

FRITO-LAY EXPLORATORY ANALYSIS

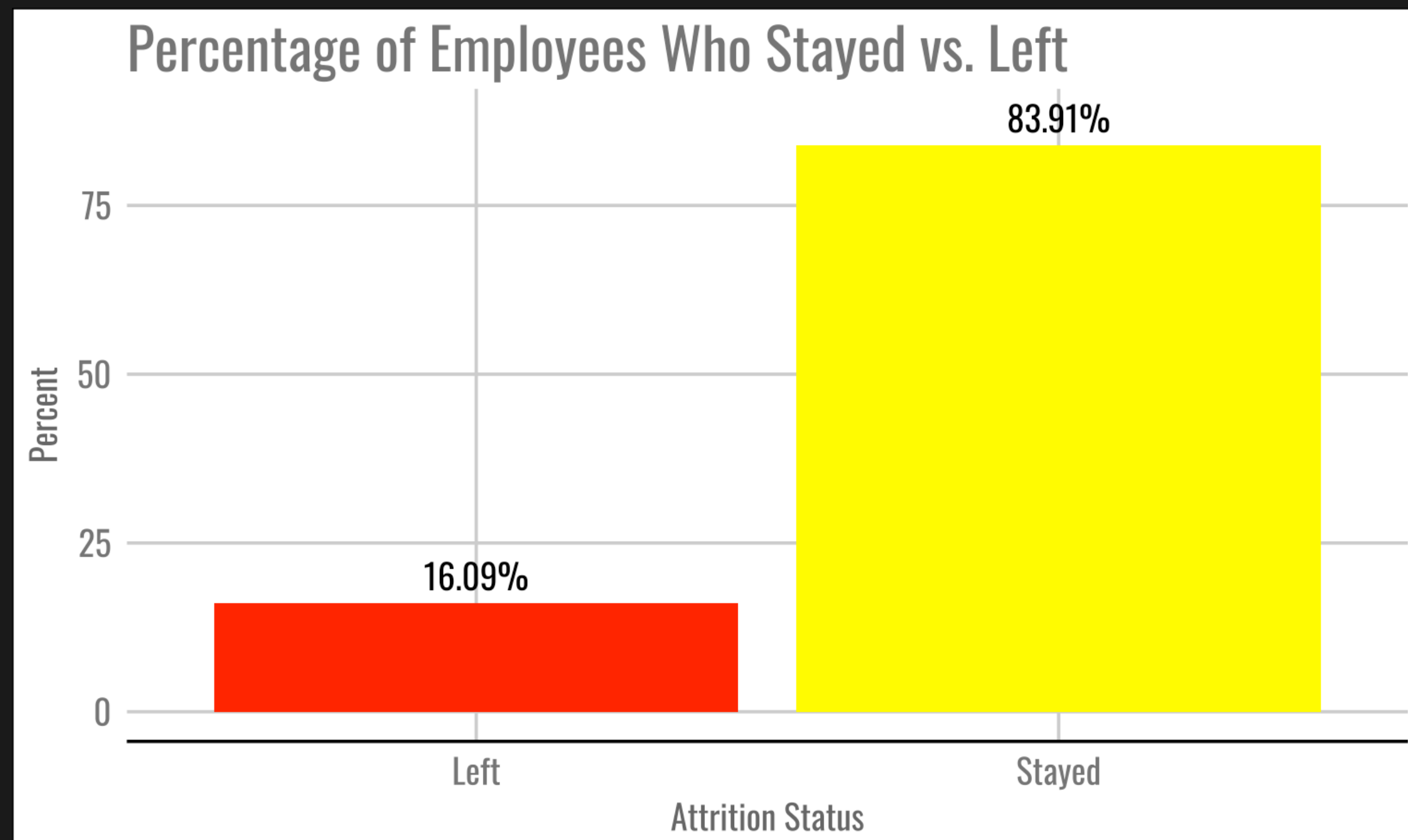
By: Chloe Barker

GOALS

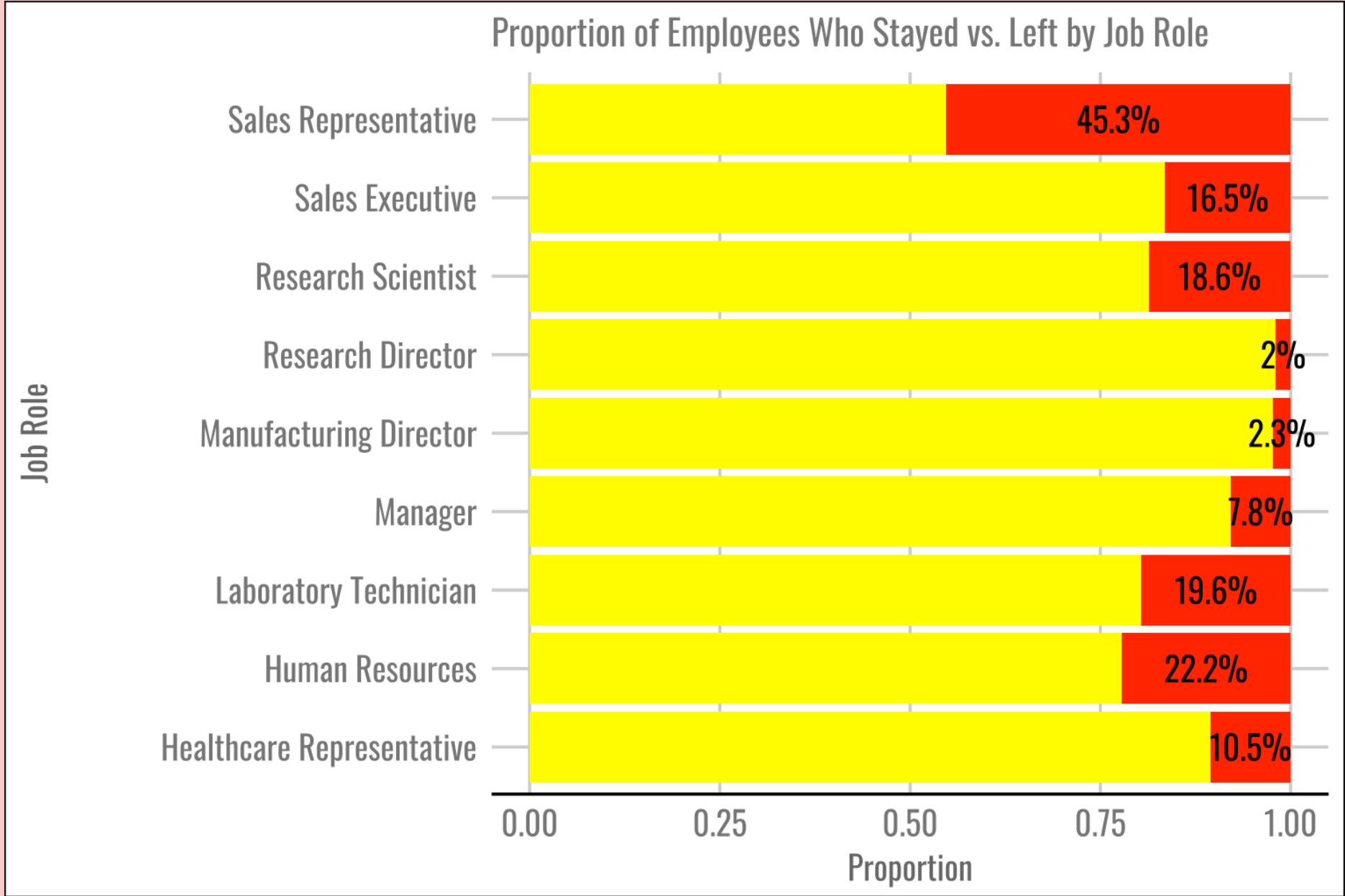
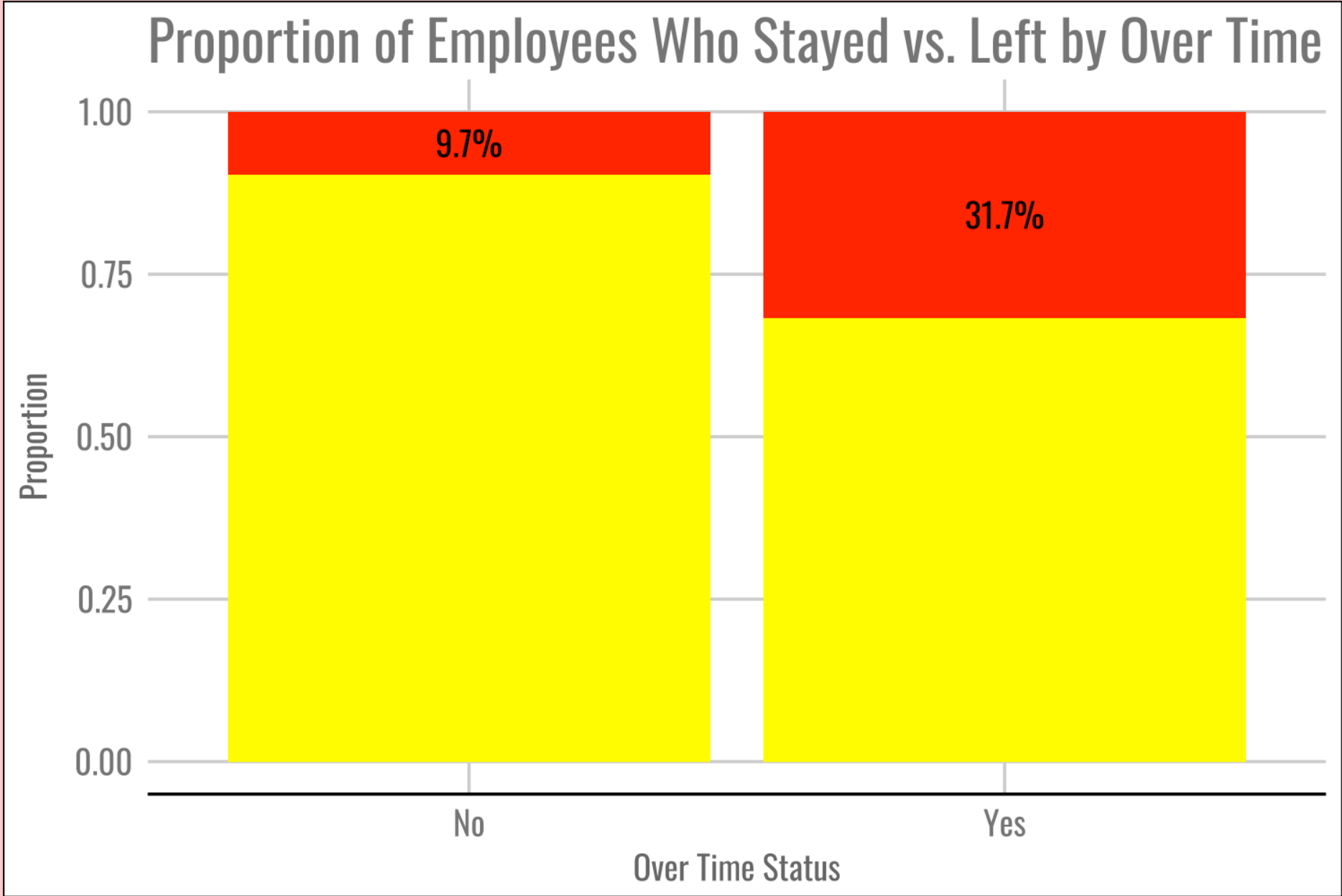
1. What are the factors most related to employee attrition (employee turnover)?
2. How well can we predict employee attrition?
3. What affect can predicting employee attrition have on costs?

