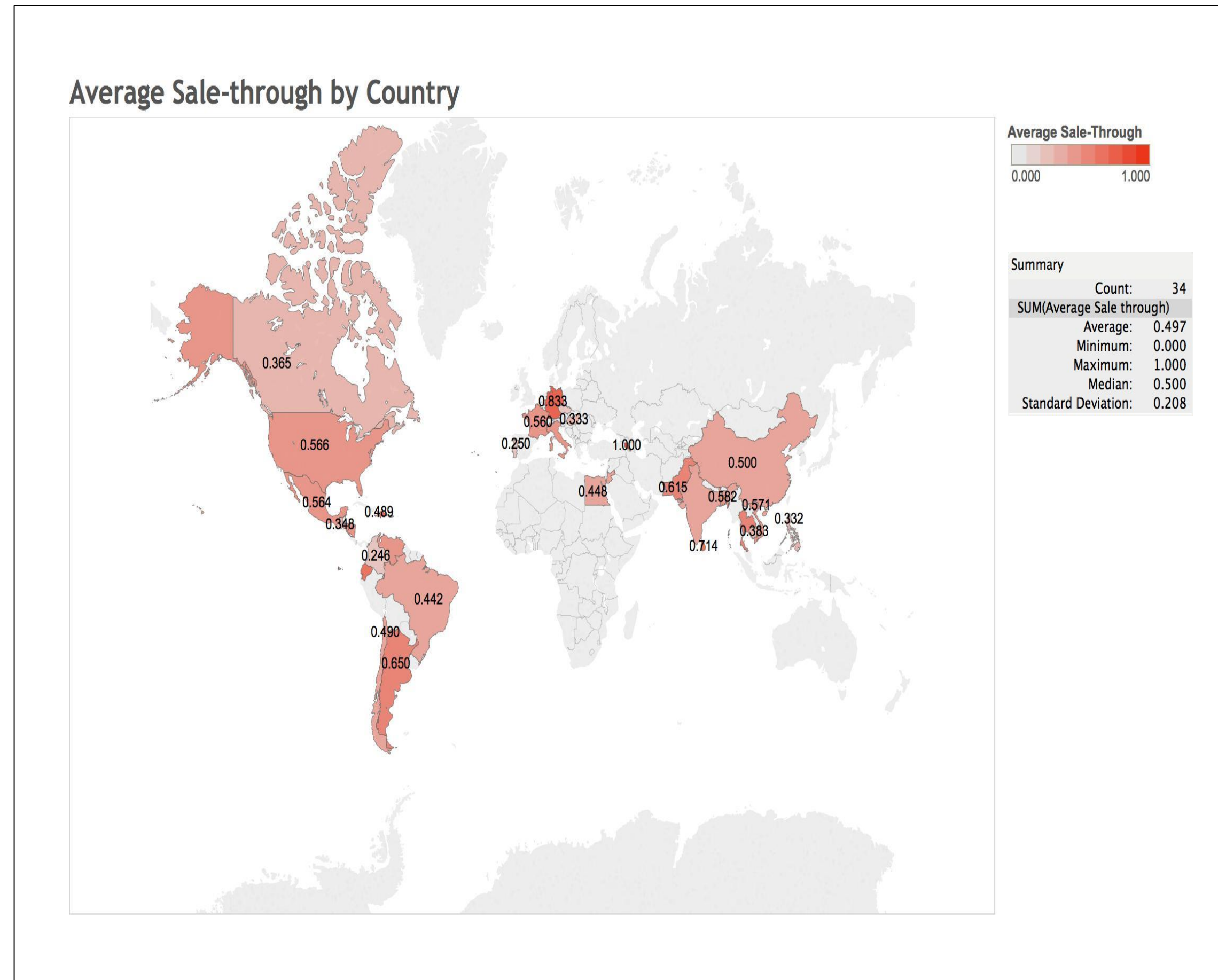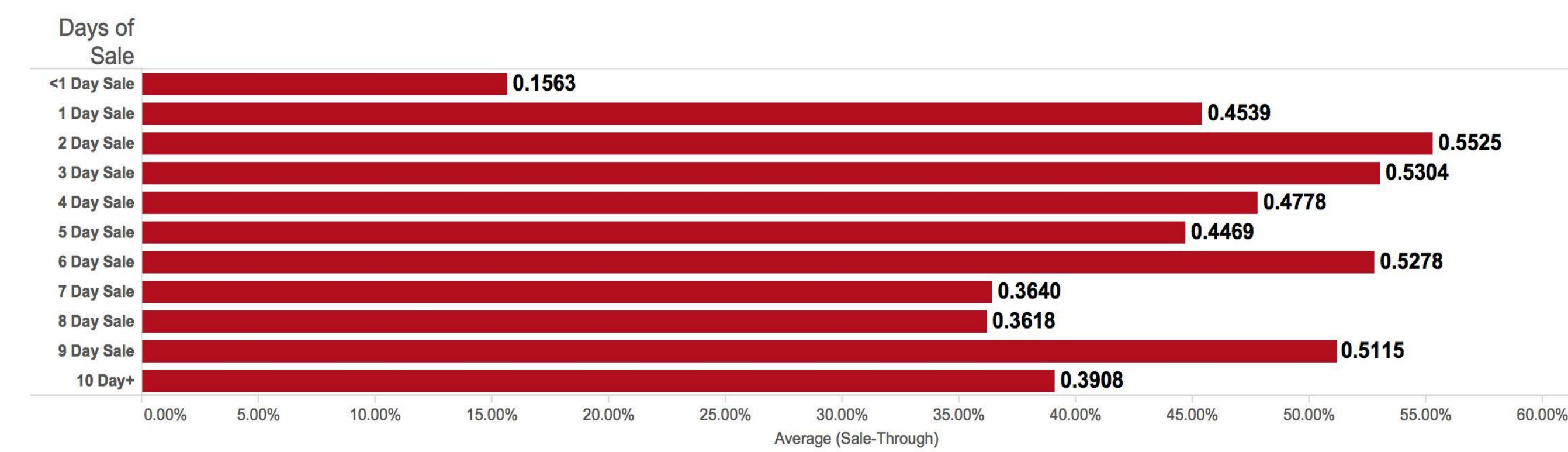# Rensselaer

