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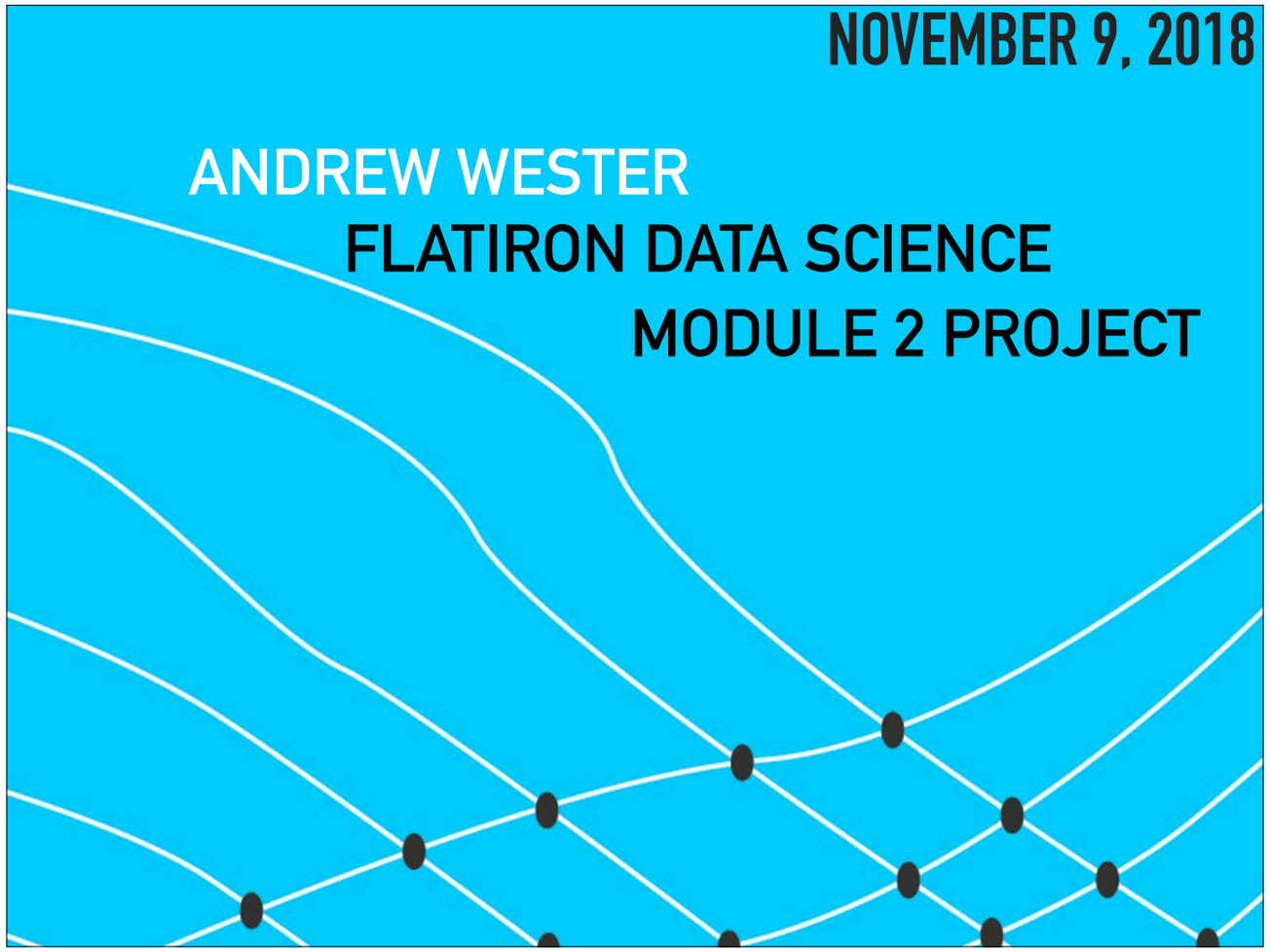
FLATIRON DATA SCIENCE
MODULE 2 PROJECT



NORTHWIND DATABASE HYPOTHESES

HYPOTHESIS 1:

IS THERE A DIFFERENCE IN QUANTITY OF ORDERED PRODUCTS WHEN DISCOUNTED VS NOT?

HYPOTHESIS 2:

DOES THE TOP SELLING EMPLOYEE HAVE HIGHER PER-ORDER SALES VS EVERYONE ELSE?

HYPOTHESIS 3:

DOES THE TOP REVENUE PRODUCING REGION HAVE HIGHER PER-ORDER SALES THAN OTHERS?

HYPOTHESIS 4:

DO THE TOP PRICED PRODUCTS SELL MORE OR LESS THAN THE LOWEST PRICED PRODUCTS?

Hypotheses:

H1:

- We wanted to see if there is a difference in the number of products ordered when they're discounted vs full priced. The advantage of looking at this is that if we can show there is a large enough difference where customers might be more likely to increase the amount they spend due to an increase in discount, we can strategically place discounts on products that we either need to clear inventory, or that we think will make us extra money due to low cost products.

