A look back:

Two Years of Worldwide Sales

By Andi Osika
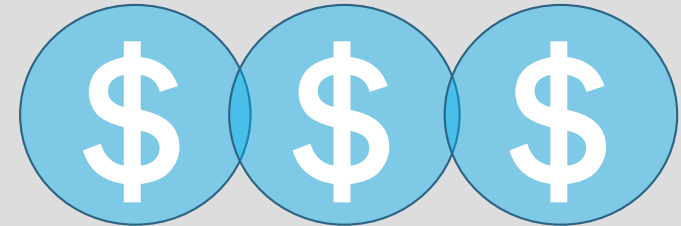
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Maximizing Revenue:

Do discount levels effect quantity ordered?

%

Do some
- Product Categories
- Regions
- Sales Staff

generate more revenue than others?

$ $ $

Sales/Order Data
April 2012 – June 2014

Hypothesis Testing: Methodology 👓

Looking for "significant" differences in sample groups by comparing averages.

Two main measures:

- A '**p-value**' <.05 indicates statistical significance.

  * = <.05
  ** = <.01
  *** = <.001
  No '*' = not significant

  (Kruskal-Wallis)

- **Effect Size** / Relative size

  (Tukey Test)

 | Relative size | Effect size | % of control group below the mean of experimental group |
  |---|---|---|
  | | 0.0 | 50% |
  | Small | 0.2 | 58% |
  | Medium | 0.5 | 69% |
  | Large | 0.8 | 79% |
  | | 1.4 | 92% |

Results......

Discount Levels:

1

Question:

- Does discount amount have a statically significant effect on the quantity of a product in an order?

&

- If so at what level(s) of a discount(s)?

Q: Do Discount Levels Effect Qty?   A: Yes

Average Quanity Purchased at Varying Discont Levels
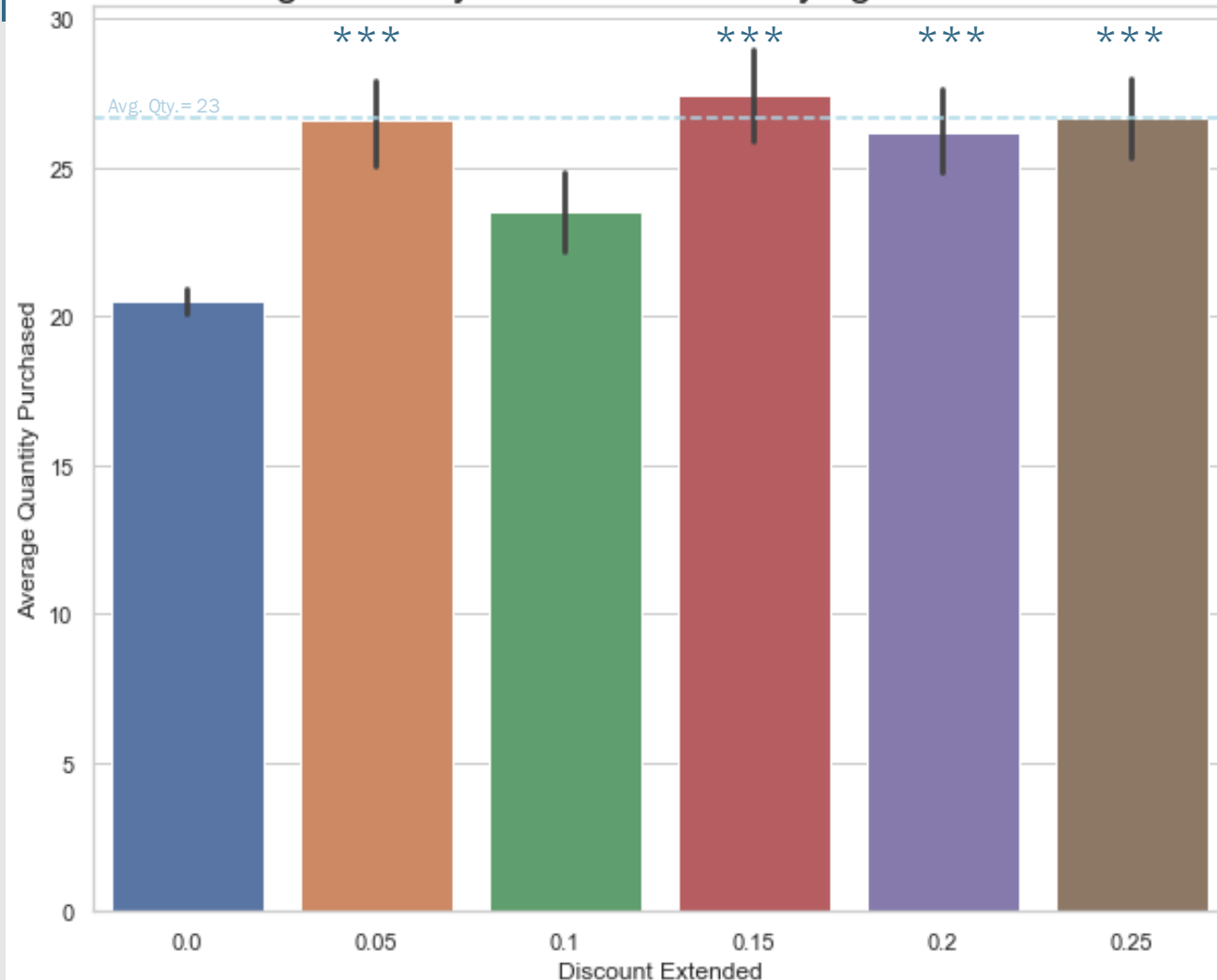
Statistically Equal →