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Summary: Our exploratory analysis of the Gilt data revealed that we should focus on the sale-through ratio for our further tests. We analyzed the effects of length, discount, season, category, color, brand, and other variables to try and determine what causes a look to sell out. We started by doing simple statistical analysis and graphing our results to look at important factors and what variables performed better. From there, we were able to do regression testing and create a decision tree. Our analysis resulted in some strange findings, such as the increase in sales but decrease in average sale-through, as well as a significant increase in sale-through rate for two day sales as opposed to sales of less time, despite Gilt focusing on short sales at high discounts.
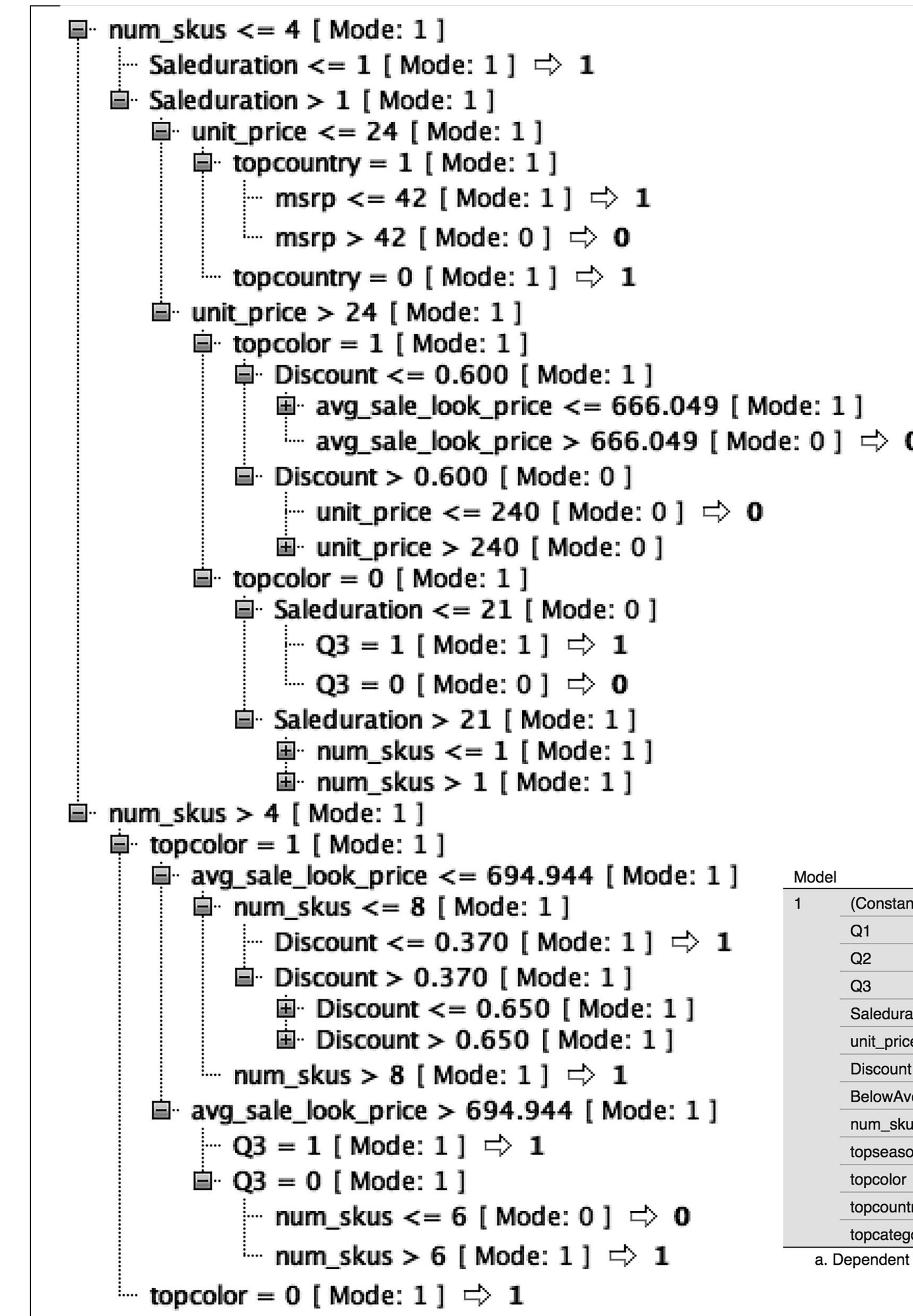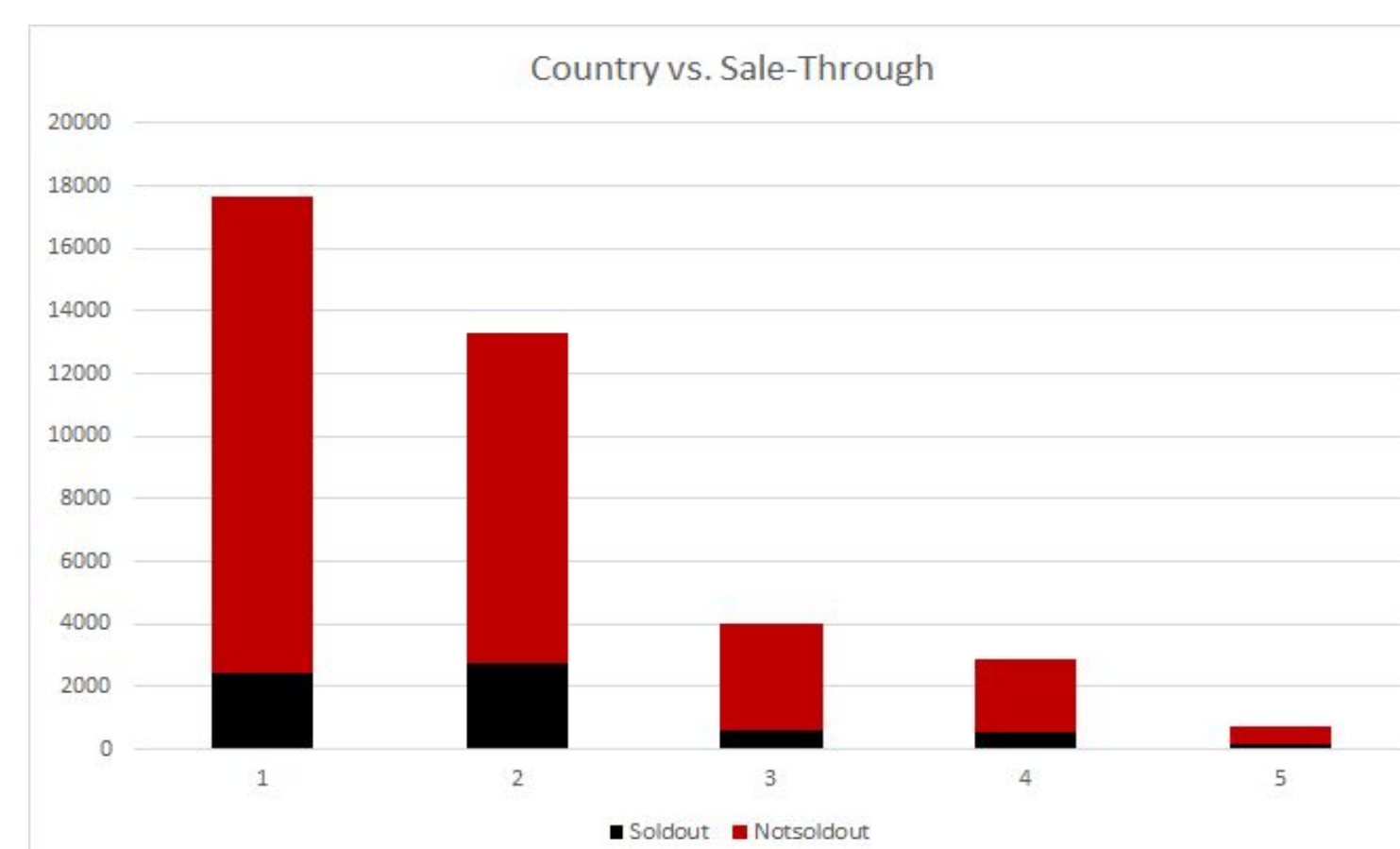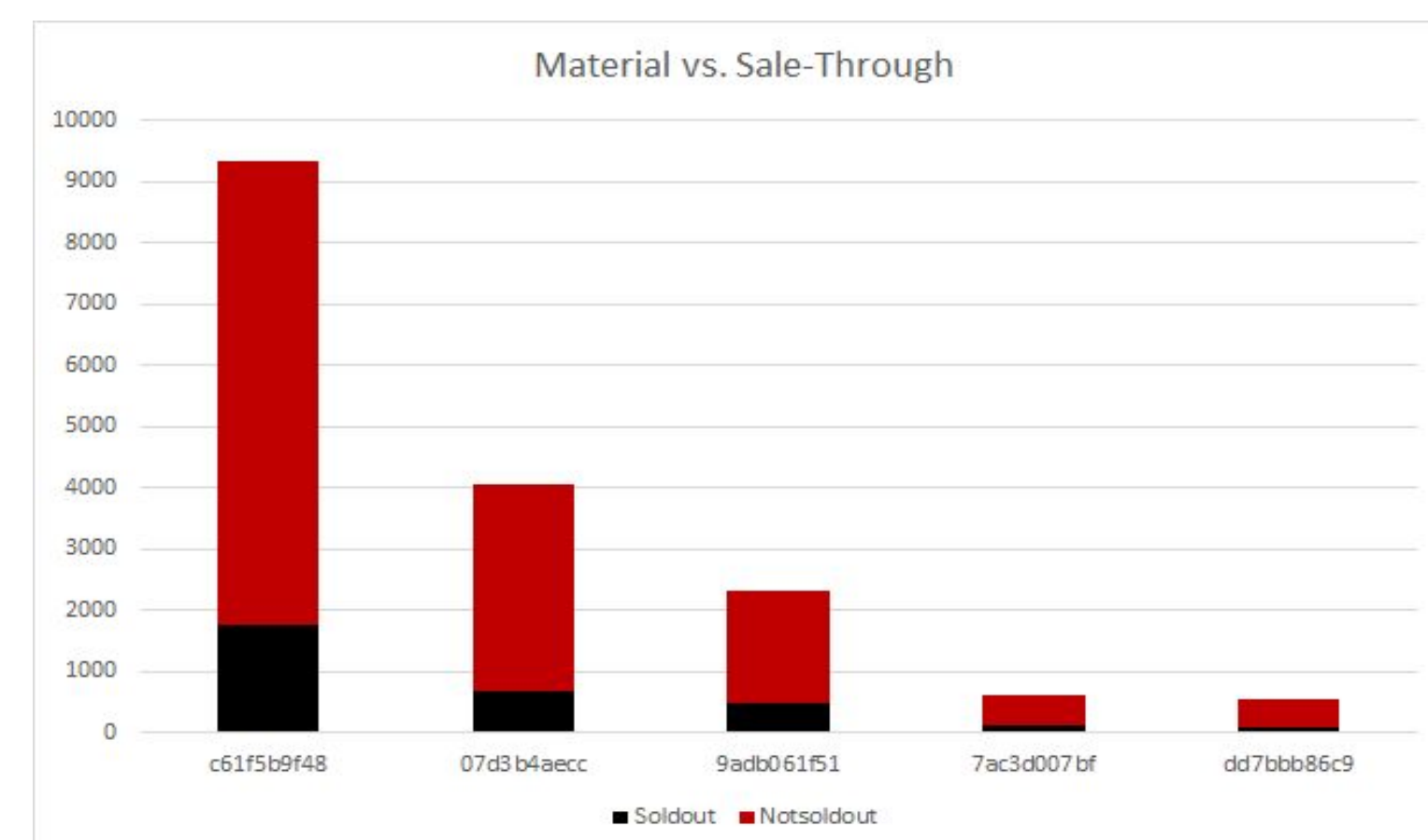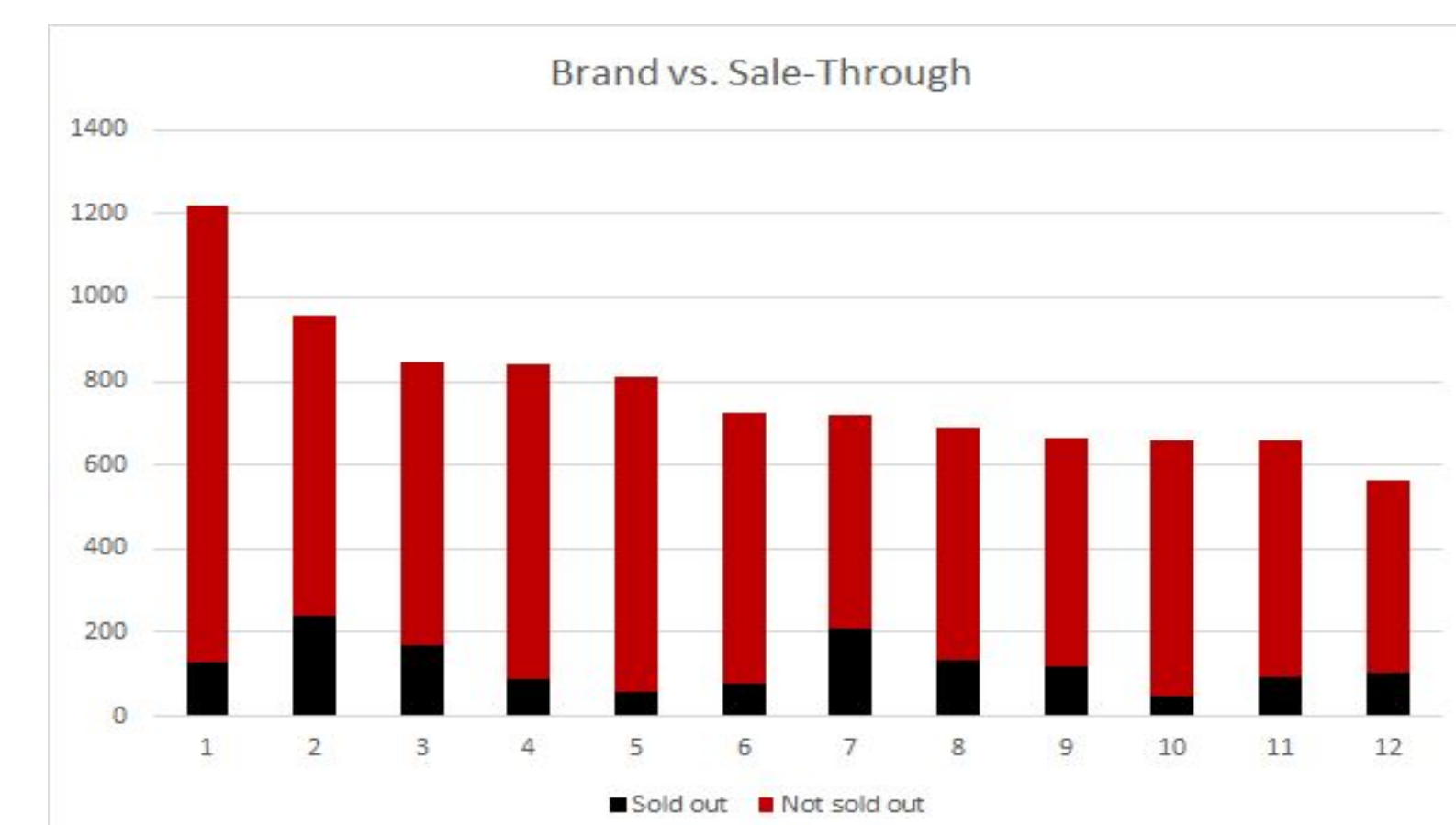
Average Sale-through by Country

