

# **1. Intro to Grammar of Graphics**

# Grammar of Graphics

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

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

Complex plots can be constructed by putting together multiple layers.

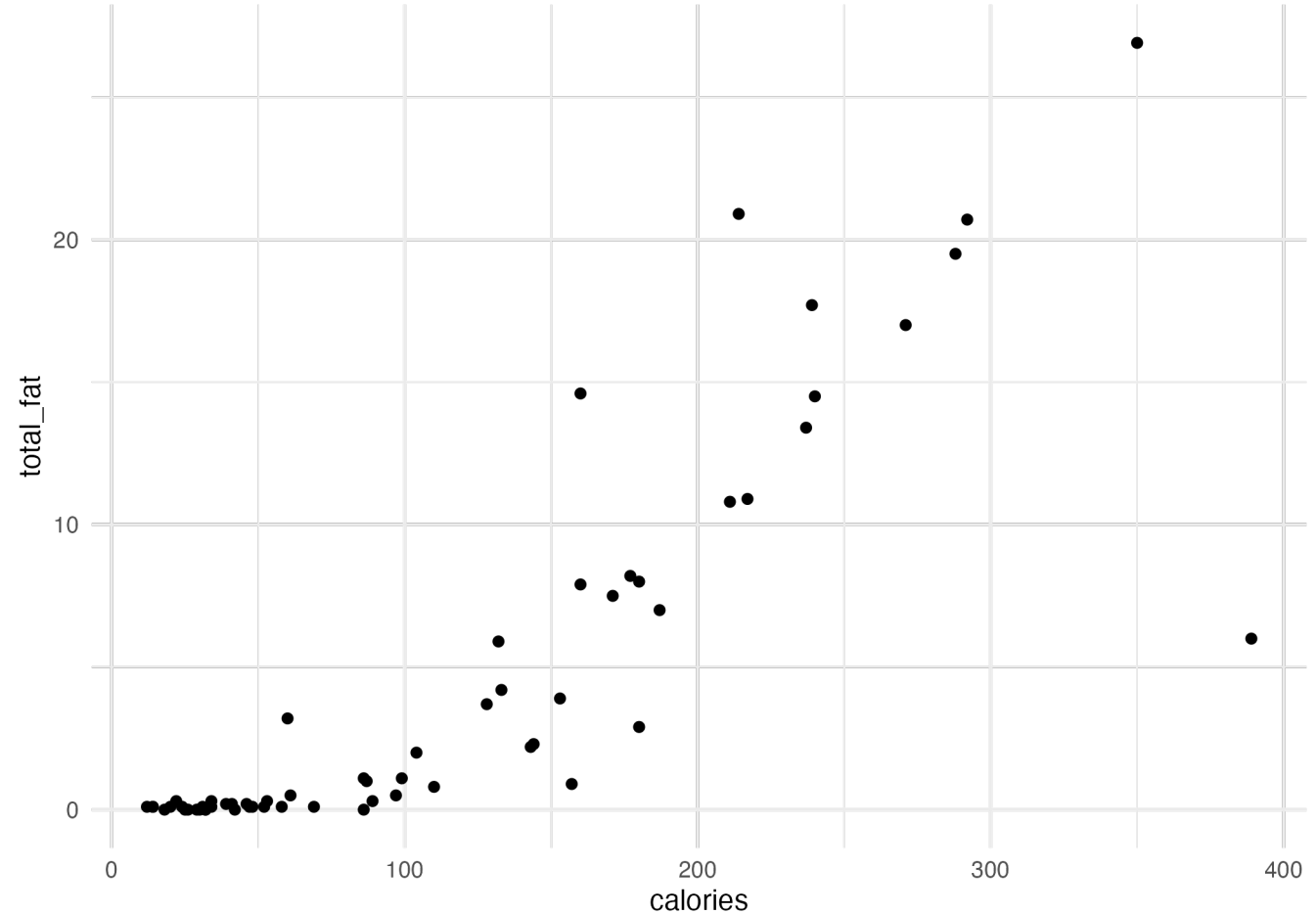
# Scatter Plot Example

**data:** food

**geom:** point

**aes:** { x: calories, y: total\_fat }

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



