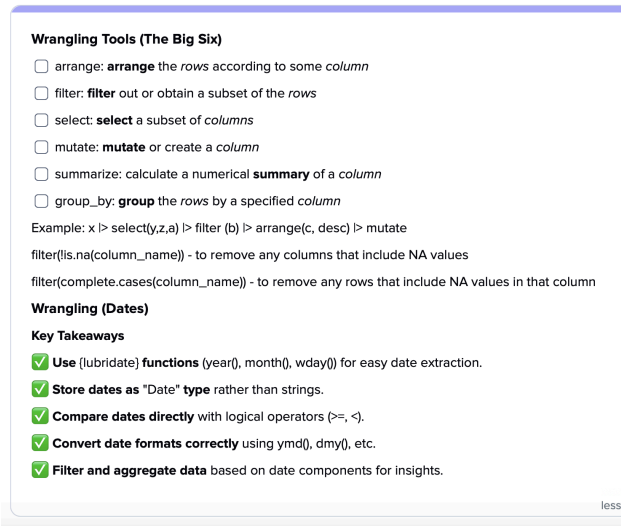
Data Wrangling



Types of Reshaped Data

1. **Aggregate Data:** Summarizes observations but loses individual-level data (e.g., using group_by() with summarize()).

2. **Raw Data, Reshaped:** Retains individual observations but is structured differently for analysis.

Join Type	Keeps All Left?	Keeps All Right?	Keeps Only Matches?	Adds Columns?
left_join ()	☑	☐	☐	☑
inner_join	☐	☐	☑	☑
full_join	☑	☑	☐	☑
semi_join	☐	☐	☑	☐
anti_join	☐	☐	☐	☐

Final Notes
Mutating joins (left_join, inner_join, full_join) are best for combining datasets.
Filtering joins (semi_join, anti_join) are best for selecting relevant rows.
• Always consider **which table should be the left table**—this affects the output.

- ❖ left_join() → Keep all students, add enrollment if available.
- ❖ inner_join() → Keep only students with enrollment data.
- ❖ full_join() → Keep everything, even if some values are missing.
- ❖ semi_join() → Keep students whose class has enrollment data, but don't add the extra column.
- ❖ anti_join() → Find students whose class has no enrollment data.

Categorical Variables: Characters and Factors

• Categorical variables (character or factor types) require special tools and considerations.
Two main considerations:
1. **Regular expressions**: Used to detect, replace, or extract patterns in character strings.
2. **Converting characters to factors**: Helps in organizing categorical data meaningfully
Regular Expressions & Character Manipulation
• Example dataset: Course sessions data with variables like sessionID, dept, level, sem, enroll, and iid.
• Replacing text (e.g., changing FA to fall_, SP to spring_).
• Filtering (e.g., keeping only courses taught in the fall).
• Splitting variables (e.g., extracting semester and year separately).
Converting Characters to Factors
Example 1: Default Order Issue
• Dataset: U.S. presidential election results by county.
• Created a new categorical variable, dem_support_20, based on Republican-Democrat vote differences.
• Problem: The variable is stored as a **character** type, causing alphabetical ordering.
Example 2: Reordering Levels using fct_relevel
• **Solution**: Convert dem_support_20 into a **factor** with a meaningful order.
• Used fct_relevel() to define the order: "low", "medium", "high".
• This ensures that categorical data is displayed meaningfully in summaries and visualizations.
Example 3: Changing Labels using fct_recode
• **Problem**: Existing category labels (low, medium, high) may not be descriptive enough.
• **Solution**: Used fct_recode() to rename categories:
• "low" → "strong republican"
• "medium" → "close race"
• "high" → "strong democrat"
• This improves clarity while maintaining meaningful order.

Key Takeaways
1. **Factors** help store categorical data with meaningful order.
2. **fct_relevel()** reorders factor levels to avoid default alphabetical sorting.
3. **fct_recode()** renames factor levels for clarity.
4. **Regular expressions** help manipulate character data efficiently.
5. **Proper factor handling** leads to clearer visualizations and analysis.