Which restaurant really is the unhealthiest?

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Content guide

1. Key Questions to Consider: Initial Hypotheses

Overall Market Trends

- Are there restaurants that share similar distributions across what we consider "unhealthy" variables (trans fat, saturated fat, calories from fat, sugars, sodium, cholesterol, etc.)?

Unhealthy vs. Healthy

- Do unhealthy restaurants have significantly more of these variables?
- Do healthy restaurants' distributions have significantly more protein and fiber?

2. A Look at the Data

Source
- Nutrition-charts.com

Restaurants
- 29 fast food chains – 29 separate links

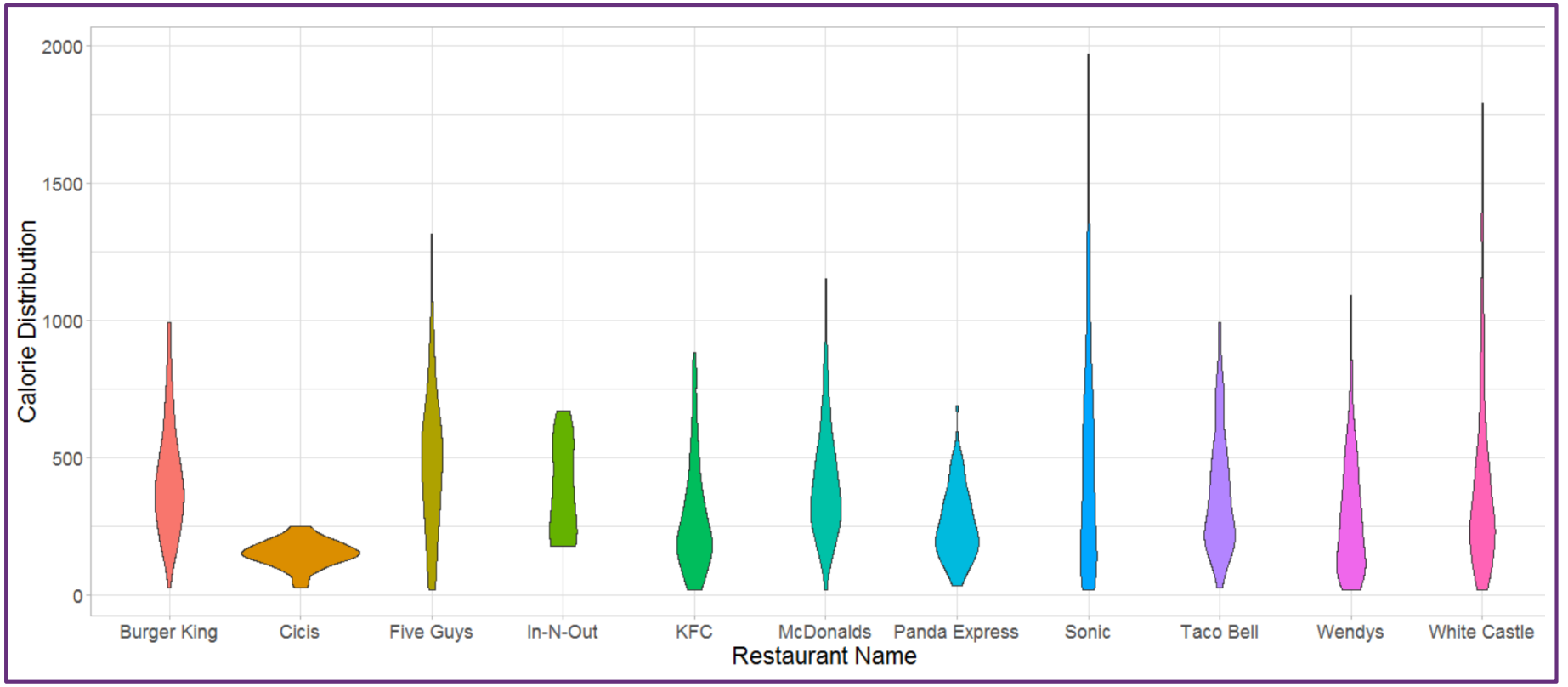
Each web page
- Exhaustive product item list for respective fast food chain

Each row
- Nutrition information by product

Overall size
- Over ~4000 rows

Variables included
- Restaurant name, product name, calories, protein, total fat, total carbs, sodium, calories from fat, saturated fat, trans fat, cholesterol, fiber, sugars