Discount	AvQty	Effect Size	Effect
5 %	27	.1982	Small
15 %	27	.454	Medium
20 %	26	.3751	Medium
25 %	27	.454	Medium

P-Value of .001 in comparison to no discount

Recommendation:

- Since the effects of higher discounts are equal to lower in terms of quantity purchased, offer the lower discounts - specifically 5% and 15% more frequently when extending any discounts to preserve profit margins.

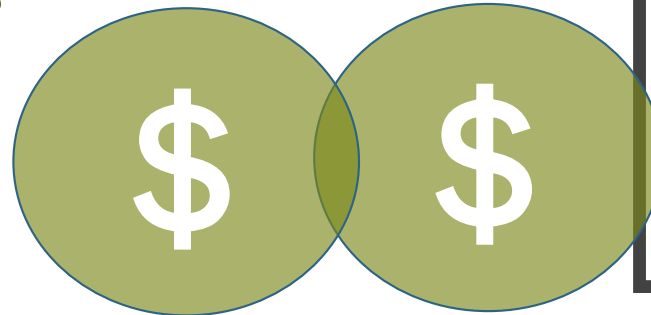* Low **Medium *** High Statistical Significance
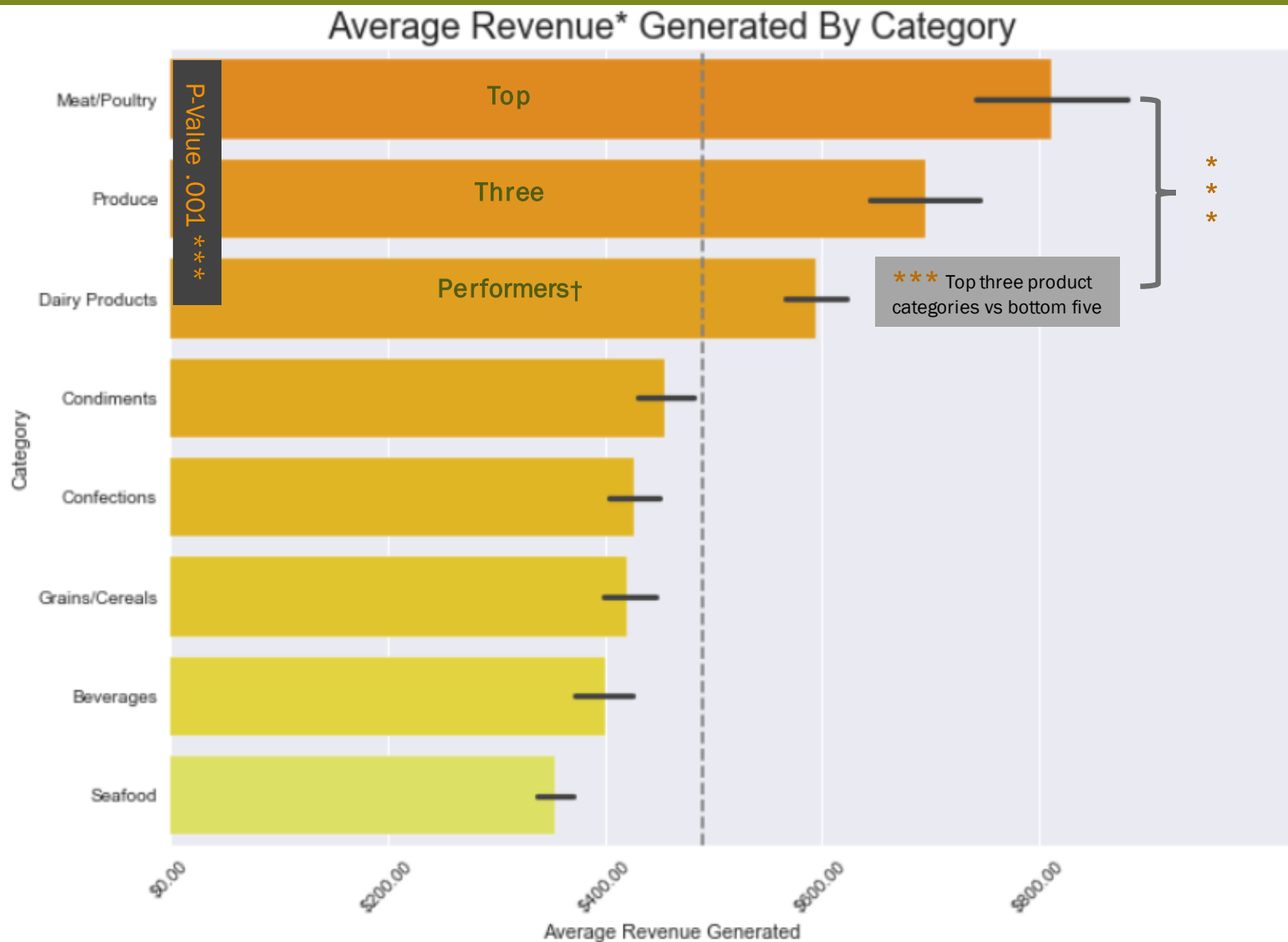
Product Categories:

2

Question:

Do some product categories generate more revenue than others?

$ $

Q: Do some product Categories generate more?

A: Yes

Average Revenue* Generated By Category

- P-Value .001 ***
- Meat/Poultry — Top
- Produce — Three
- Dairy Products — Performers†

*** Top three product categories vs bottom five

- Condiments
- Confections
- Grains/Cereals
- Beverages
- Seafood

Category (y-axis)

Average Revenue Generated: $0.00, $200.00, $400.00, $600.00, $800.00

- • Meat/Poultry
- • Produce &
- • Dairy

Top 3

Recommendations:

- Maximize revenues with additional products that align with the higher revenue generating categories.