H2:

- We wanted to look at whether the highest selling employee makes their money due to their ability to make extra sales throughout the year, or if it has to do with higher spending clients, or just an ability to sell higher priced products. This can be beneficial in recognizing strategies to improve sales performance, as well as to recognize the efficiency of the top selling employee.

H3:

- We wanted to see if there was a large difference in the top revenue producing regions around the world, and where the differences in revenue came from. If there are certain regions more likely to spend on certain products, or if there needs to be an increase in spending on employees to cover certain regions that will help produce extra income for the company.

H4:

- We looked at the difference in sales information for products that were in the top 10% on unit pricing, compared with products in the bottom 10%. Examining this information is beneficial to recognize whether clients are more or less likely to spend on higher or lower priced products, as well as where revenue can increase based on sales representatives pushing or sponsoring products with discounts, or with package deals, etc…

DIFFERENCE BASED ON DISCOUNTS?

	Full Price	Discounted
Orders	1,317	838
Avg. Order Price	$570.01	$614.67
Avg. Item Qty.	21.72	27.11
Total Revenue	$750,698.61	$515,094.43

- 1,317 Orders without discount
- 838 Orders with discount
- $570 Average Full Price Order
- $615 Average Discounted Order
- 21.72 Items per Full Price Order
- 27.11 Items per Discounted Order
- $715,698 Revenue Full Price
- $515,094 Revenue Discounted

DIFFERENCE BASED ON DISCOUNTS?

HYPOTHESIS 1:

IS THERE A DIFFERENCE IN QUANTITY OF ORDERED PRODUCTS WHEN DISCOUNTED VS NOT?

- Discounts produce increase in Order Price
- Discounts produce increase in Quantity of Items
- However...
  - Total revenue less for discounted items

- 1,317 Orders without discount
- 838 Orders with discount
- $570 Average Full Price Order
- $615 Average Discounted Order
- 21.72 Items per Full Price Order
- 27.11 Items per Discounted Order
- $715,698 Revenue Full Price
- $515,094 Revenue Discounted

TOP SALES EMPLOYEE

	Top Employee	Average
Orders	156	84.25
Total Sales	$250,187.45	$150,495.40
Order Price	$1,603.77	$1,638.38

DOES THE TOP SELLING EMPLOYEE HAVE HIGHER PER-ORDER SALES VS EVERYONE ELSE?

- **Top employee produced $250k in revenue**
  - **Every other employee produced average of $183k**

- 156 Orders placed for Employee 4 (Top individual sales)
- 674 Orders placed by Everyone else (average 84.25, only 56% of E4)
- $250,187 in sales for top employee
- $1,104,271 in sales total for everyone else
  - Other 8 employees average $183,033 in sales
- Average order price for Employee 4 was $1,603.77
- Average order price for everyone else was $1,638.38

REGIONAL DIFFERENCES IN REVENUE

	N. America	W. Europe	Total
Orders	152	276	830
Revenue	$318,901	$537,690	$1,354,458
Average Order	$2098.03	$1,948.15	$1,638.88
Average Discount	$1,945.93	$1,830.31	$1,214.31

- Looking at differences in regional sales, with top two regions being North America and Western Europe
- North America had 152 orders placed vs, 276 for Western Europe and 830 orders total
- Total revenue was $318,901 for N. America, $537,690 for Western Europe
- Average Order was $2,098 for North America, $1,948 for Western Europe, and $1,638 overall
- Average Discount order was $1,945 for N. America, $1,830 for W. Europe, and $1,214 overall

REGIONAL DIFFERENCES IN REVENUE

	Region	TotalOrders	TotalSales	TotalDiscountSales	AverageOrder	AverageDiscountOrder
1	Western Europe	276	537690	505164	1948.15	1830.31
0	North America	152	318901	295781	2098.03	1945.93
2	South America	145	183902	171856	1268.29	1185.21
4	British Isles	75	117934	108951	1572.45	1452.68
5	Northern Europe	55	94305.9	87156.2	1714.65	1584.66
3	Southern Europe	64	48605.7	45225.7	759.46	706.65
7	Scandinavia	28	25513.6	24545.2	911.2	876.61
8	Central America	28	24073.4	23582.1	859.77	842.22
6	Eastern Europe	7	3531.95	3531.95	504.56	504.56

This graph highlights the distribution of Orders, Total Sales, Discount Sales and their averages relative to the regional distributions

TOP VS BOTTOM PRICED PRODUCTS

	Top 10% Products	Bottom 10% Products
Orders	221	260
Total Sales	$473,037.40	$39,885.55
Quantity	5,781	6,484
Average Item Price	$81.83	$6.15

Looking at the distribution between the top 10% priced products and the bottom 10% priced products

- Top 10% was products priced over $47.32, Bottom 10% was below $9.38
- Total orders for top 10% products was 221, and 260 for bottom 10%
- Total sales for top 10% was $473k, and only $39,885 for bottom 10%
- Quantity of items sold was 5,781 for top 10% and 6,484 for bottom 10%
- Average item price was $81.83 for top 10% and $6.15 for bottom 10%