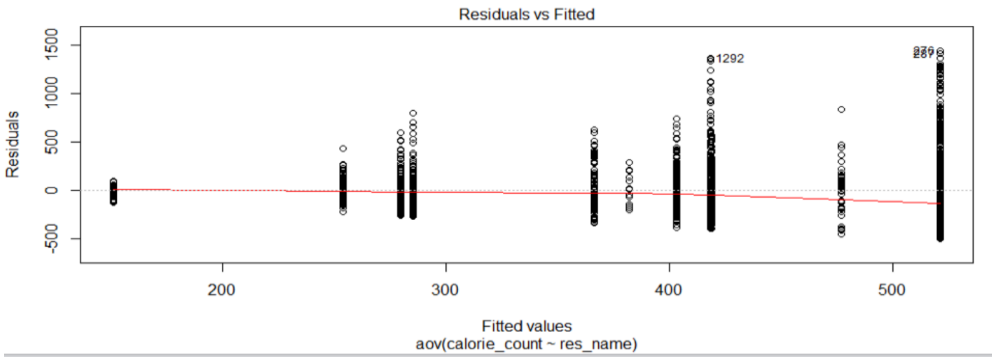
3. Distribution of Calories



- Cicis's distribution of calories tends to favor 'healthier' food choices
- Sonic and White Castle's distributions are heavily right-skewed, suggesting several items that span across higher calorie counts

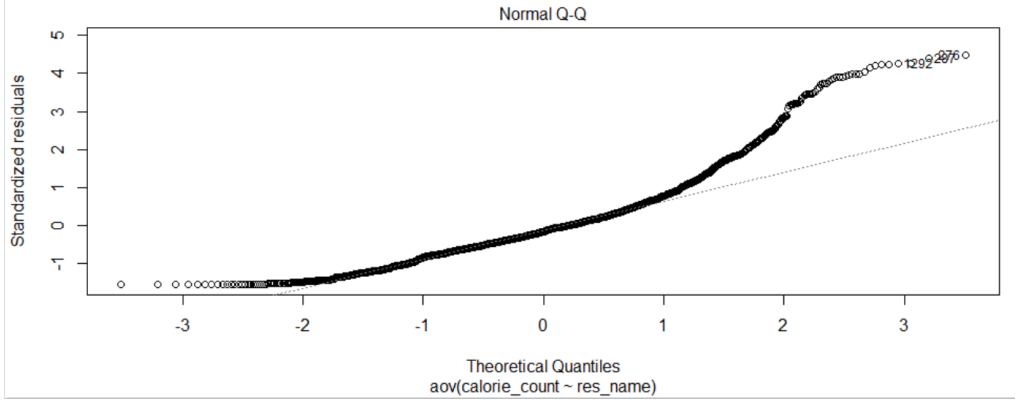
3. Distribution of Calories - ANOVA assumptions for calorie difference

Homogeneity of Variances



- Central limit theorem allows us to move forward with the ANOVA test

Normality Assumption




```
        Shapiro-Wilk normality test

data:  aovtest
W = 0.9063, p-value < 2.2e-16
```

