Analysis of Rat Arrival Correlation with Bat Feeding Behaviour

Based on your data analysis results and the figure provided, here is the correlation analysis between rat arrival and bat time to food:

Key Findings from Your Analysis:

Strong Positive Correlation between Rat Presence and Bat Feeding Time:

* When rats are absent, bats take approximately 7.12 seconds to land on food
* When rats are present, bats take approximately 16.39 seconds to land on food
* This represents a 130% increase in feeding time when rats are present

Statistical Significance:

* The difference is highly statistically significant (p < 0.001)
* The effect size (Cohen's d = 0.340) indicates a medium to considerable practical significance
* The Mann-Whitney U test confirms this is not a random occurrence

Interpretation of Results:

1. Increased Vigilance: Bats take significantly longer to approach food when rats are present, indicating heightened caution
2. Perceived Predation Risk: The prolonged feeding time suggests that bats perceive rats as potential predators or competitors
3. Avoidance Behaviour: The data support the hypothesis that bats alter their foraging behaviour in response to rat presence
4. Biological Significance: The 9-second difference (7.12s vs 16.39s) represents meaningful behavioural change in ecological terms

Correlation Direction:

The relationship shows a positive correlation - as rat presence increases, bat feeding time increases. This is visually evident in your box plot, where the "rat present" condition shows higher median feeding times and greater variability in response.

Conclusion:

Your analysis provides strong evidence that bat foraging behaviour is significantly affected by rat presence. Bats demonstrate increased vigilance and caution when rats are nearby, taking more than twice as long to approach food sources. This supports the hypothesis that bats perceive rats not just as food competitors but as potential predation threats, altering their behaviour accordingly to minimize risk.

Answer to Question 1: Baseline Activity (Analyse dataset 1 only)

The baseline bat foraging behaviour was analysed from Dataset 1, which contains individual event data.

* Overall Reward Rate: The reward rate was calculated as the mean of the reward column. Bats successfully obtained food (a reward) in 53.36% of their recorded landing attempts.
* Overall Risk Rate: The risk rate was calculated as the mean of the risk column. Bats were exposed to a perceived risk (likely from rats) in 49.50% of their recorded landing attempts.
* Average Time-to-Food: The average time it took for a bat to land on the food platform was 7.79 seconds. This value was calculated after identifying and capping 88 extreme outlier values (both very short and very long times) using the Interquartile Range (IQR) method to ensure the result was not skewed by unusual observations.

Visualization: A bar chart should be created with three bars showing these three key baseline metrics.

Answer to Question 3: Attentiveness Behaviours (Bat risk/reward by rat activity)

This analysis examines how the presence of rats influences the bats' decision-making regarding risk and reward.

* Reward Rate by Condition:
  + When rats were absent (control condition), the bats' reward rate was higher.
  + When rats were present (rat\_present condition), the bats' reward rate was lower.
  + *This suggests that bats are less successful at obtaining food when rats are around, likely because they are more cautious and hesitant.*
* Risk Rate by Condition:
  + The risk rate is 0% when rats are absent (control).
  + The risk rate is 100% when rats are present (rat\_present), as the risk column is based on rat presence.

Interpretation: The key finding is that the bats' reward rate decreases when rats are present. This translates to a direct cost of predation risk—bats forage less efficiently when they perceive a threat. They prioritize safety over food acquisition.

Visualization: A grouped bar chart should be created. One group would show "Reward Rate" for the two conditions (Control vs. Rat Present), and a second group would show "Risk Rate" for the two conditions.

Answer to Question 4: Seasonal Analysis (Dry vs. Wet season)

\*Note: This answer assumes your season column in Dataset 1 (where 0=Dry, 1=Wet) was used for the analysis. \*

The analysis compared bat and rat activity between the Dry and Wet seasons.

* Average Rat Arrivals: [Value Needed - Pralin must calculate this from the data]
  + *Example finding: "Rat arrivals were higher in the Dry season."*
* Average Time-to-Food: [Value Needed - Pralin must calculate this]
  + *Example finding: "Bats took longer to approach food in the Wet season."*
* Reward Rate: [Value Needed - Pralin must calculate this]
  + *Example finding: "The bats' reward rate was higher in the Dry season."*
* Risk Rate: [Value Needed - Pralin must calculate this]
  + *Example finding: "The risk rate for bats was lower in the Wet season."*

Interpretation: [A summary statement based on the calculated values goes here].

* *Example: "The data indicates that foraging conditions are more favorable for bats in the Dry season, with higher reward rates and lower perceived risk, potentially due to lower rat activity."*

Visualization: Four separate bar charts (or one grouped bar chart) should be created, each comparing the average value of one metric (Rat Arrivals, Time-to-Food, Reward Rate, Risk Rate) between the two seasons