Tidy data

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Separate tables for different observational units

Table of individual people

Age	Sex	City
37	male	Houston
19	male	Houston
8	female	Austin
78	female	Dallas

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Age	Sex	City
37	male	Houston
19	male	Houston
8	female	Austin
78	female	Dallas

Table of cities

City	Area	Population
Houston	608	2,239,558
Austin	307	912,791
Dallas	386	NA
San Antonio	NA	1,436,697

Working with tidy data in R: tidyverse

Fundamental actions on data tables:

- choose rows — `filter()`
- choose columns — `select()`
- make new columns — `mutate()`
- arrange rows — `arrange()`
- calculate summary statistics — `summarize()`
- work on groups of data — `group_by()`

Working with tidy data in R: dplyr

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- choose rows — `filter()`
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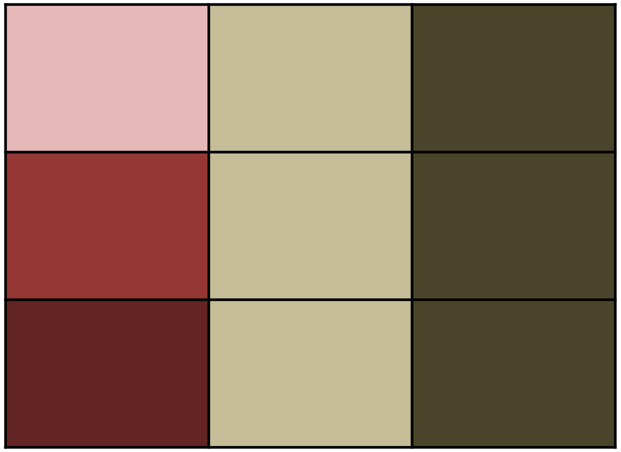
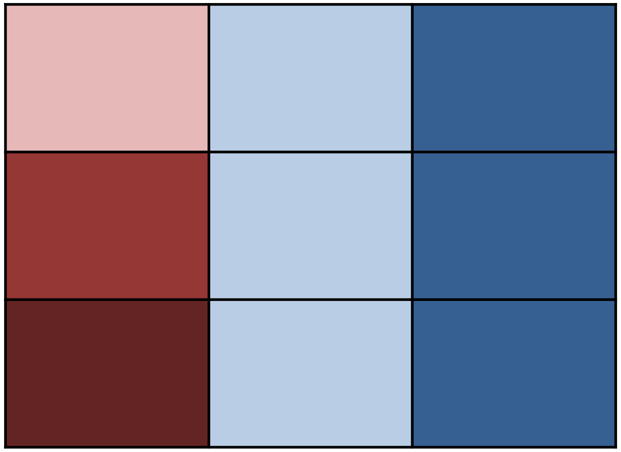
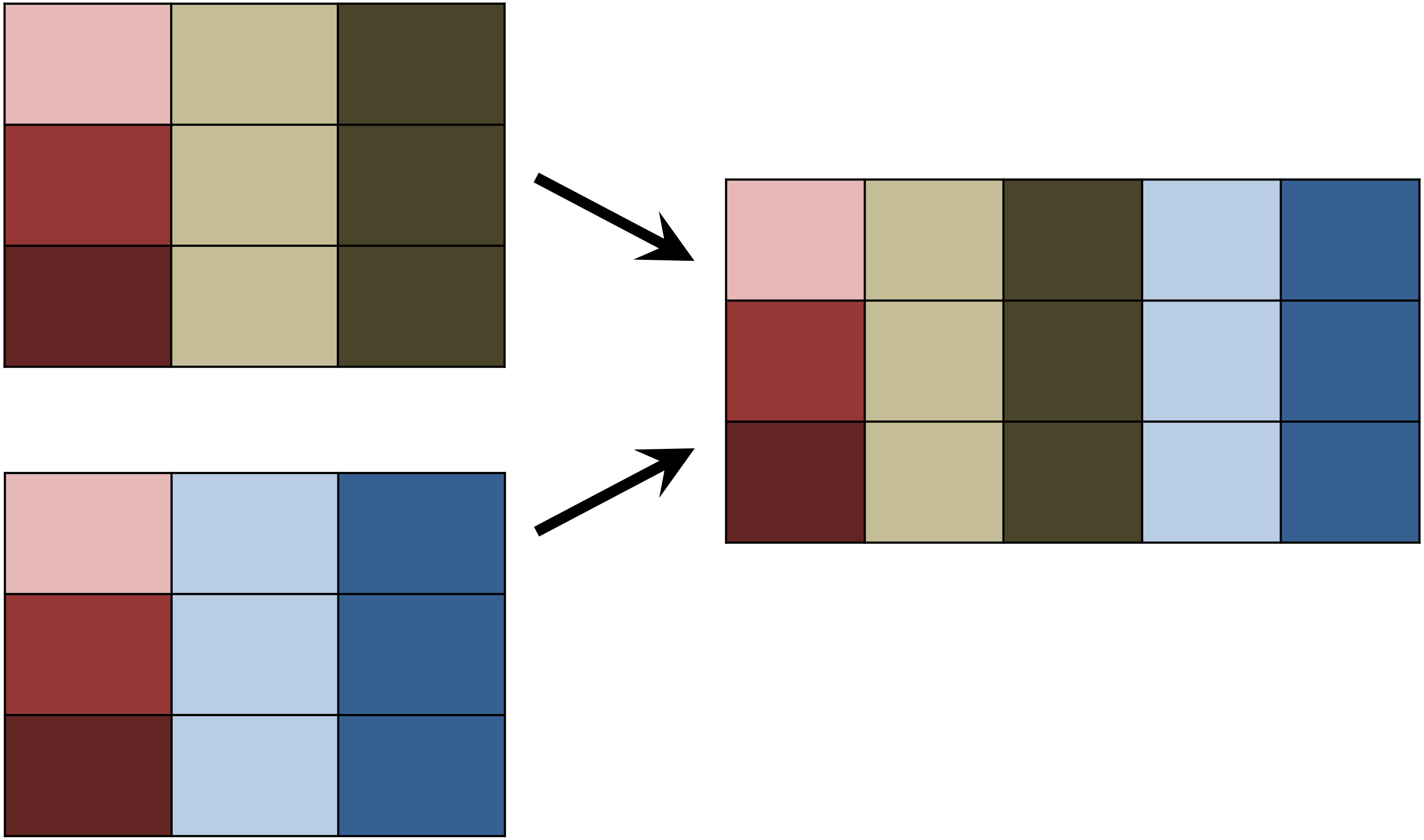
- make new columns — `mutate()`
- arrange rows — `arrange()`
- calculate summary statistics — `summarize()`
- work on groups of data — `group_by()`
- combine tables — `left_join(), ...`