ATTRITION SUMMARY

Retention (Stayed)	Attrition (Left)
730 Employees	140 Employees

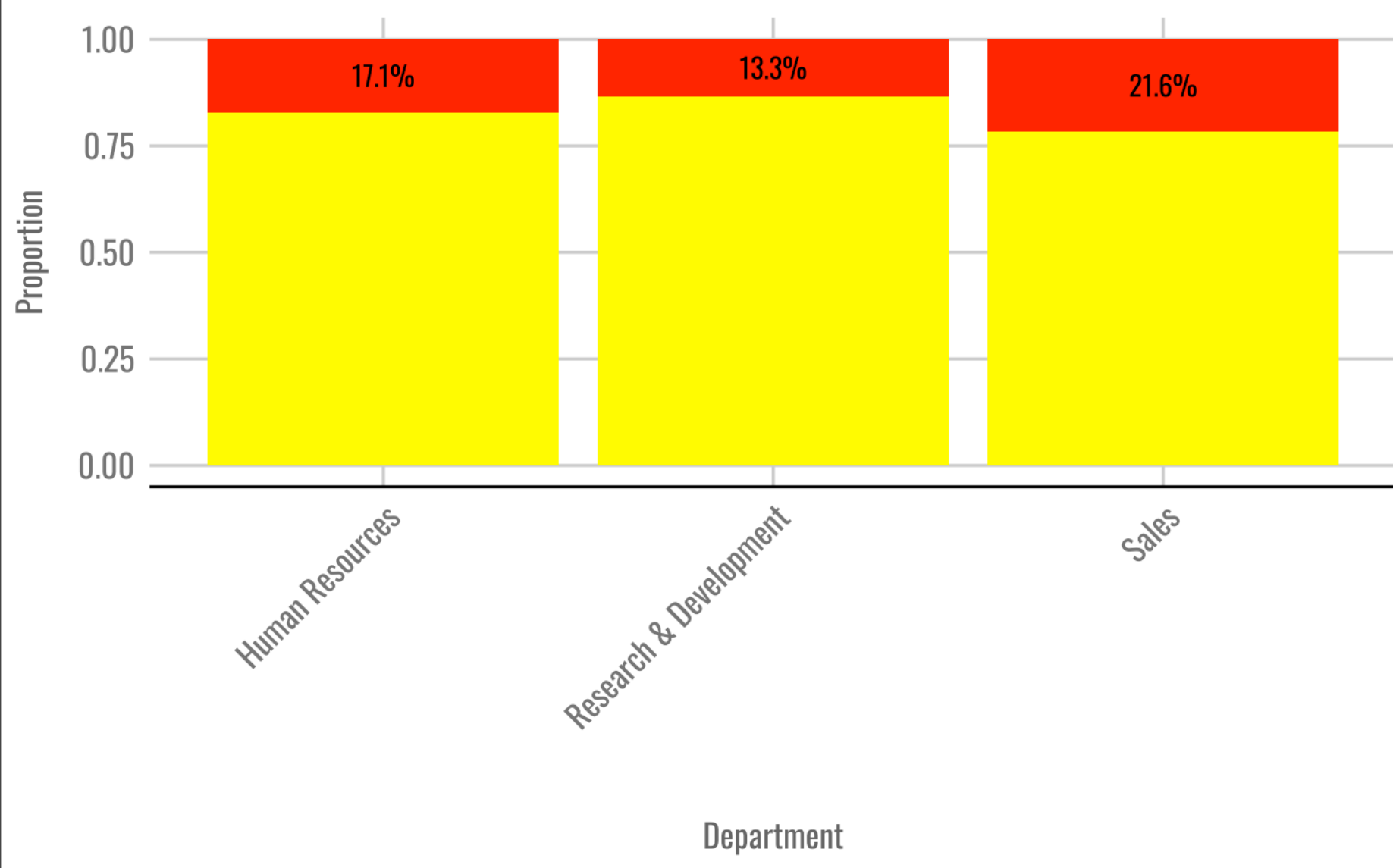


INTERESTING FACTORS

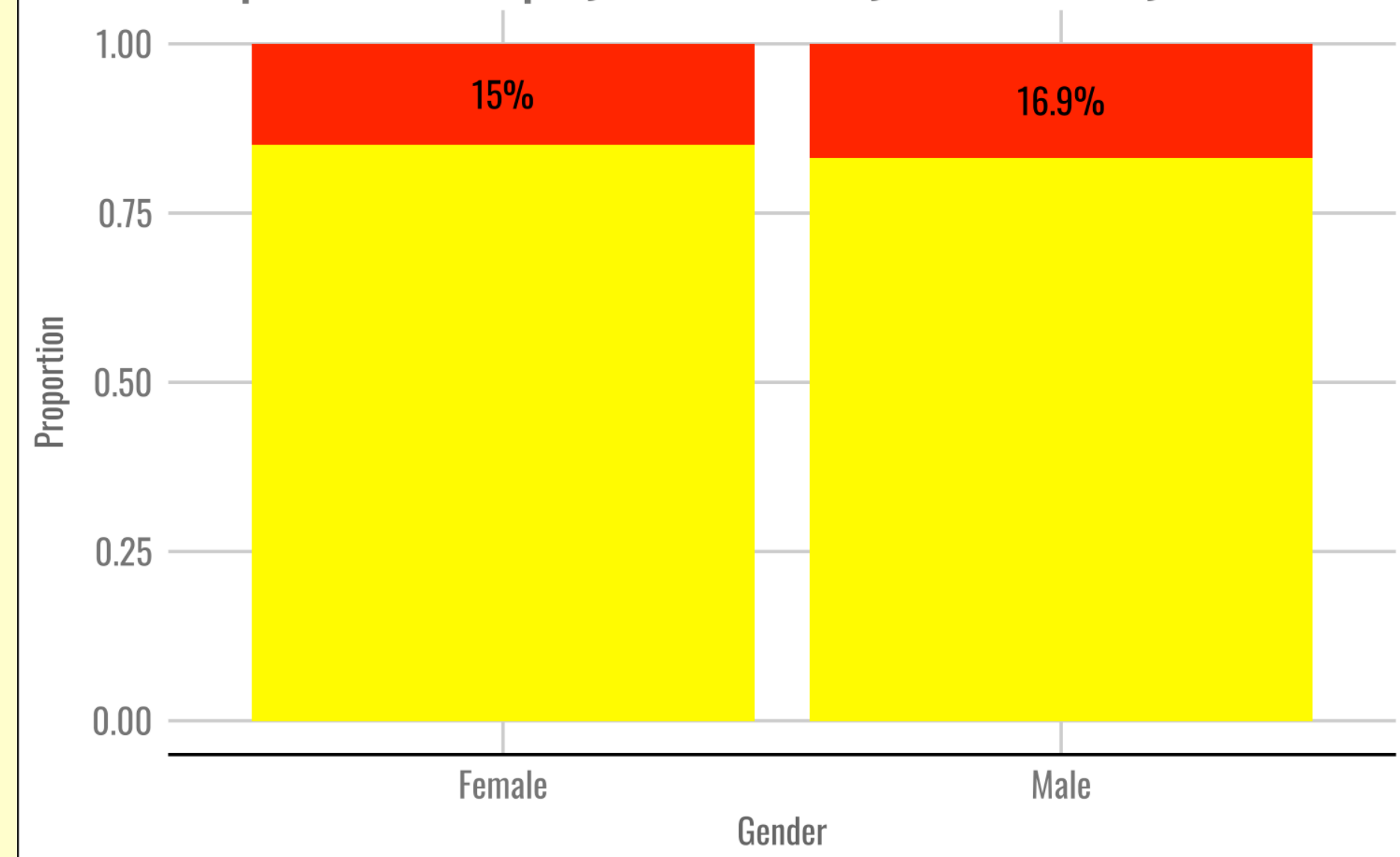


LESS INTERESTING FACTORS

Proportion of Employees Who Stayed vs. Left by Department



Proportion of Employees Who Stayed vs. Left by Gender



FURTHER ANALYSIS ON NUMERIC VARIABLES

Goal: Test the claim that the mean Monthly Income for the "Stayed" attrition group is different than that of the "Left" attrition group.

Impact: If this is true then we can consider Monthly Income as a viable variable of interest for the factors with the greatest impact on whether an employee will stay or leave.

Data: We will use the 870 employees from the Frito Lay case study.