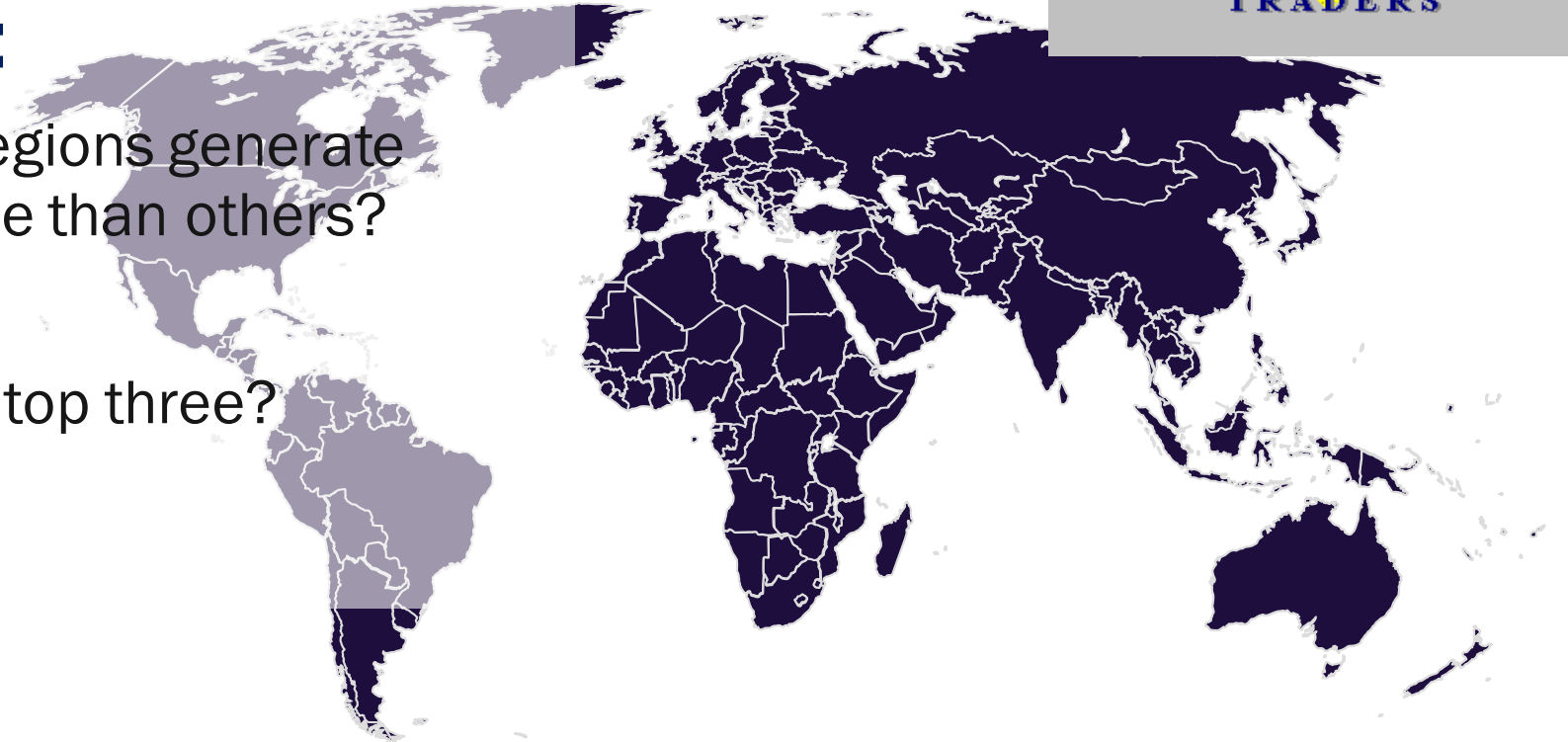- Minimize product offerings in lesser generating categories

Region:

3

Question:

Do certain regions generate more revenue than others?

&

Who are the top three?

