Week 2

Variables

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Outline

Recap

Variables

Example

Scientific method

- Try to be “objective”
- Theories should be falsifiable
- Research should be reproducible
- Knowledge is cumulative and provisional

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Variables

Example

Variable

- A **constant** is a fixed value that never changes.
    - e.g., pi, the number 1, etc.
- A **variable** is a value that differs across observations.
    - can often be thought of as features or characteristics

Variable values

- **Values** are measurements (observations) on a given variable
    - e.g., Tracy's height (variable) is `6'6''` (value)
    - e.g., Avery's final race position (variable) is `1` (value)
    - e.g., Cory's skill level in chess (variable) is `master` (value)
    - e.g., Rory's hometown (variable) is `Kansas City` (value)
- Different levels of measurement enable different levels of analysis

Levels of measurement

- Nominal
- Ordinal
- Interval
- Ratio

Ratio/numeric/interval

Numeric variables are [or represent] real numbers.

```
foo <- function(x) {
  rnorm(x)
}
foo(5)
## [1]  1.6611164  0.5662811  0.1319759 -0.6425423  0.5179032
class(c(1.25, 3.5, 4))
## 'numeric'
```

Technically, if there's a true zero, then it's considered "ratio". Otherwise, it's "interval".

Ordinal/integer

Ordinal variables are a meaningful sequence of integers.

```
class(1:3)
## 'integer'
```

Categorical/character

Categorical variables are used to represent nominal-level categories.

```
class(c('a', 'b', 'c'))
## 'character'
```

Defining variables

Conceptual definition

- A description of a variable's abstract [or theoretical] meaning.

Operational definition

- A description of a variable's practical [or observable] meaning.

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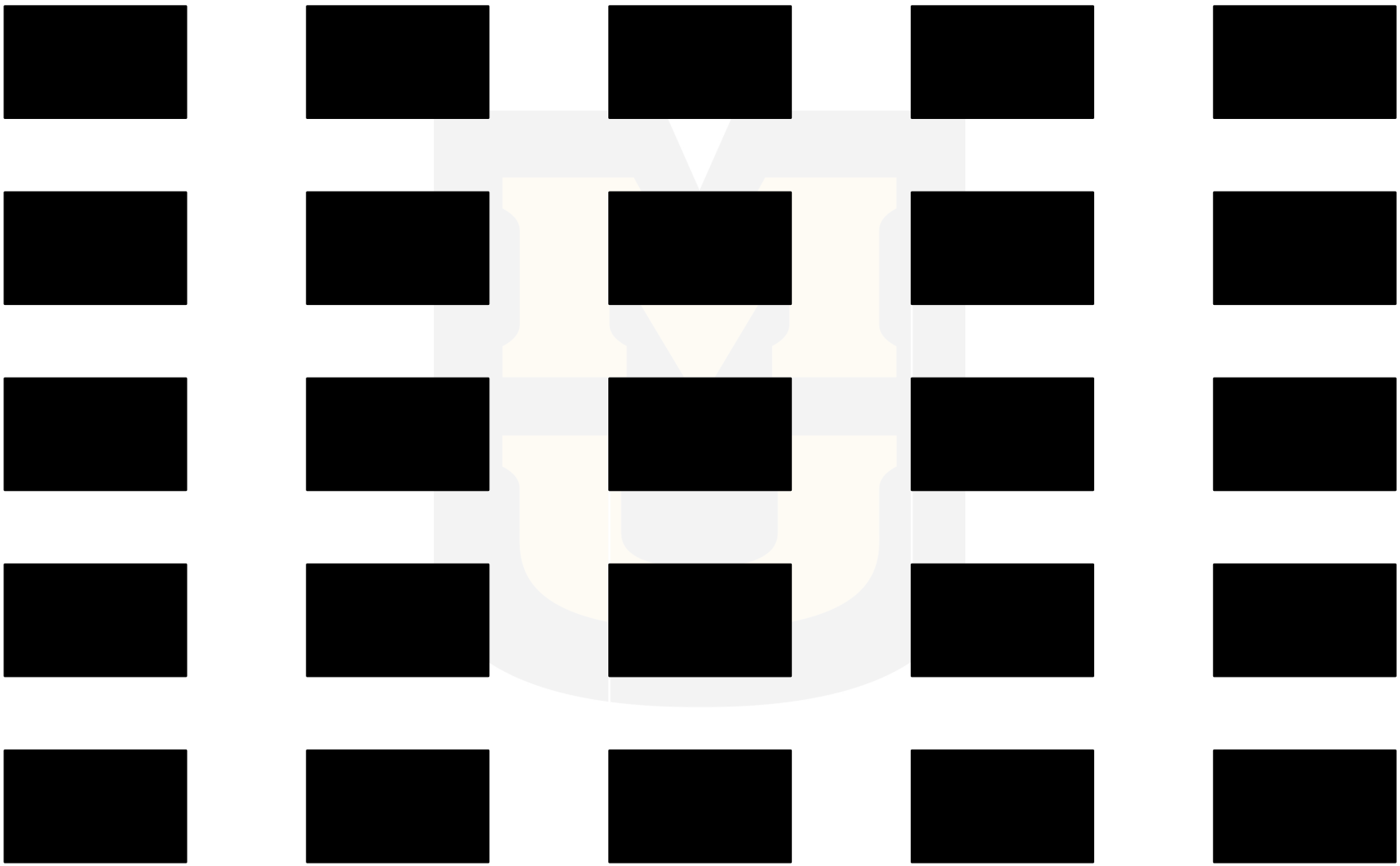
Size

Define the word size

- **Size** refers to the dimensions of an object

Class 1



Class 2

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