$$H_0: \mu_{Stayed} = \mu_{Left}$$

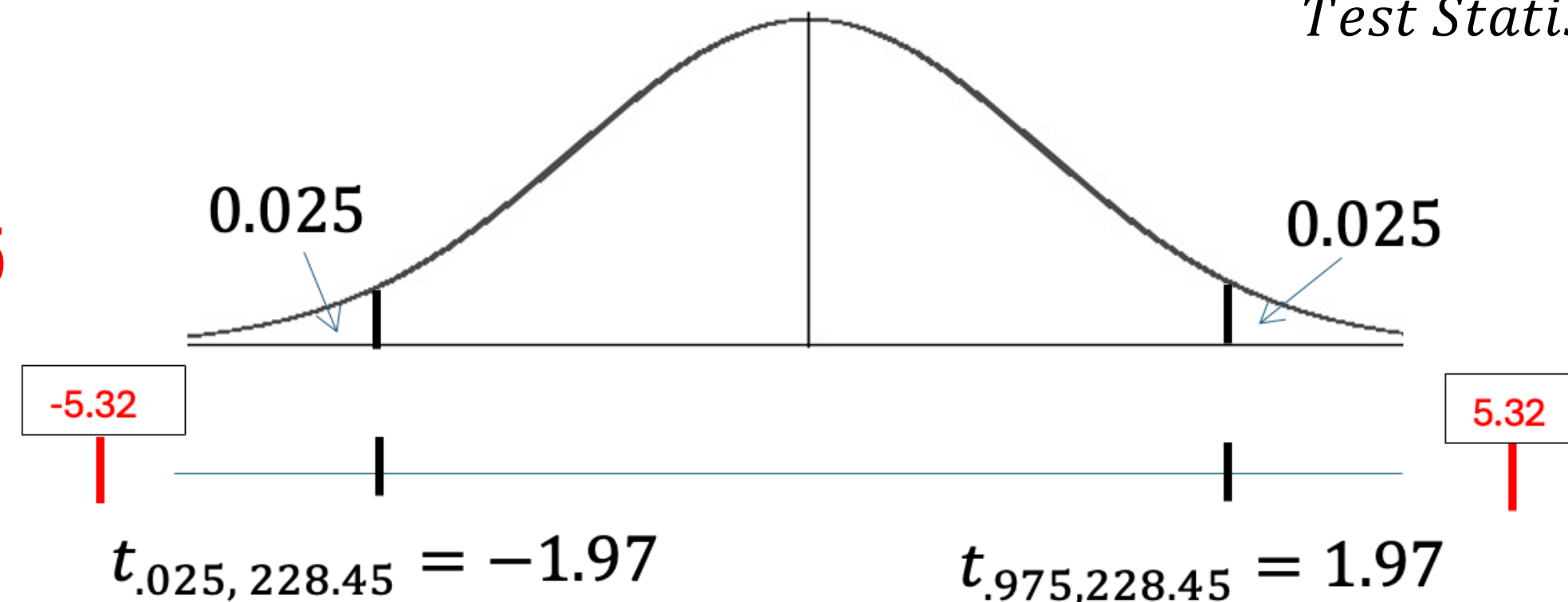
$$H_A: \mu_{Stayed} \neq \mu_{Left}$$

$$\alpha = 0.05$$

$$\text{Critical Value: } \pm t_{.975, 228.45} = \pm 1.97$$

$$\text{Test Statistic: } -5.3249$$

P-value = $2.412e-07 < .05$
Reject H_0

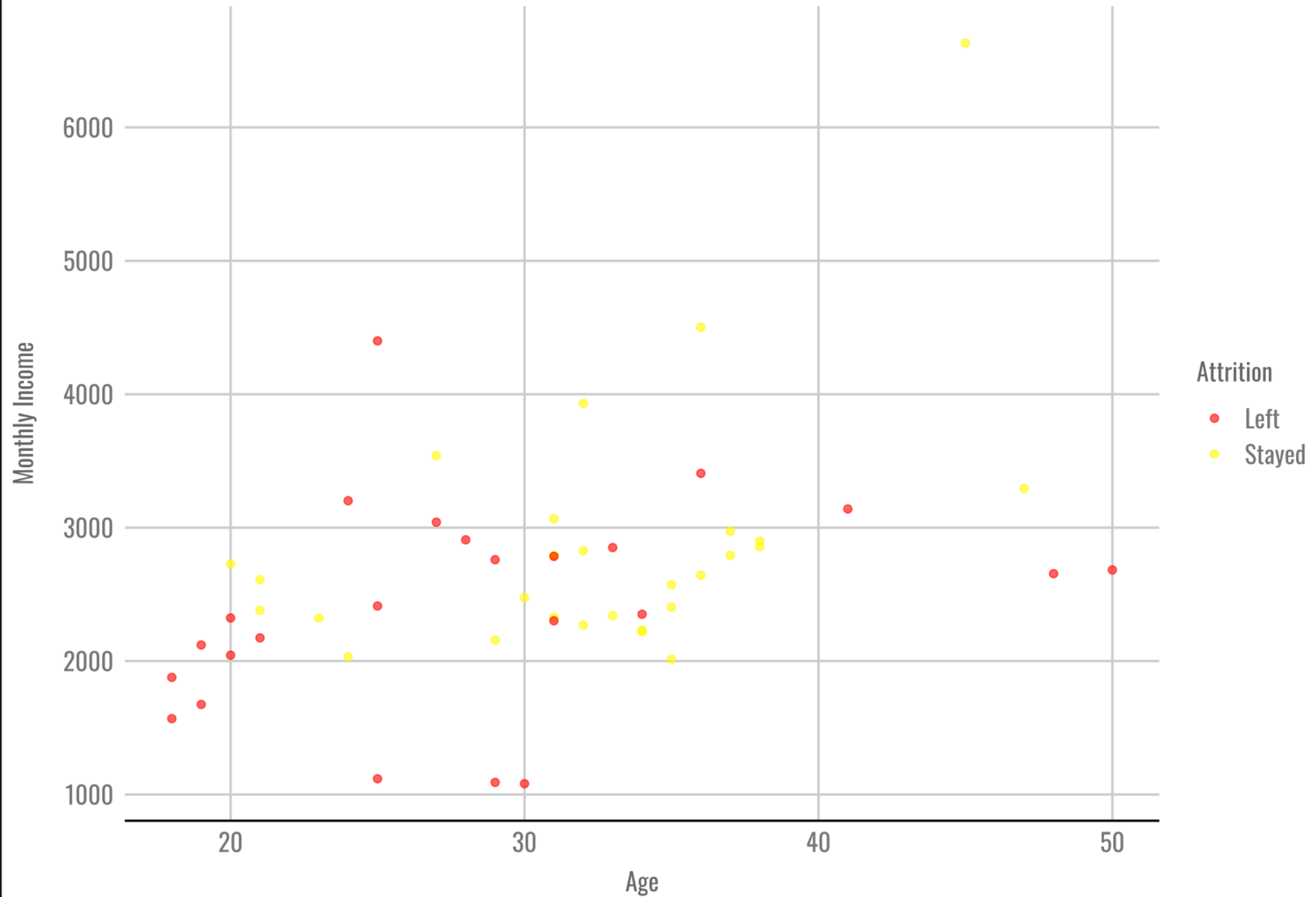


$$\bar{X}_{left} = 4764.786$$
$$\bar{X}_{stayed} = 6702.000$$

FURTHER ANALYSIS ON NUMERIC VARIABLES

Conclusion: There is strong evidence to suggest that the mean Monthly Income for the "Stayed" attrition group is greater than that of the "Left" attrition group (p-value $< .05$ from t-test). We are 95% confident that the mean Monthly Income for the "Left" attrition group is 1,220.382 to 2,654.047 dollars less than that of the "Stayed" group.

