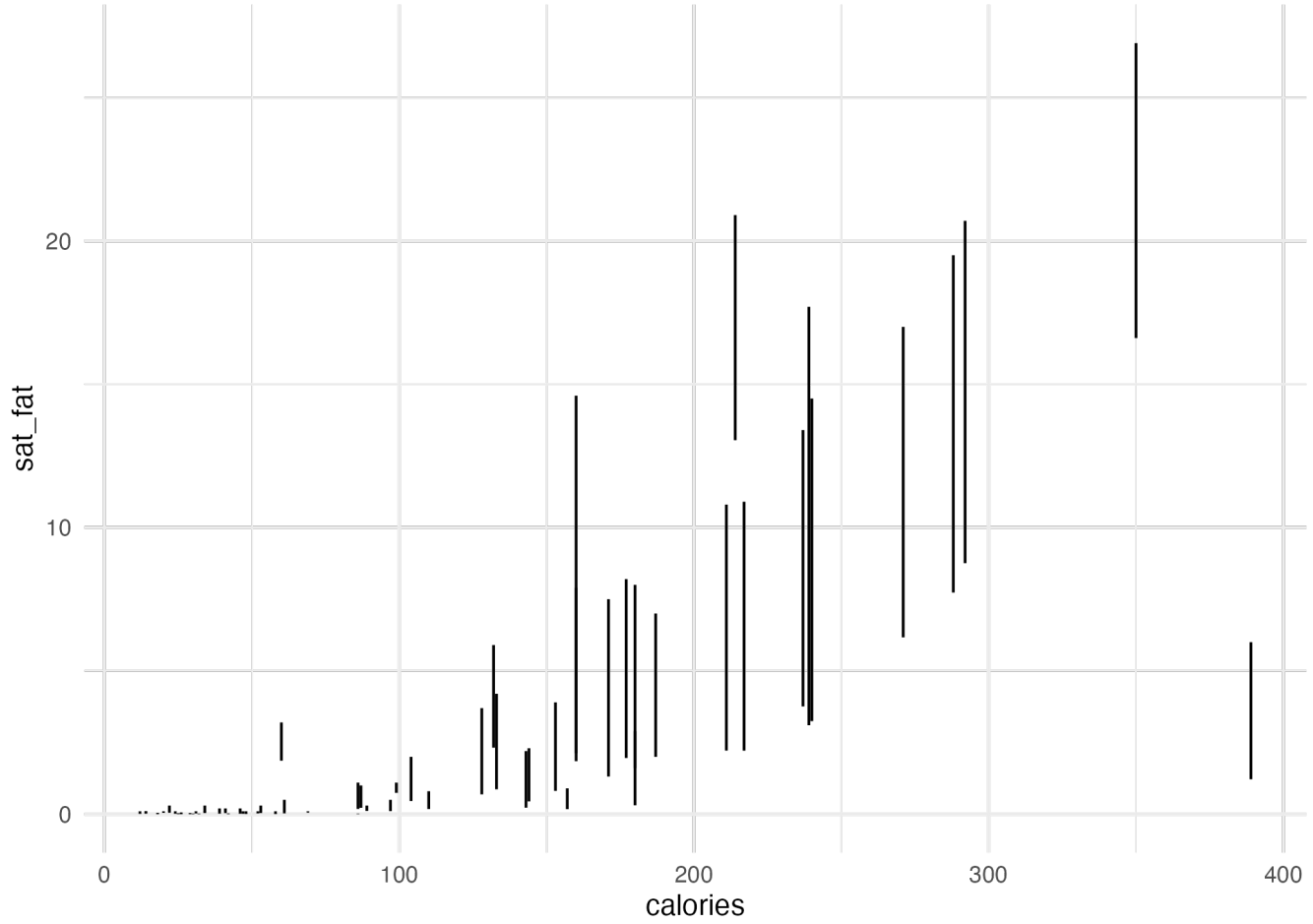
each **observation** in the food dataset is represented by a textual label



Segment Plot Example

data: food
geom: segment
aes: { x: calories,
y: saturated_fat
xend: calories,
yend: total_fat }