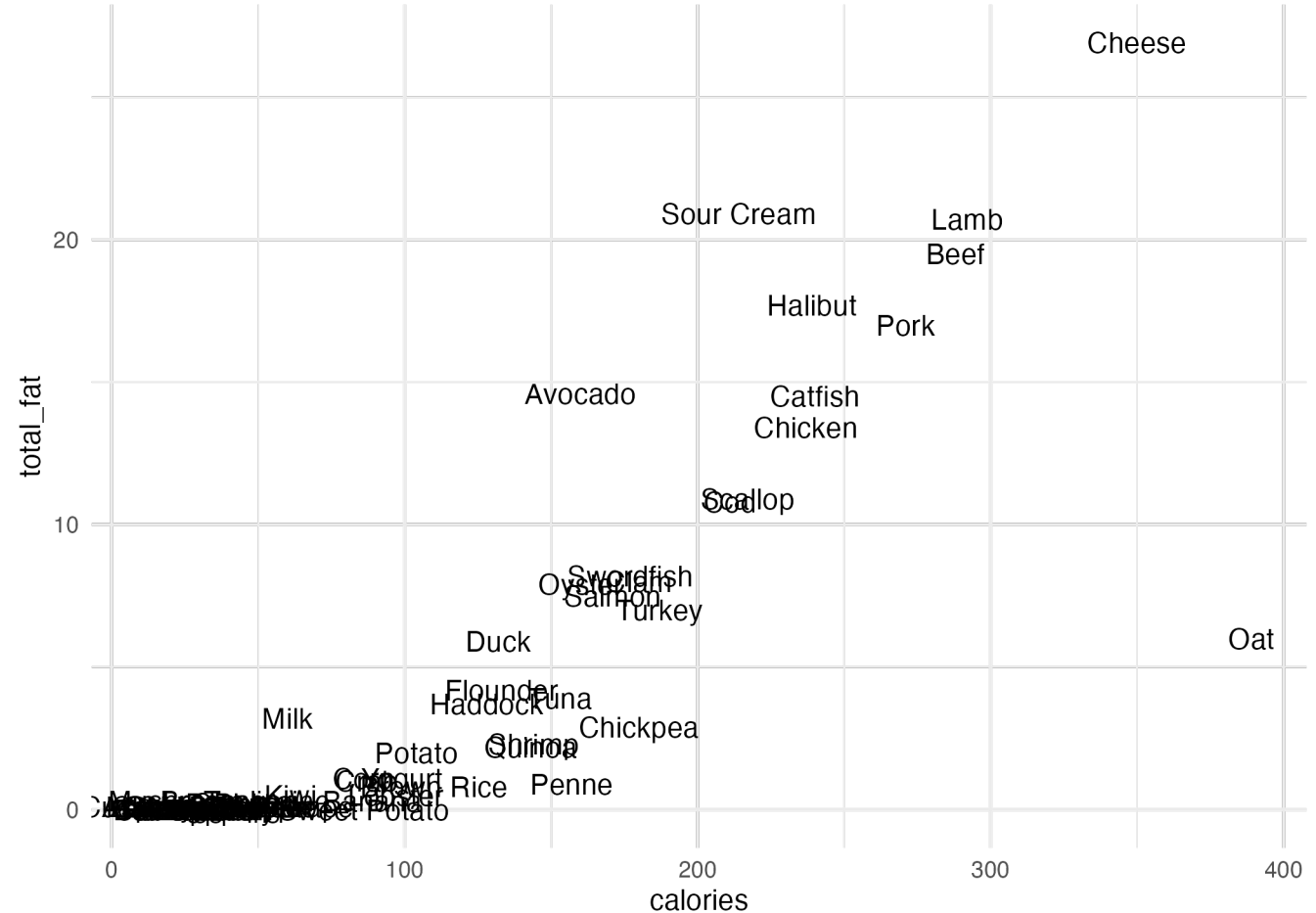
# Text Plot Example

**data:** food

**geom:** text

**aes:** { x: calories,  
y: saturated\_fat  
label: item }

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