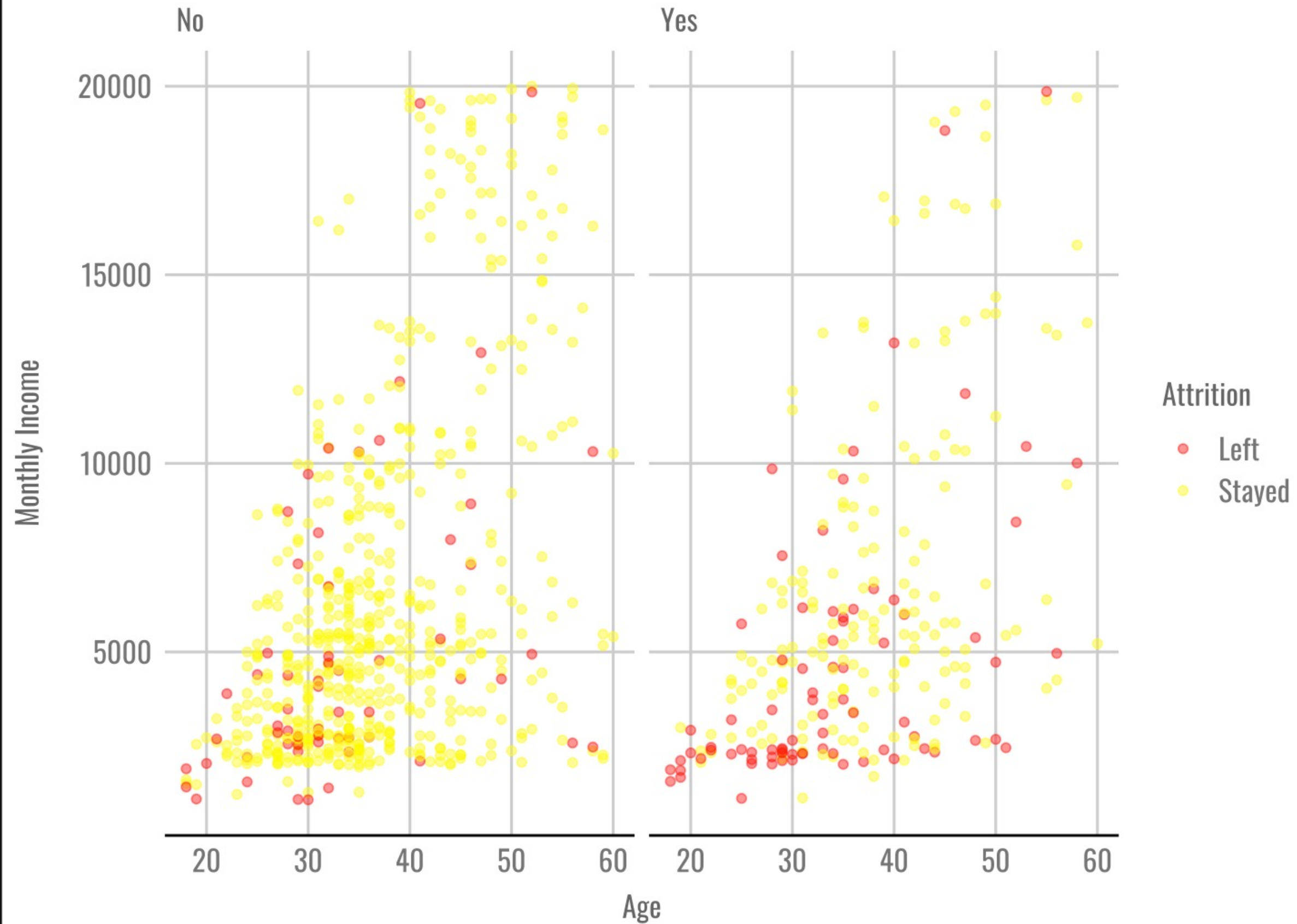
Age vs. Monthly Income for Sales Representatives



Age vs. Monthly Income by Job Role



Age vs Monthly Income by Over Time Status



PREDICTED TOP THREE FACTORS INFLUENCING ATTRITION AT FRITO-LAY

AGE

JOB ROLE

OVER TIME

NAÏVE BAYES MODEL

Threshold for optimal Costs = 0.12

Predictors: Age, Job Role, and Over Time

	Actually Left	Actually Stayed
Predicted to Leave	109	277
Predicted to Stay	31	453

ACCURACY = 64.60%

Out of the employees who actually left and those who actually stayed, our model flagged 64.60% correctly.
(overall proportion of correct predictions)

SENSITIVITY = 77.86%

Out of the employees who actually left, 77.86% were correctly identified as leaving by the model.