Q: Do some regions generate more?
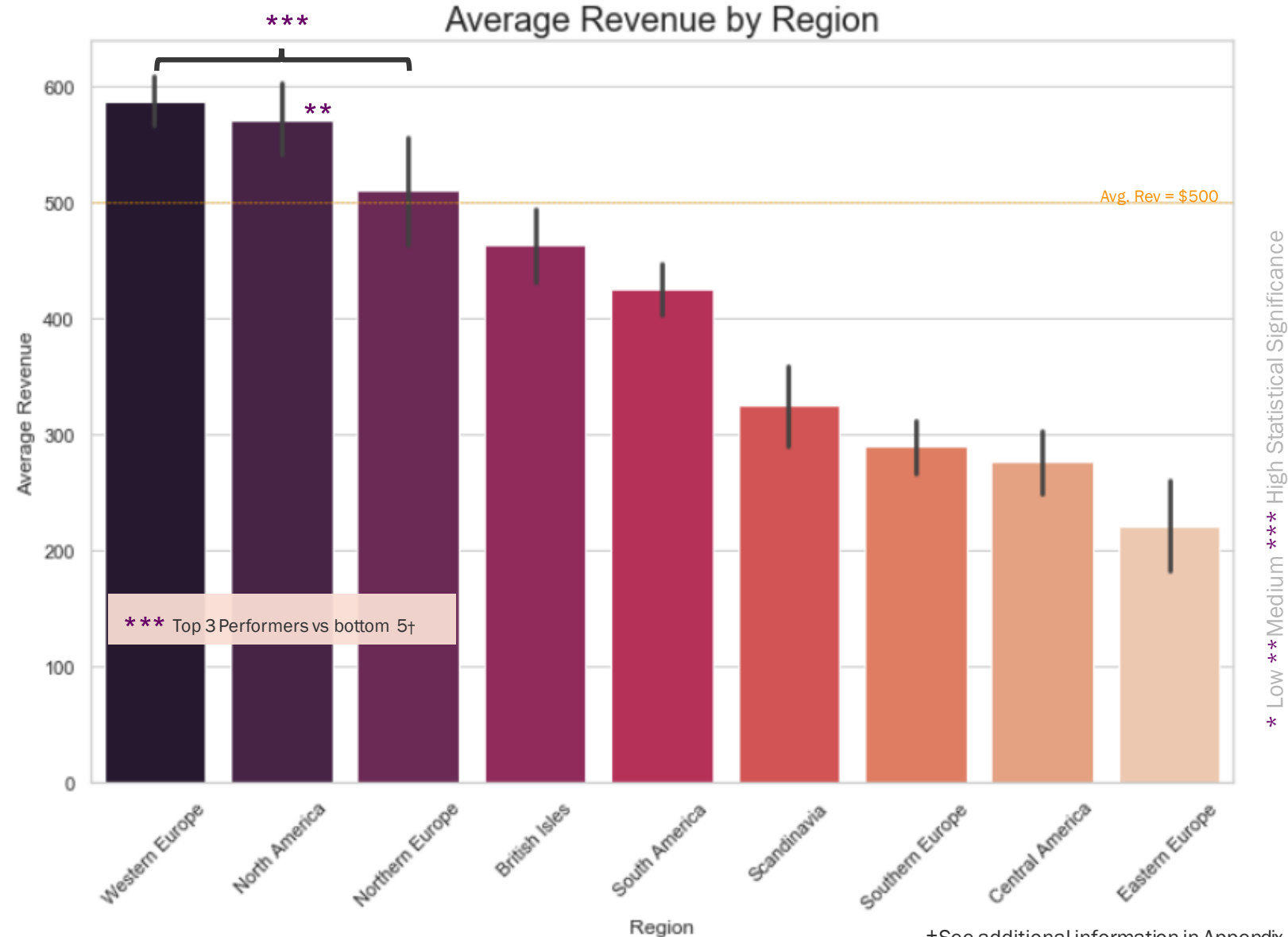
A: Yes

Western Europe, North America

…. and

Northern Europe

Small sample sizes from Eastern Europe, Scandinavia, Central America** †

Recommendation:

- Explore best practices from regions that are top performers via additional market analysis.

- Additional analysis on underdeveloped regions (apply categorical and discount knowledge)

Average Revenue by Region

*** Top 3 Performers vs bottom 5†

Avg. Rev = $500

* Low **Medium *** High Statistical Significance

†See additional information in Appendix

Sales Staff:

4

Question:

Do some sales representatives generate more revenue than others ?

&

Who are the top sellers?

Q: Do some regions generate more? A: No.