3. Distribution of Calories - ANOVA results for calorie difference

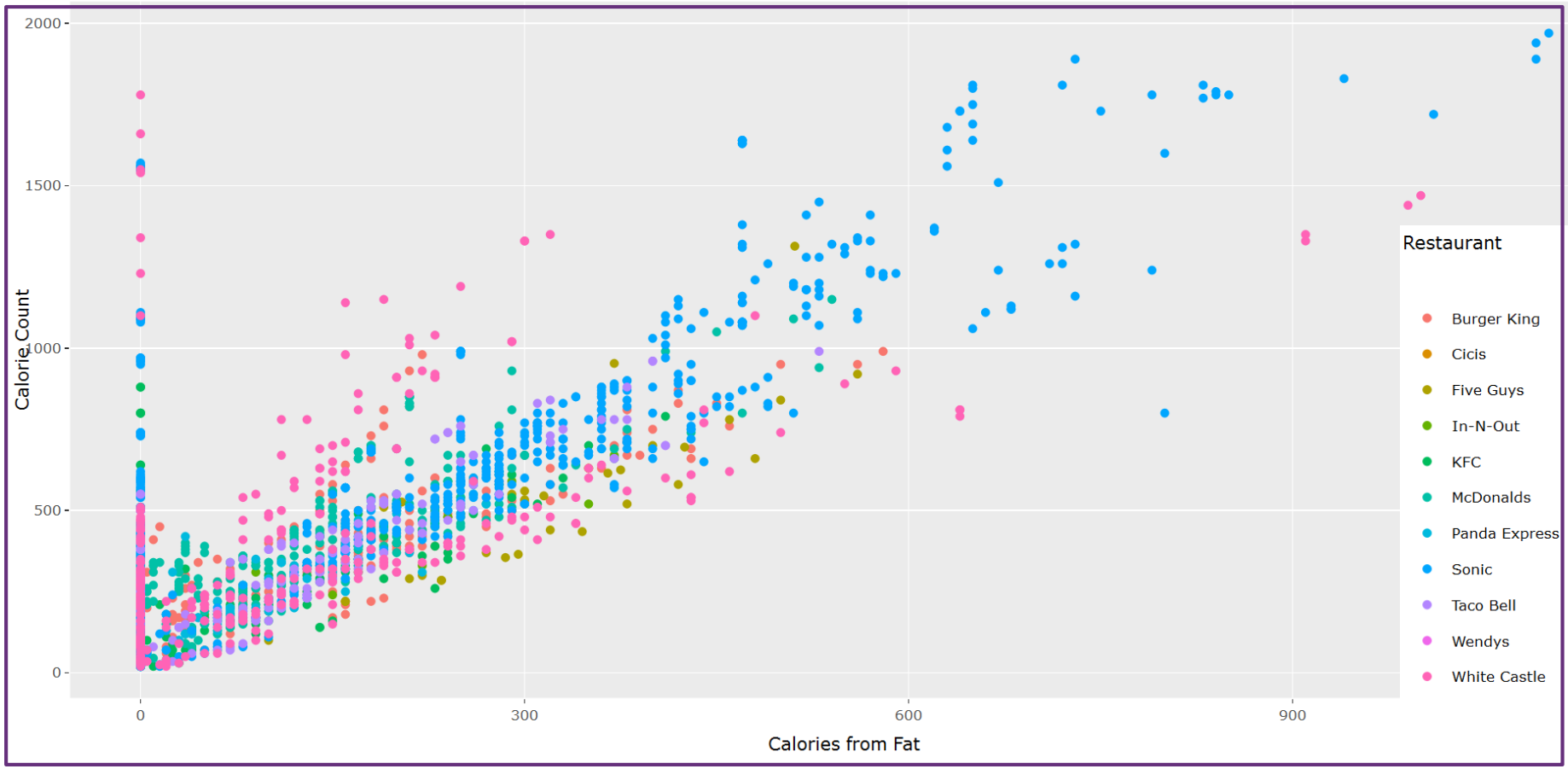
ANOVA results

```
             Df    Sum Sq Mean Sq F value Pr(>F)
res_name     10  21502224 2150222   20.55 <2e-16 ***
Residuals  2208 231086629  104659
```

Post HOC Tukey

Cicis – Burger King	Sonic -- Cicis	Sonic -- KFC	Taco Bell -- Sonic
KFC – Burger King	Taco Bell -- Cicis	White Castle -- KFC	Wendys -- Sonic
Panda Express – Burger King	White Castle -- Cicis	Panda Express -- McDonalds	White Castle -- Sonic
Sonic – Burger King	KFC – Five Guys	Sonic -- McDonalds	White Castle -- Wendys
Wendys – Burger King	Panda Express – Five Guys	Wendys -- McDonalds	
Five Guys -- Cicis	Wendys – Five Guys	Sonic – Panda Express	
McDonalds -- Cicis	McDonalds -- KFC	White Castle – Panda Express	