SPECIFICITY = 62.05%

Out of the employees who actually stayed, 62.05% were correctly identified as staying by the model.

Threshold	Sensitivity	Specificity	Accuracy
0.12	77.86%	62.05%	64.6%

COSTS

WHAT WE KNOW:

- Incentives to stay are predicted to be around \$200 per employee
- Predicted costs to be between 50% and 400% of the employee’s salary to recruit a replacement for someone who has left the company
- Average Employee Yearly Salary = \$76,683.17
 - Cost Per Incentive for employees predicted to leave = \$200

Total cost of incentives for employees who are predicted to leave: \$77, 200

Greater costs for employees predicted to stay but actually left:

- For 50% of salary costs: \$1,188,589
- For 400% of salary costs: \$9,508,713

Predicted Costs:
\$1,265,789 to \$9,585,913

Threshold for optimal costs = 0.12

Threshold	Lower Cost Range	Upper Cost Range	Sensitivity	Specificity	Accuracy
0.15	\$1,748,030	\$13,557,238	71.37%	68.57%	70.92%
0.12	\$1,265,789	\$9,585,913	77.86%	62.05%	64.6%

kNN MODEL

ACCURACY = 72.76%

Out of the employees who actually left and those who actually stayed, our model flagged 72.76% correctly. (The overall proportion of correct predictions)

SENSITIVITY = 94.29%

Out of the employees who actually left, 94.29% were correctly identified as leaving by the model.

SPECIFICITY = 68.63%

Out of the employees who actually stayed, 68.63% were correctly identified as staying by the model.

Threshold for optimal Costs = 0.15
k-value = 3

Predictors: Age, Over Time, and and Job Role

k	Threshold	Sensitivity	Specificity	Accuracy	Lower Cost Range	Upper Cost Range
1	0.15	97.14%	78.49%	81.49%	\$211,966.30	\$1,285,531.00
3	0.15	94.29%	68.63%	72.76%	\$378,932.70	\$2,526,062.00
5	0.15	90.00%	65.62%	69.54%	\$612,182.20	\$4,369,658.00

