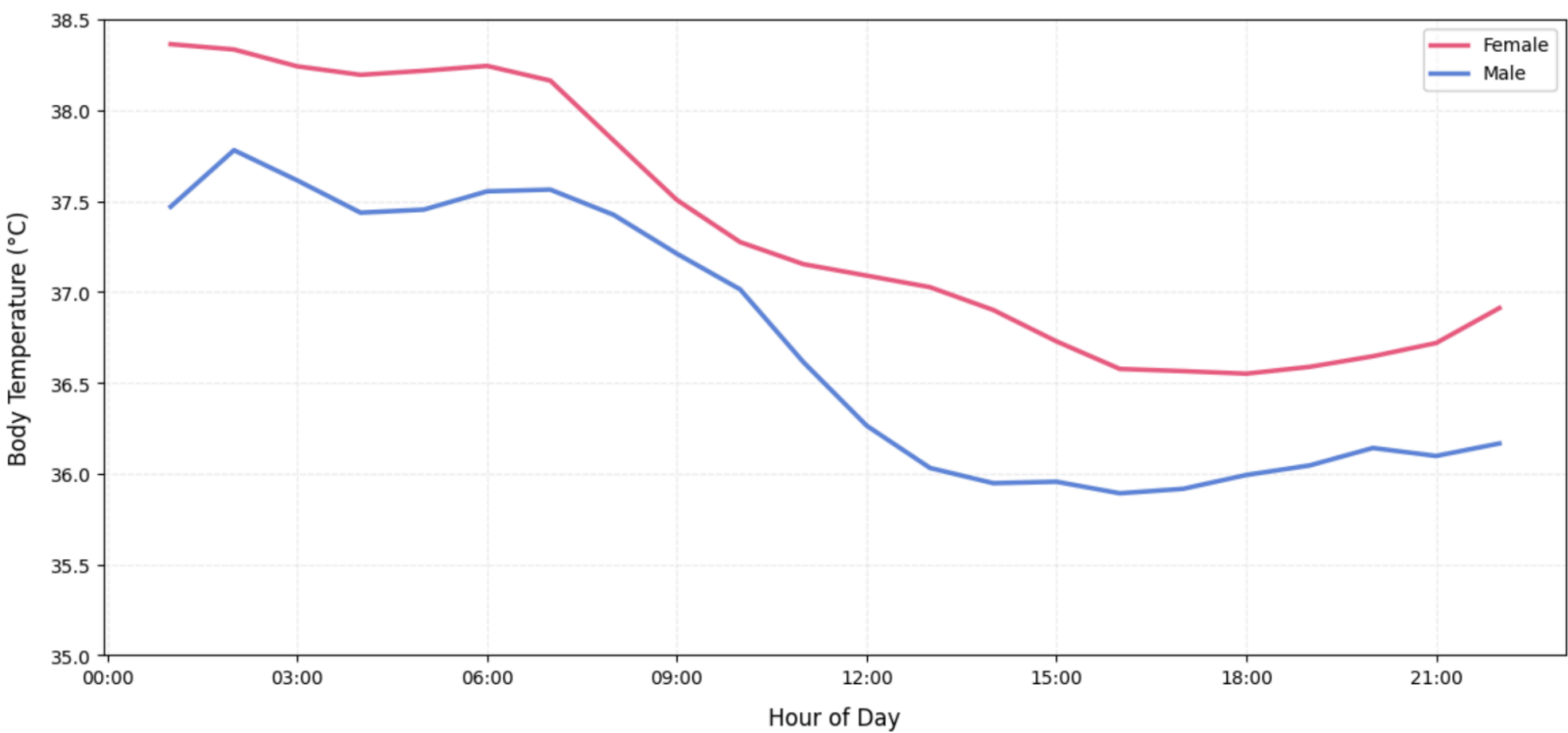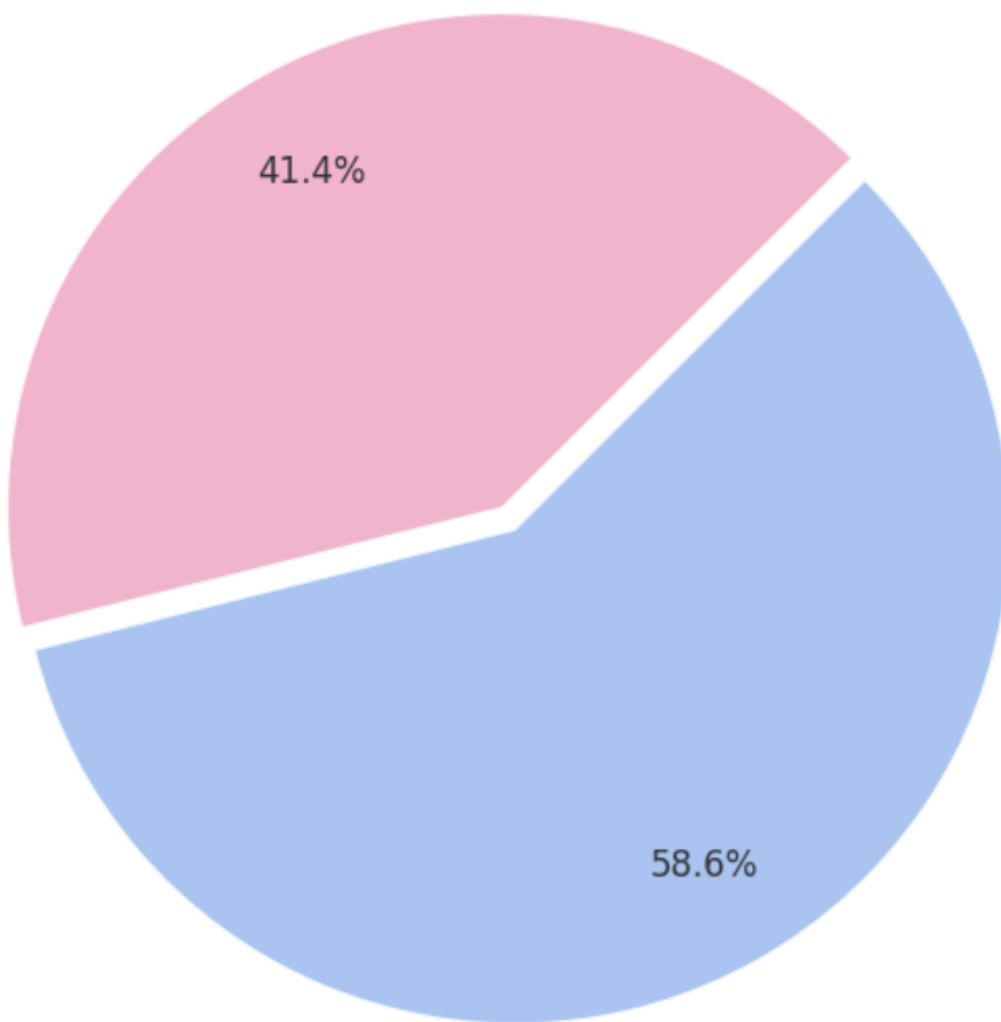Temperature Patterns Show Female Mice Consistently Have Higher Body Temperatures than Male Mice