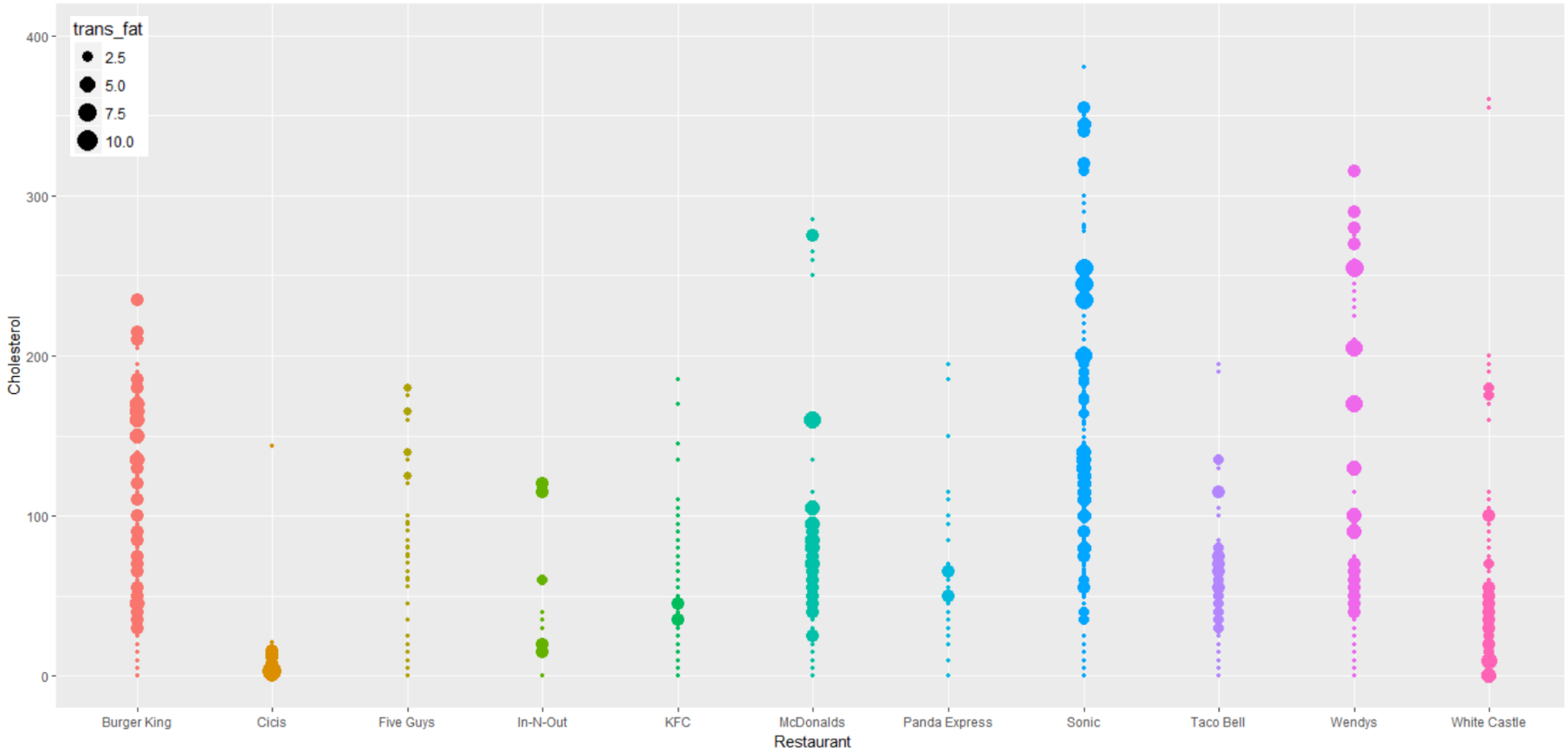
4. The ‘Unhealthy’ Calories



- Essentially maps the fat calorie percentage across each food item
- Sonic (in blue) consistently has products that are highest in fat calorie percentage
- Similarly, White Castle (in pink) tends to skew towards higher fat calories within calorie count