left_join(): combine two tables

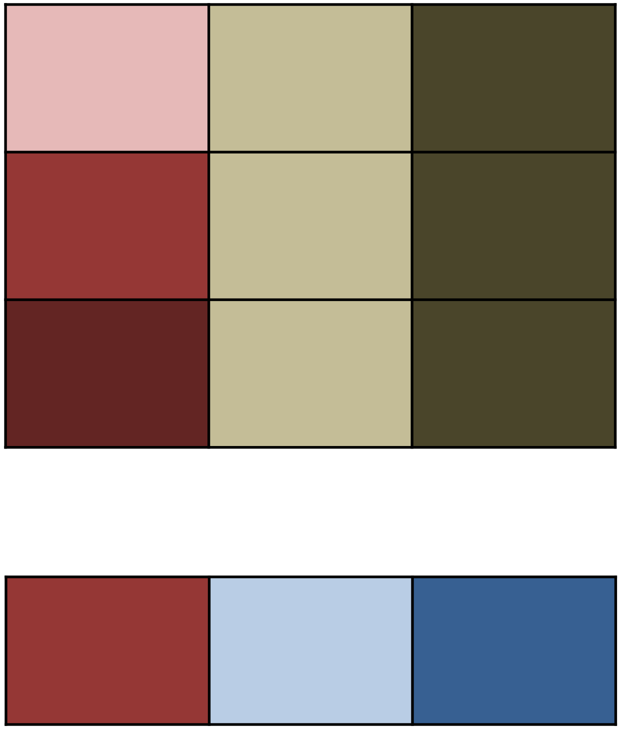




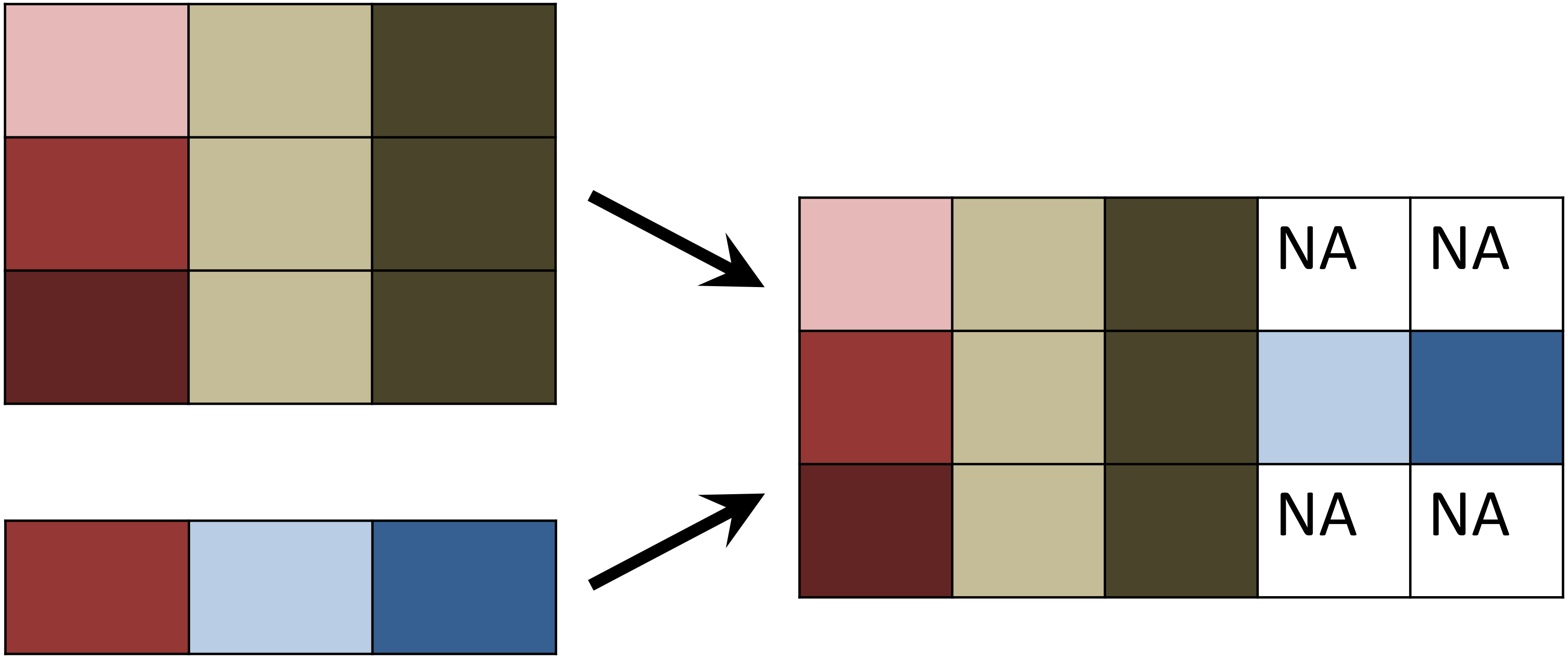