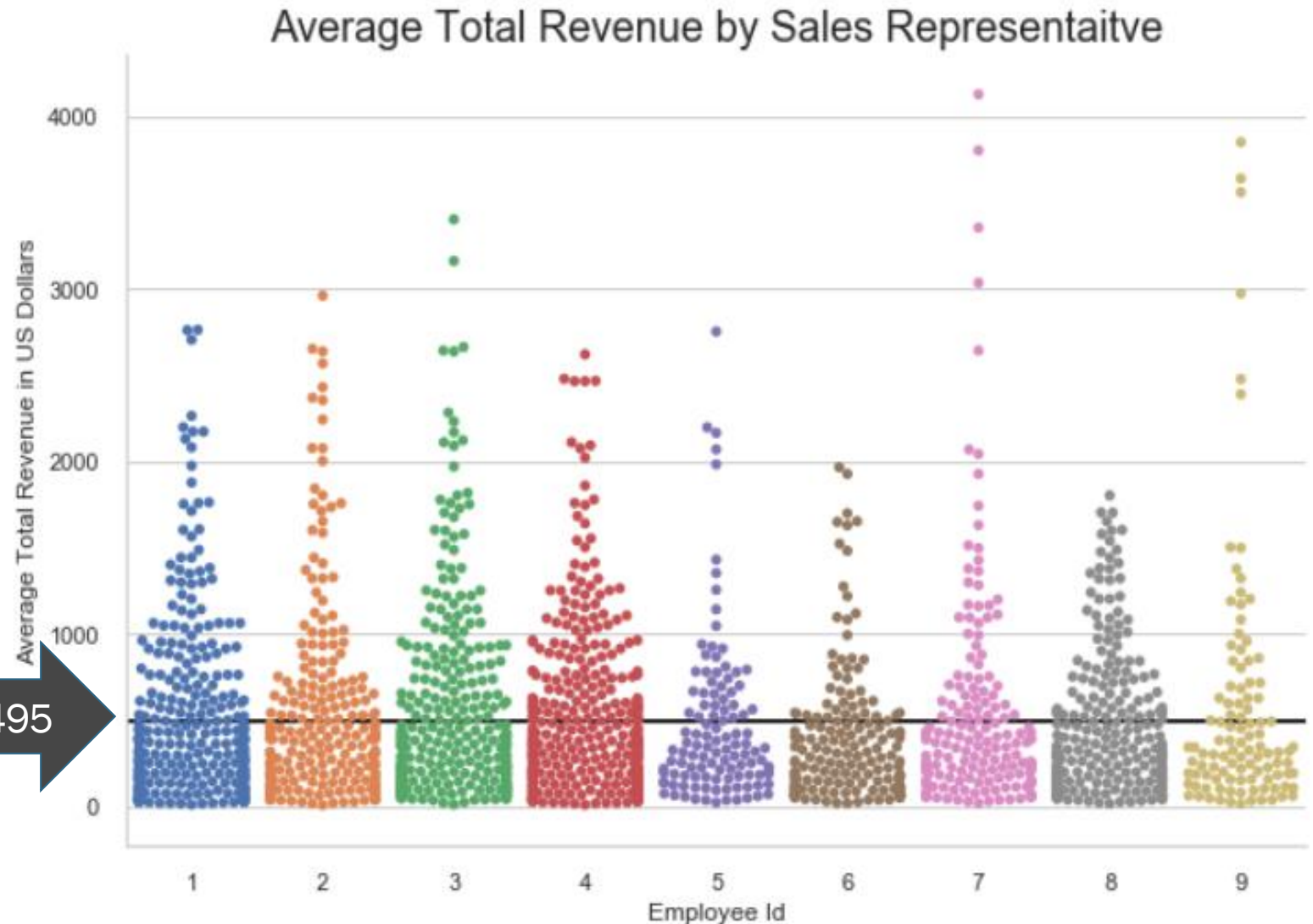All sales staff, regardless of location or title statistically generate equal revenue.

Recommendation:

- Build on knowledge of smaller discounts achieving larger quantities.

- Develop regional markets (via analysis - future work?)

Average revenue across all sales staff:

$495

Average Total Revenue by Sales Representaitve

Average Total Revenue in US Dollars

4000

3000

2000

1000

0

Employee Id
1 2 3 4 5 6 7 8 9

What next?

Maximize Revenues

1. *Offer discounts 5% and 15% more frequently to preserve profit margins.*
2. *Refine product categories offerings – expand those that generate higher revenues and cut those who are lacking.*
3. *Examine best practices in regions that generate the most revenue and analyze underdeveloped markets.*
4. *Use discovered insight to inform and develop sales staff.*

Future Work:

- Market analysis for regions that need to be developed.
  Examples:
  - Regional category refinement
 - Discount types and frequency
  - Sales relationships

Thank You.