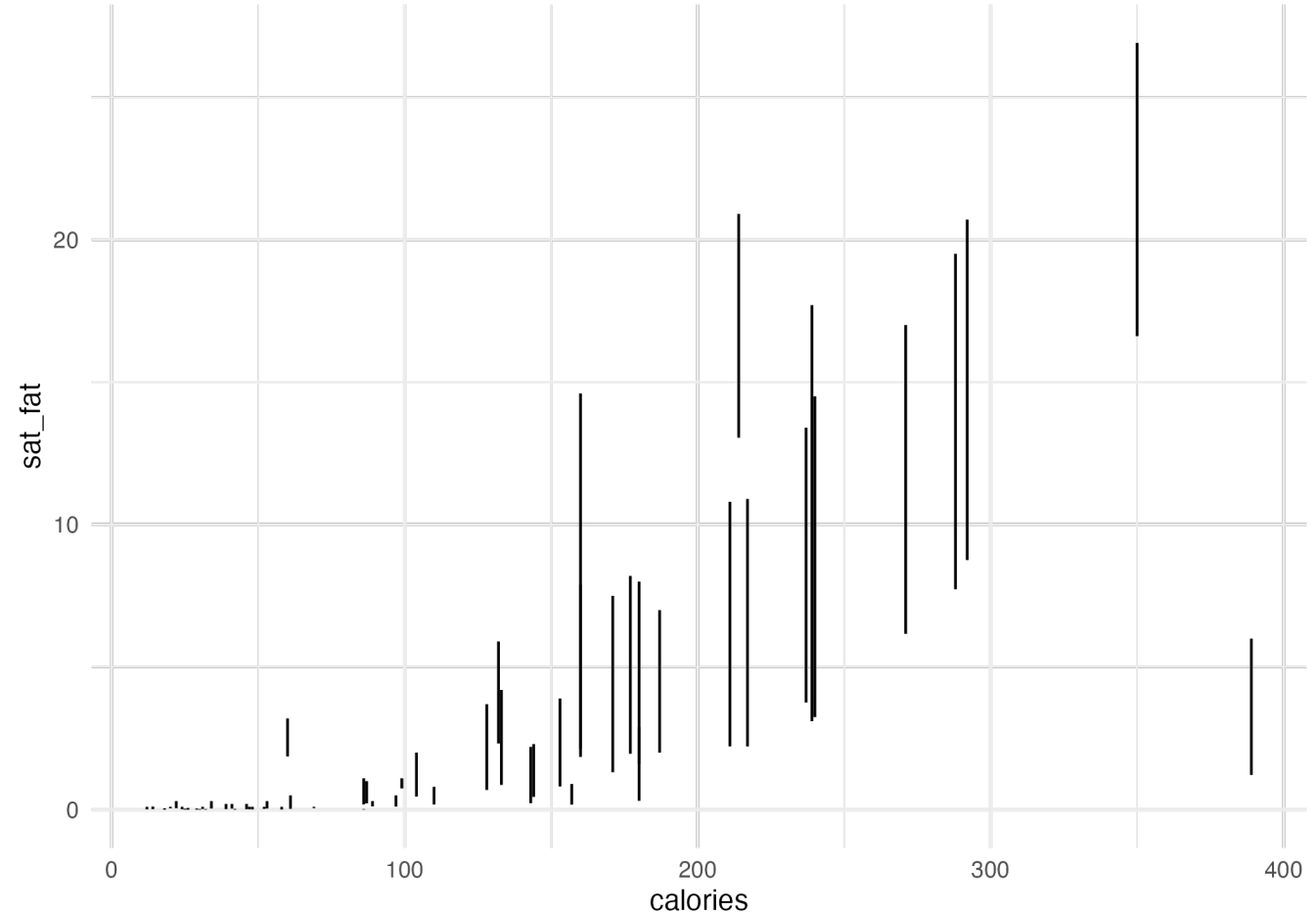
# Segment Plot Example

**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



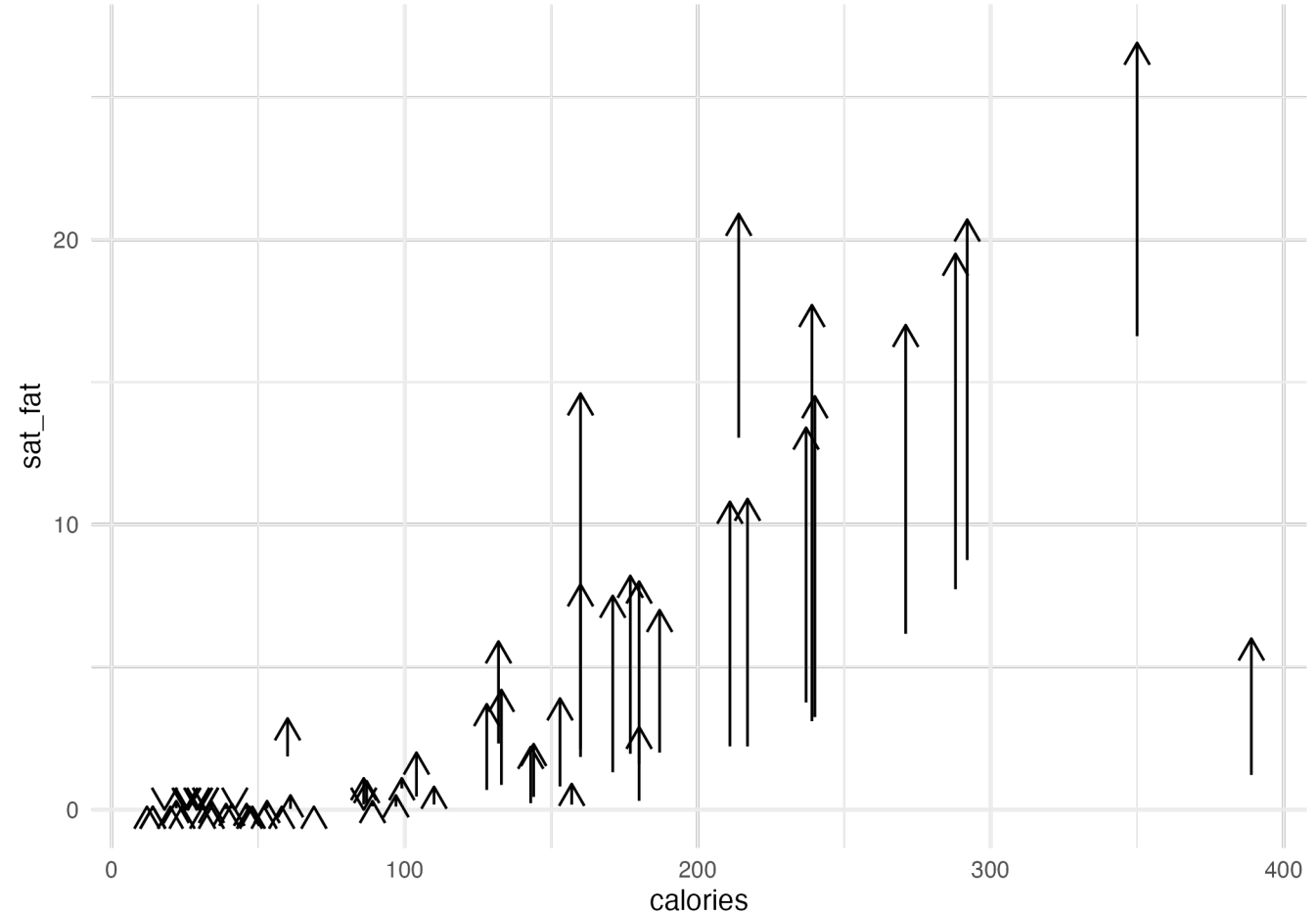
# Arrow Plot Example

**data:** food

**geom:** arrow