Summary	
Count:	34
SUM(Average Sale through)	
Average:	0.497
Minimum:	0.000
Maximum:	1.000
Median:	0.500
Standard Deviation:	0.208

We used decision trees and regression tests to find a link between the variables and a high sale-through rate. Through our models we were able to determine the variables that most positively and negatively affected the sale-through rate*. Our decision tree showed that the number of skus was among the most important predictor in determining if a look sold out. Following the decision tree, we went down the tree until the tree ended in a 1, indicating the product did not sell out or if the tree ended in a 0, the product sold out. Regression tests showed that the discount along with whether the item was sold below the average price and was in the top color category positively affected the sale-through rate.

		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	.588	.008		70.589	.000	.571	.604
	Q1	.013	.005	.016	2.729	.006	.004	.023
	Q2	.062	.005	.077	12.107	.000	.052	.072
	Q3	-.012	.005	-.014	-2.373	.018	-.021	-.002
	Saleduration	.000	.000	-.029	-6.179	.000	.000	.000
	unit_price	.000	.000	-.094	-16.629	.000	.000	.000
	Discount	.020	.004	.023	4.972	.000	.012	.028
	BelowAverage	.032	.003	.045	9.339	.000	.025	.039
	num_skus	-.019	.001	-.158	-32.100	.000	-.020	-.018
	topseason	-.027	.004	-.035	-7.127	.000	-.034	-.019
	topcolor	.204	.003	.283	60.193	.000	.197	.210
	topcountry	-.041	.004	-.057	-10.489	.000	-.049	-.033
	topcategory	-.015	.004	-.016	-3.449	.001	-.024	-.007