Predicted Costs:
\$378,932.70 to \$2,526,062

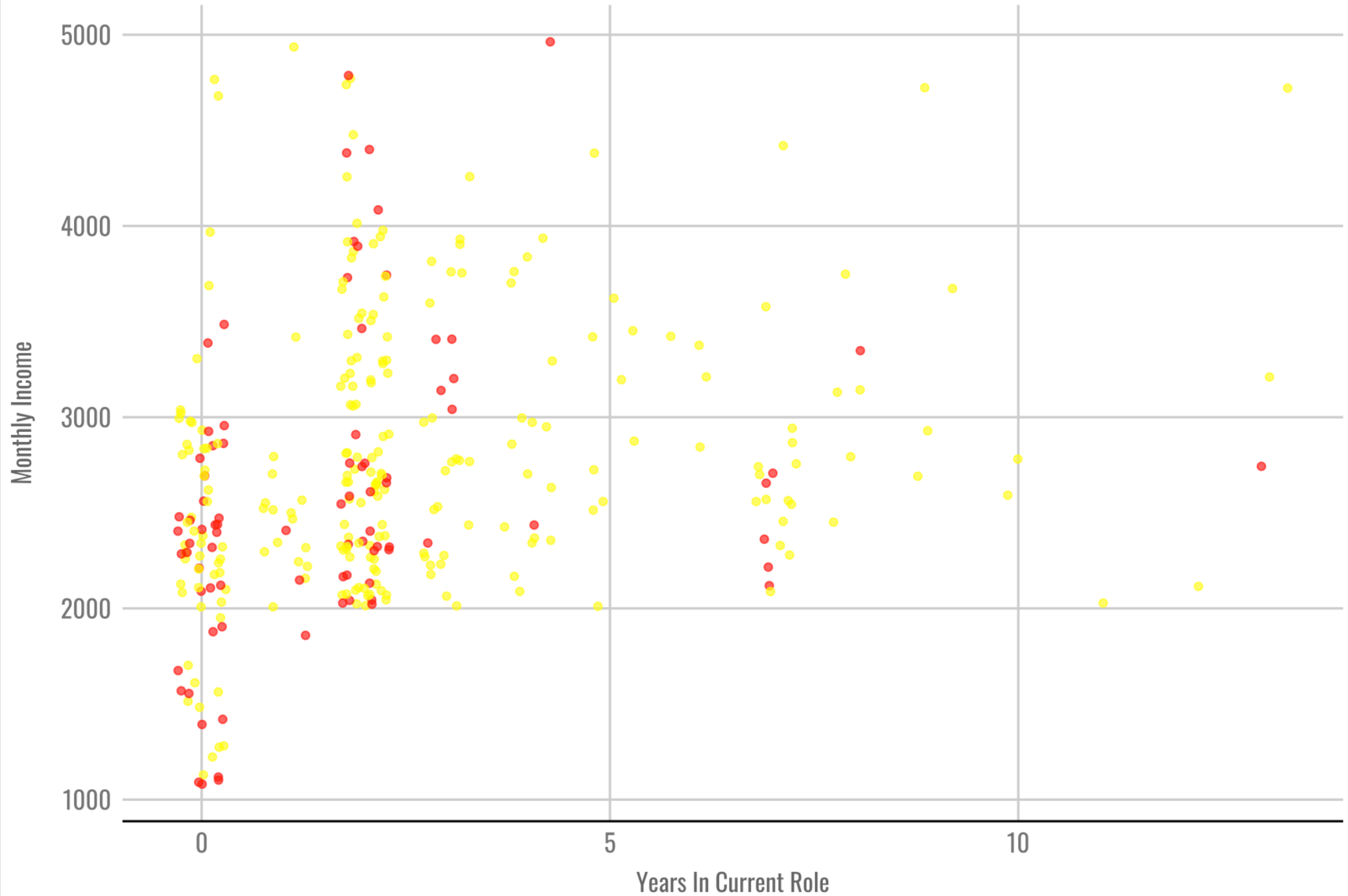
ADDITIONAL FACTORS TO CONSIDER

**YEARS IN
CURRENT
ROLE**

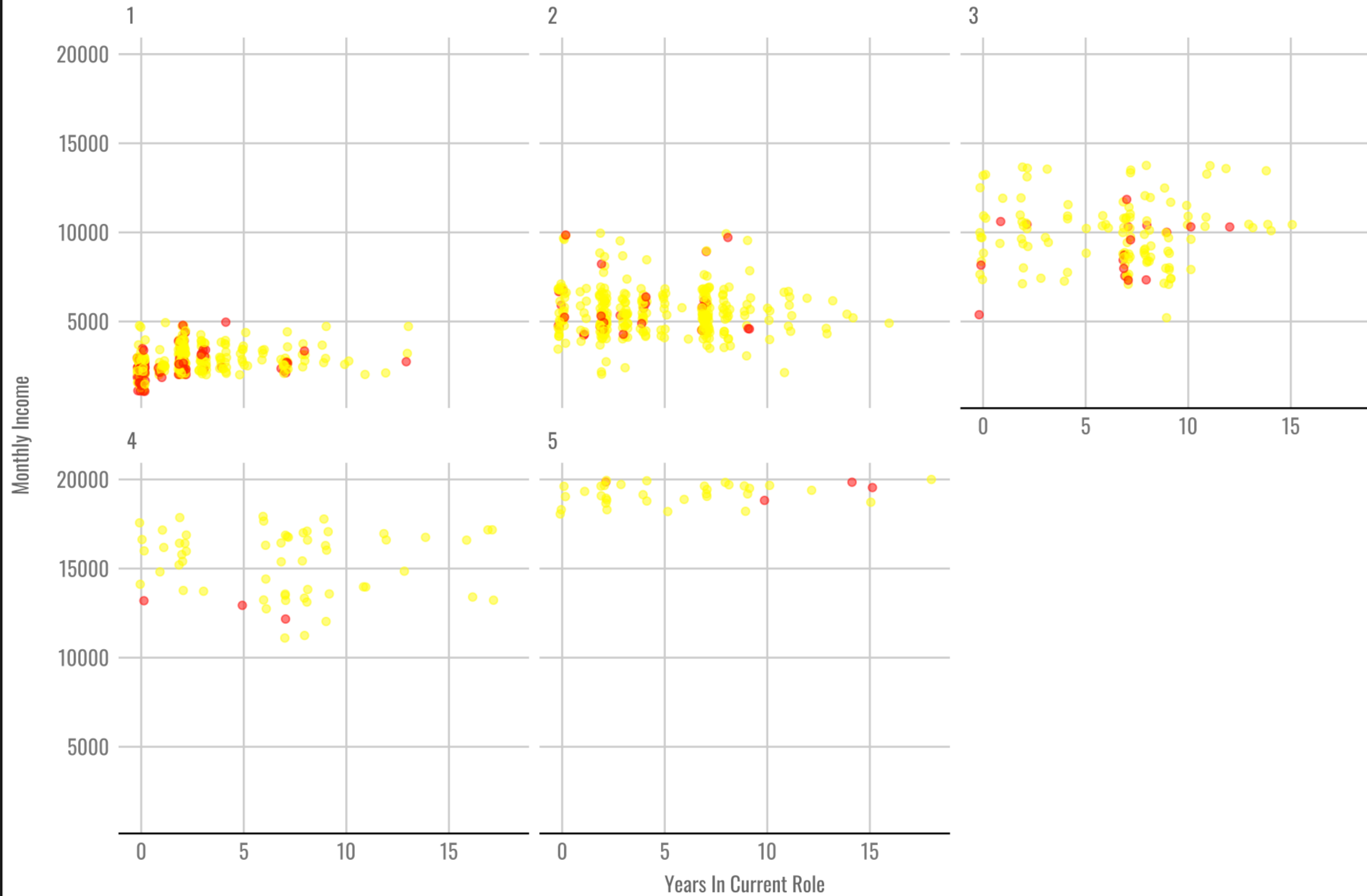
JOB LEVEL

**MONTHLY
INCOME**

Years In Current Role vs. Monthly Income for Job Level 1



Years In Current Role vs Monthly Income by Job Level



THANK YOU

We're excited to revolutionize Frito-Lay with you!
Questions?