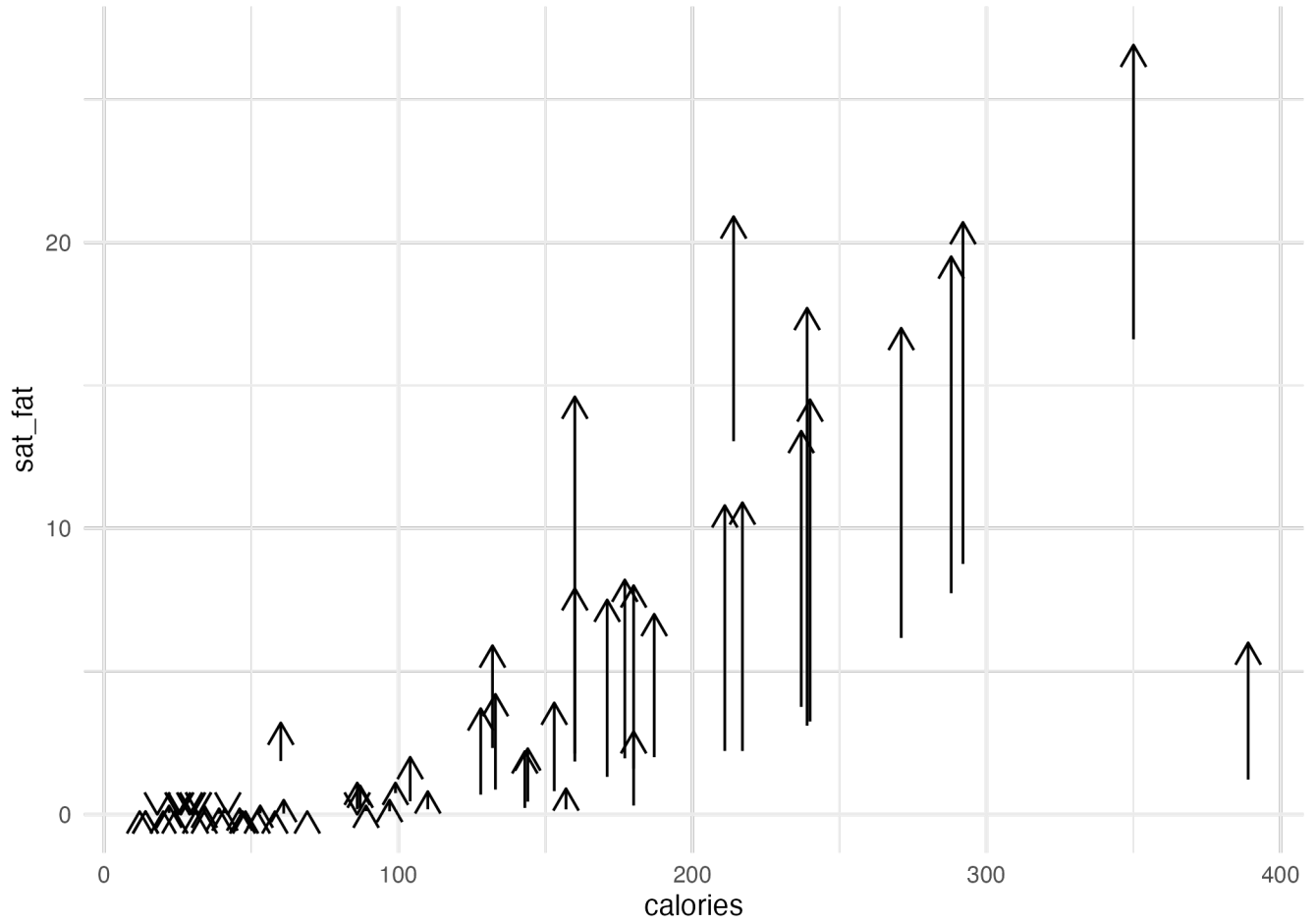
each observation in the food dataset is represented by a vertical line segment



Arrow Plot Example

data: food
geom: segment (+ some options)
aes: { x: calories,
y: saturated_fat
xend: calories,
yend: total_fat }

each observation in the food dataset is represented by a vertical line segment plus an arrow!