**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))
```

## 2. Fixed Aesthetics



# Fixed Aesthetics

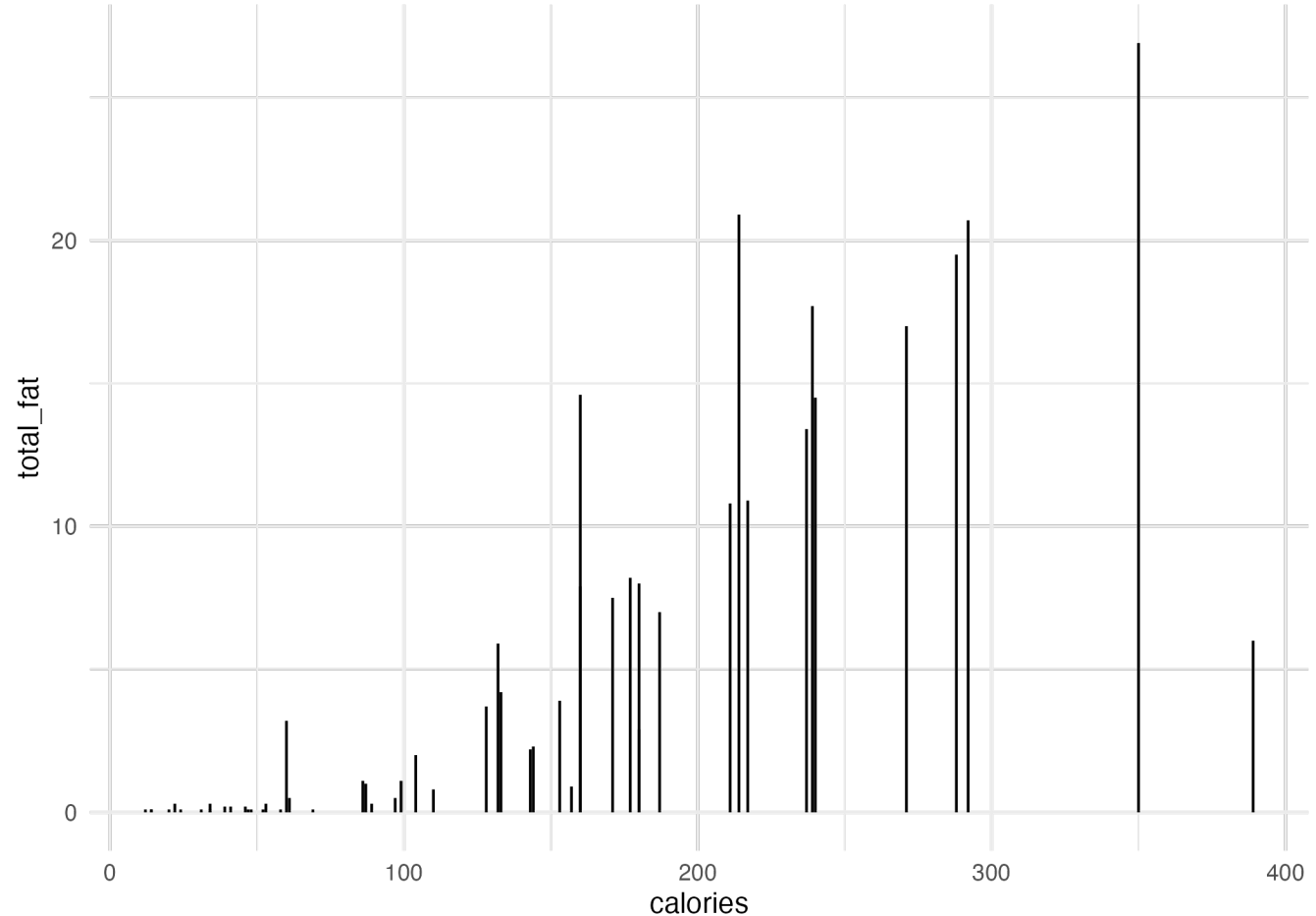
**data:** food

**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