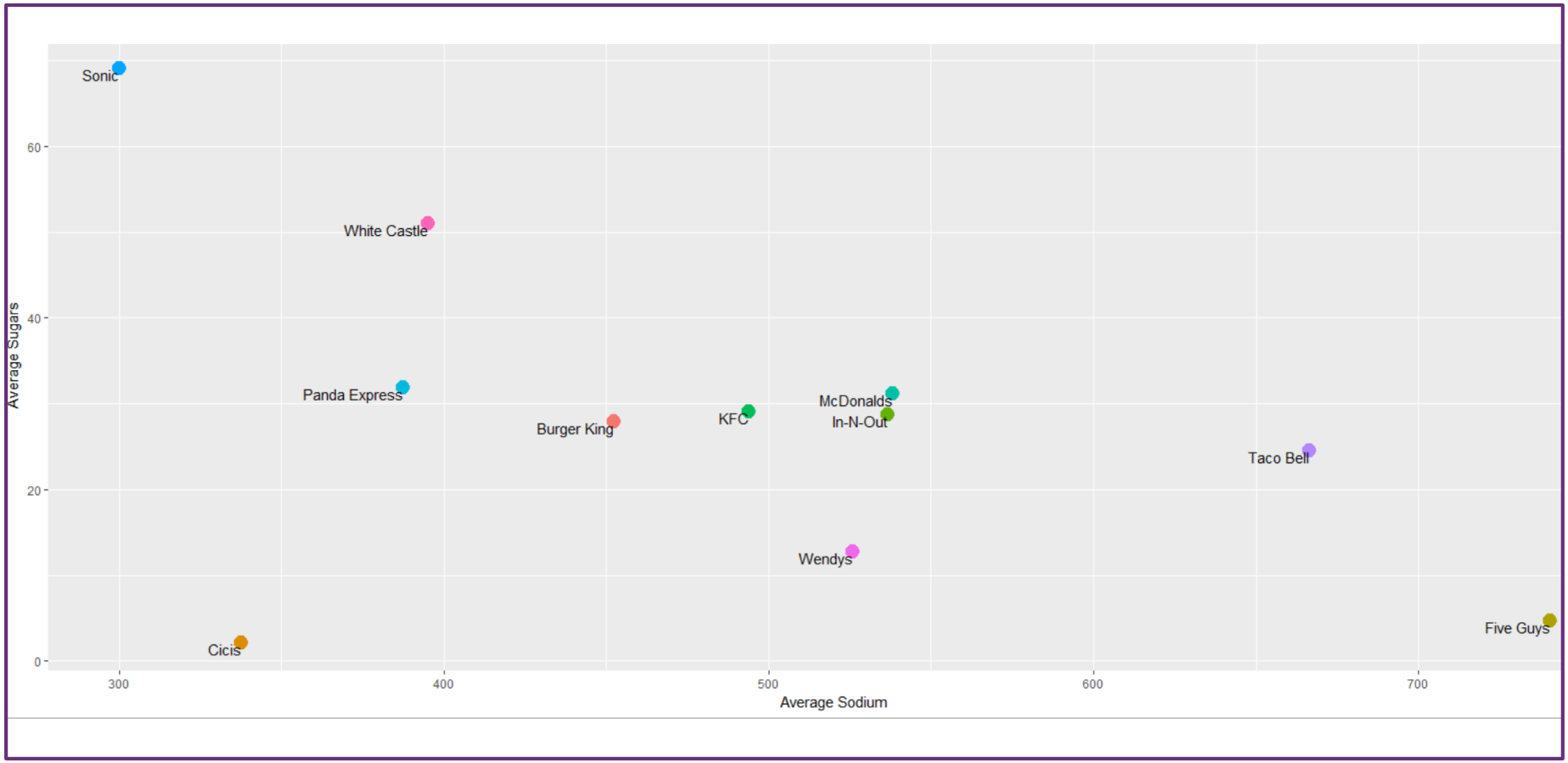
1 Removed Wendys and Cicis because their data did not have Calories from Fat altogether