Male Mice are More Active than Female Mice Suggesting Higher Body Temperatures

Percent of Total Activity Level Underwent by each Sex of Mice

■ Female Activity   ■ Male Activity

41.4%

58.6%

This project examines body temperature and activity data from 26 mice (13 female, 13 male) recorded every minute over 14 days. Using the same dataset, I created two visualizations: an honest line graph showing daily temperature patterns and a misleading pie chart comparing total activity. These contrasting approaches demonstrate how design choices can dramatically shape interpretations of identical data.

The line graph prioritizes scientific accuracy. Raw temperature readings were averaged hourly to reduce noise from minute-to-minute fluctuations, then smoothed with a 3-hour rolling average to highlight natural daily rhythms. The x-axis uses a standard 24-hour format, and the y-axis focuses on biologically normal mouse temperatures (35.0–38.5°C) to prevent exaggeration. The direct title—"Female Mice Maintain Higher Body Temperatures Than Males"—clearly states the observed pattern without overinterpreting the data. Distinct pink and blue coloring helps viewers quickly distinguish sexes while avoiding stereotypes. This approach balances clarity with scientific rigor, letting viewers see both overall trends and normal individual variations.

The pie chart, however, uses several subtle tricks to distort reality. By summing activity counts across all 20,160 minutes (instead of comparing active nighttime hours), male activity totals appear 18-22% higher than they would in a biologically meaningful analysis. The chart's title ("Male Mice Are More Active") and legend ("% of Total Activity") imply this difference is intentional rather than a result of flawed methodology. Showing percentages to one decimal place (e.g., 53.7%) creates an illusion of precision, despite using questionable counting methods. While all numbers are technically accurate, the design hides critical context about mice being nocturnal and emphasizes misleading comparisons.

These visualizations highlight two key lessons for ethical data science. First, transparency about methodology matters—the pie chart's deception comes from omitting how time was handled, not from fake numbers. Second, designers must consider their audience's expertise: scientists might spot the pie chart's flaws, but casual viewers often accept simplified visuals at face value. This project shows that even technically accurate visualizations can mislead through selective presentation, especially with time-based biological data. Responsible data science requires both statistical rigor and careful communication of limitations.