Syntax

data: food
geom: point
aes: { x: calories, y: total_fat }

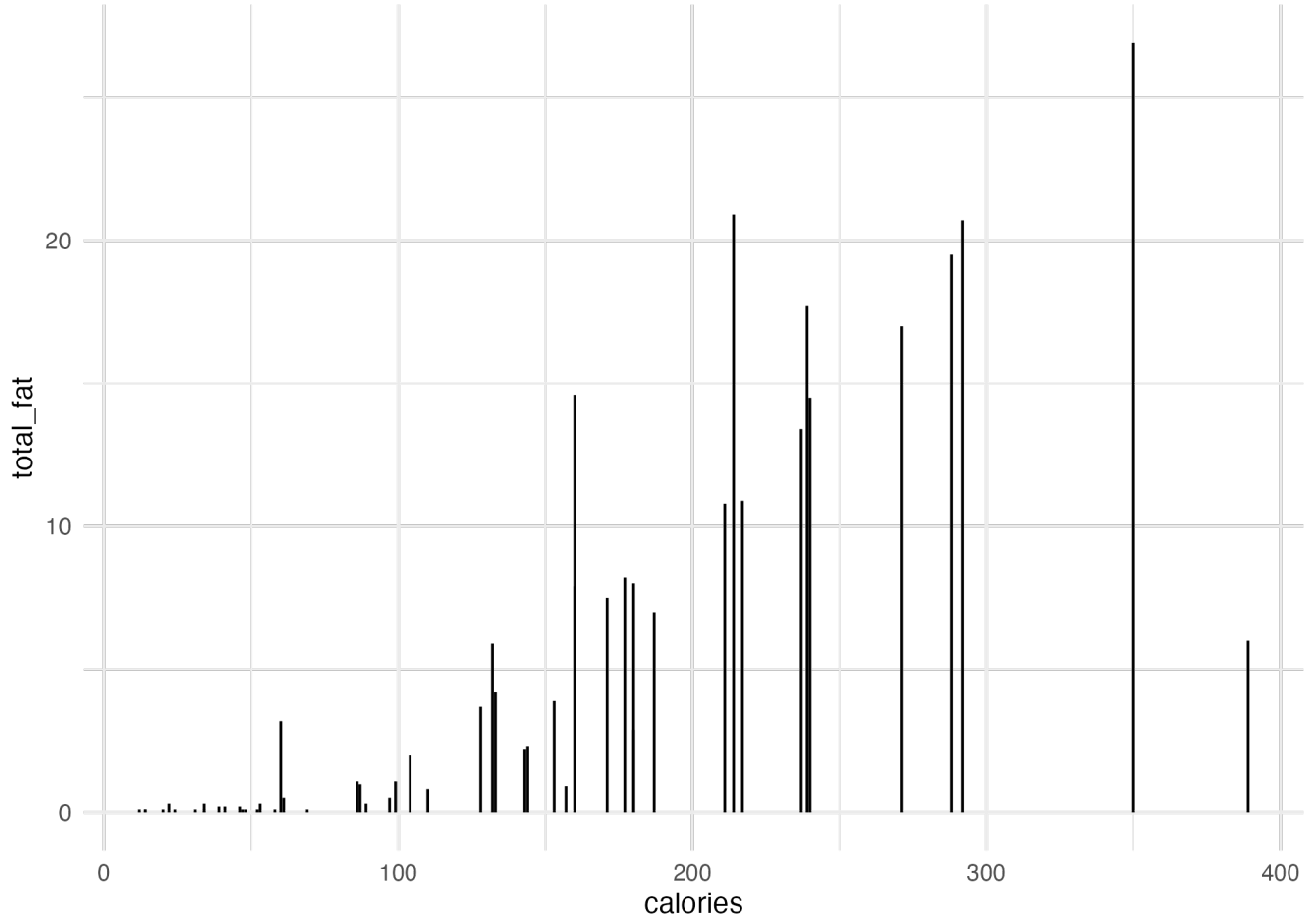
```
food %>%
  ggplot() +
    geom_point(aes(x = calories, y = total_fat))
```

data: food
geom: text
aes: { x: calories,
y: saturated_fat
label: item }

```
food %>%
  ggplot() +
    geom_text(aes(x = calories, y = total_fat,
                  label = item))
```

Fixed Aesthetics

data: food
geom: segment
aes: { x: calories,
y: **0**,
xend: calories,
yend: total_fat }



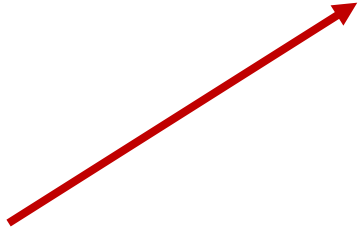
we can map an aesthetic to a fixed value rather than a feature

we will see even better examples of why this is useful next time!

Fixed Aesthetic Syntax

data: food
geom: segment
aes: { x: calories, y: **0**, xend: calories, yend: total_fat }

```
food %>%
  ggplot() +
    geom_segment(aes(x = calories, xend = calories, yend = total_fat), y = 0)
```



fixed aesthetics go OUTSIDE the aes function
but inside the geom_* function