`left_join()`: combine two tables



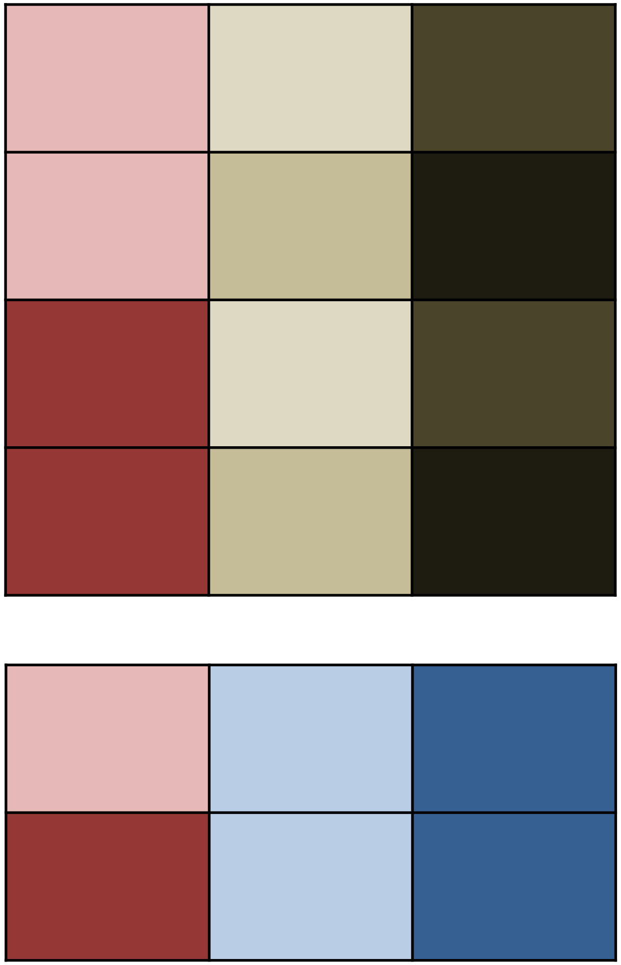
`left_join()`: missing values in 2nd table are set to NA