a. Dependent Variable: SALETHROUGH

*All models had a low R-Square and are therefore not highly significant. Regression models include bias.

What Causes a Look to Sell Out?

Length of Sales VS Sale-Through %

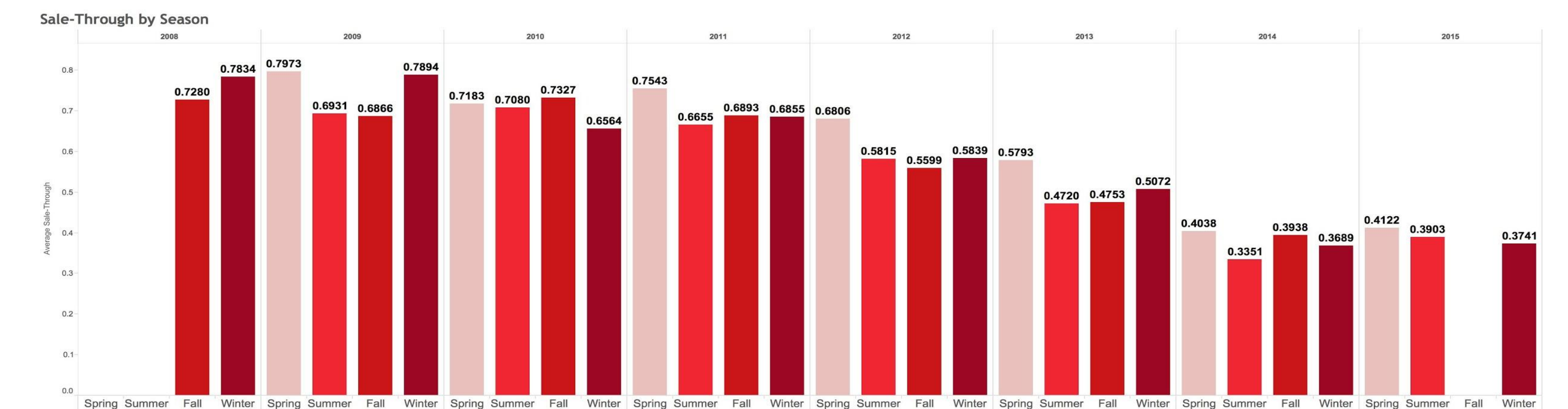Sum of Averages (Sale Through) for each Days of Sale.

The bar graphs in this section provide a qualitative exploration of factors affecting sale-through rate. First, the top graph shows two-days sales are among the highest performing ones. Next, the six graphs at the bottom each focus on a different variable and its relationship with sale-through rate. All graphs were constructed in the same way: we divided the data into sold-out (sale-through value of 1, which measured as 17% of the looks) and not sold-out (sale-through value less than 1, 83% of the looks). We then counted the number of looks by specific values of the variable (color, size, etc.) in each of the two subsets. The graphs present the top results for each variable. With these graphs, it can be seen which variables are likely to sell out.

Sale-Through by Season

Our analysis revealed that the rate of which Gilt's looks sell out has been steadily declining since 2008. We observed a 565% increase in total looks sold from 2009 to 2015. Despite this sharp rise in the overall number of looks sold per year, the average rate of sale-through is declining consistently.

Spring is historically the most popular month of sales by volume during each year, however the average sale-through ratio for Spring 2015 was 48% lower than Spring 2009.