4. Trans Fat and Cholesterol



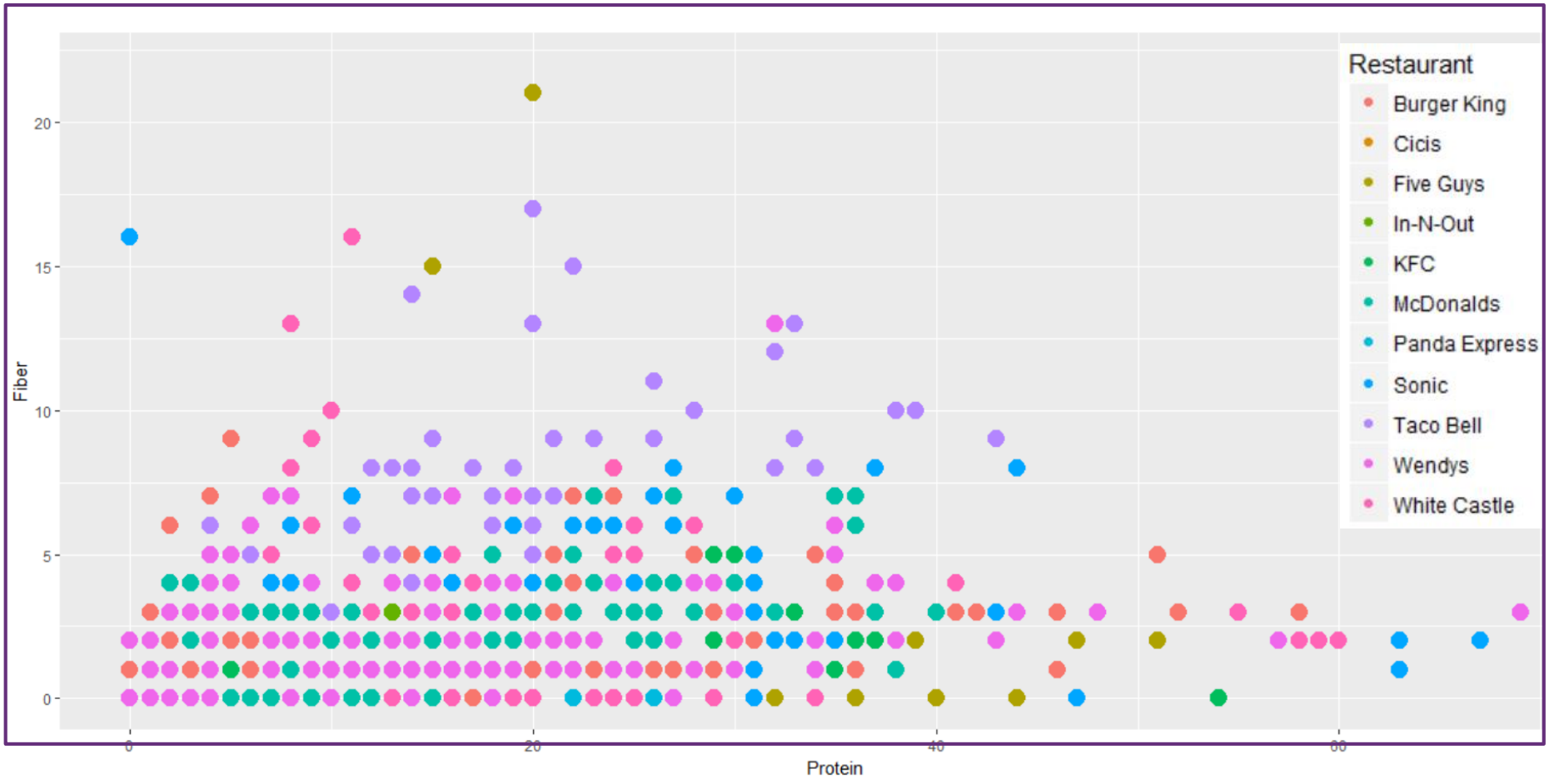
- This graph takes a look at distributions of cholesterol across food choice and showcases those restaurants that tend to have higher instances of trans fat
- Sonic, Wendys, and Burger King have the longest distribution of cholesterol with higher instances of trans fat; Cicis cholesterol distribution is much smaller