`left_join()`: missing values in 2nd table are set to NA



`left_join()`: values from 2nd table are duplicated where necessary



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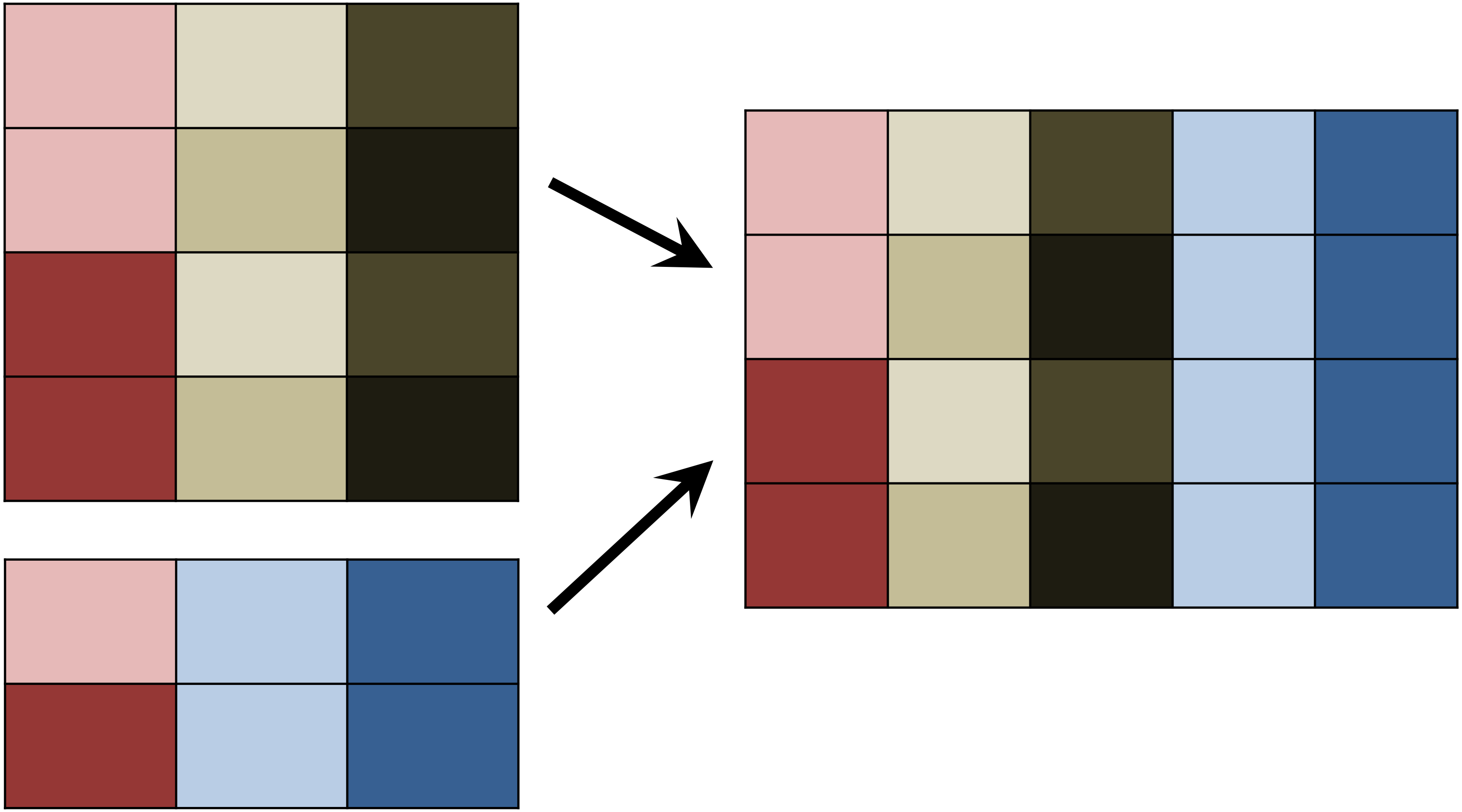

Example: Joining tables

Let’s extract two tables from msleep:

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```
> order_table <- select(msleep, name, order)
> order_table
                             name           order
1                         Cheetah       Carnivora
2                      Owl monkey        Primates
3                 Mountain beaver        Rodentia
4      Greater short-tailed shrew    Soricomorpha
5                             Cow    Artiodactyla
6                Three-toed sloth          Pilosa
7               Northern fur seal       Carnivora
8                    Vesper mouse        Rodentia
9                             Dog       Carnivora
10                       Roe deer    Artiodactyla
```

Example: Joining tables

Let’s extract two tables from msleep:

```
> awake_table <- select(msleep, name, awake)
> awake_table
                             name awake
1                         Cheetah 11.90
2                      Owl monkey  7.00
3                 Mountain beaver  9.60
4      Greater short-tailed shrew  9.10
5                             Cow 20.00
6                Three-toed sloth  9.60
7               Northern fur seal 15.30
8                    Vesper mouse 17.00
9                             Dog 13.90
10                       Roe deer 21.00
```

Example: Joining tables

And put them back together:

```
> left_join(order_table, awake_table)
```

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And put them back together:

```
> left_join(order_table, awake_table)
Joining by: "name"
                             name           order awake
1                         Cheetah       Carnivora 11.90
2                      Owl monkey        Primates  7.00
3                 Mountain beaver        Rodentia  9.60
4      Greater short-tailed shrew    Soricomorpha  9.10
5                             Cow    Artiodactyla 20.00
6                Three-toed sloth          Pilosa  9.60
7               Northern fur seal       Carnivora 15.30
8                    Vesper mouse        Rodentia 17.00
9                             Dog       Carnivora 13.90
10                       Roe deer    Artiodactyla 21.00
```

Several different join functions are available

- `left_join()`
- `right_join()`
- `inner_join()`
- `semi_join()`
- `full_join()`
- `anti_join()`