Total Number of Looks Sold Per Year
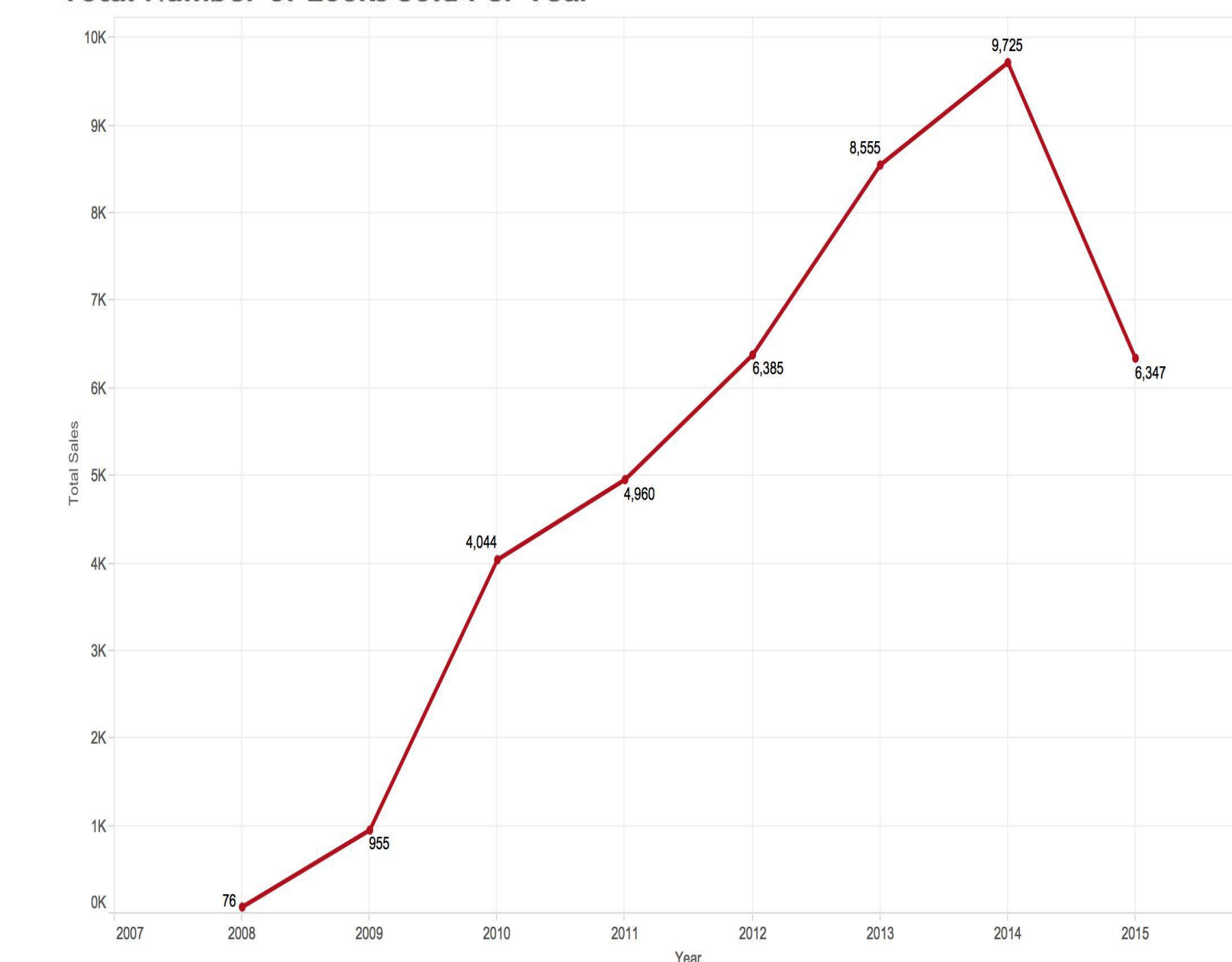
Based on our analysis, we have concluded that in order to boost critical sale-through ratio percentages, Gilt will need to focus on the important components that make their core business model unique.

To achieve high sale-through averages throughout each year, Gilt will need to advance their inventory forecasting techniques. The reason Gilt needs to focus on inventory management, is because of declining sale-through percentages despite a rise in the number of looks sold per year. These findings suggest that Gilt overestimates the amount of inventory it needs per season and per year. Proper inventory management and forecasting will lead to more profitable periods for Gilt, by increasing the all important sale-through ratio.