4. Sugars and Sodium



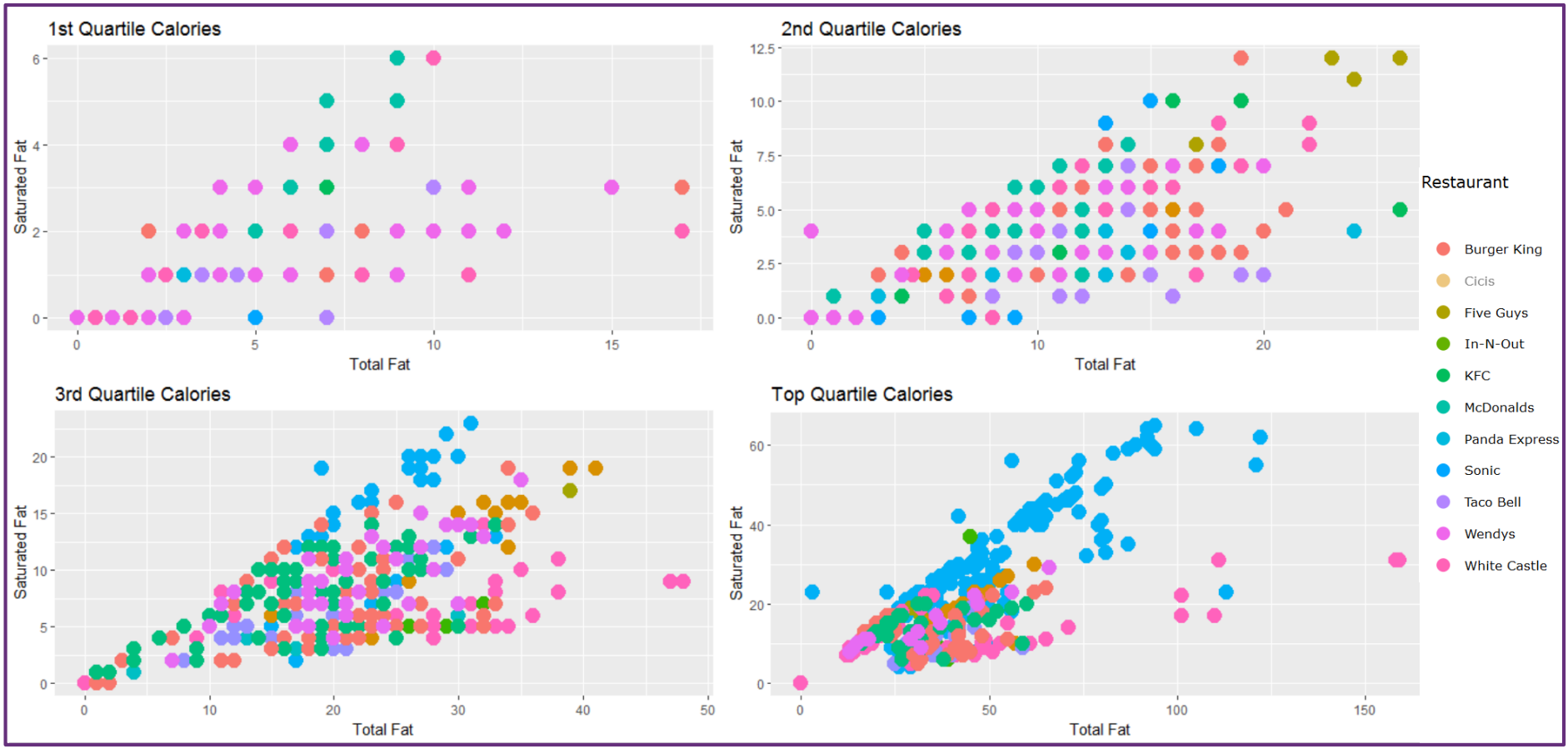
- The chart above illustrates the average of sodium and sugar content across each restaurant
- There aren't any restaurants that have strong quantities of ***both*** sugar and sodium
- Sonic has the highest average content of sugar with the lowest sodium (probably due to all those shakes!) and Five Guys has the highest sodium content and lowest sugar content

4. The Healthy! – Protein and Fiber



- Taco Bell tends to have the highest instances of fiber included its food choices
- Other than that, there is no clear pattern of what makes the healthiest fast food chain when looking at just fiber and protein

4. A Quartile Breakdown by Calorie Group



- Wendys (in pink) tends to have the highest instance within the 1st quartile of calories
- Sonic (in blue) tends to have the highest instance within the top quartile of calories

Opportunities and Next Steps

Key Insights

1. Don't eat at Sonic and White Castle

- These restaurants tend to have food choices that have the highest levels of calories, sodium, sugars, and saturated/calories from fat

2. Prefer chains like Cicis and Taco Bell

- Cicis tends to have the lowest distribution across our 'unhealthy' set of variables
- Taco Bell, although, not consistently ranked with the lowest on our 'unhealthy' variables tends to have higher instances of fiber

Next Steps

1. A Look into Product Type

- How do these restaurants differ in terms of product offerings?
- How do our set of unhealthy and healthy variables' distribution differ by each product group?

2. Expand fast food chain list

- How would Subway look in the mix?
- And other up and coming fast food chains that 'promise' healthier food options?

Appendix

Highest quartile of calories