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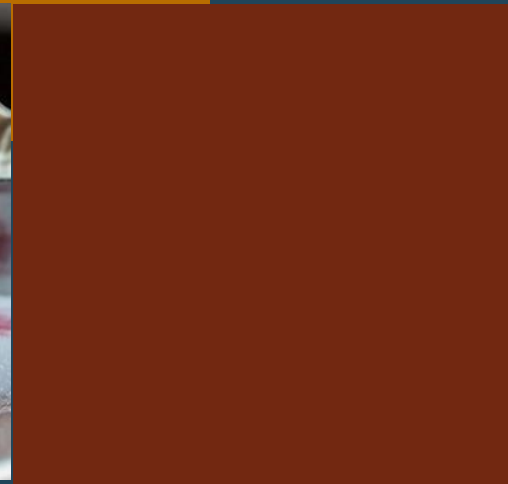
Appendix:

Region:

Illustrates the difference in confidence intervals of Tukey test. Some regions that visibly look like they out perform others demonstrate equality here this might be attributed to varying sample sizes.

N. & W. Europe, N. America
Statistically Equal Performance

Region 1	Region 2	Adj P
North America	Northern Europe	0.9000
North America	Western Europe	0.9000
Northern Europe	Western Europe	0.7992

Multiple Comparisons Between All Pairs (Tukey)
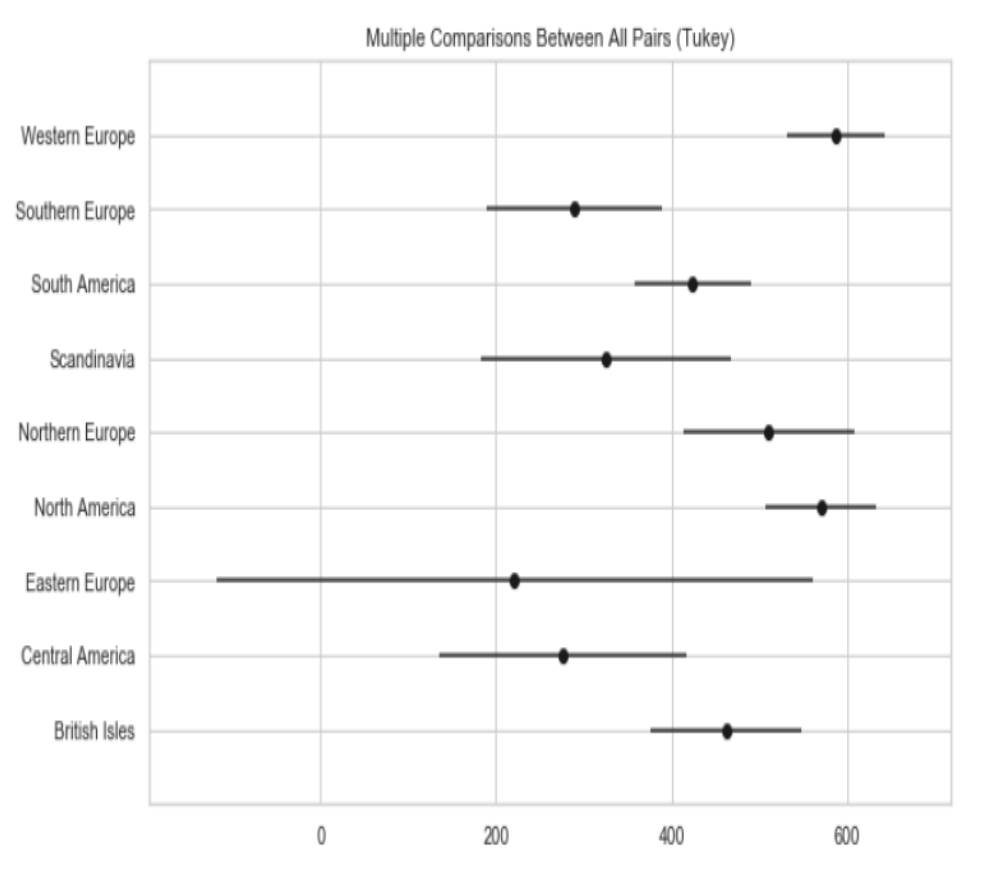
Group 1	Group 2	P-Adj
Central America	North America	0.001
North America	Scandinavia	0.012
North America	South America	0.005
North America	Southern Europe	0.001
Northern Europe	Southern Europe	0.016
Central America	Western Europe	0.001
Scandinavia	Western Europe	0.003
South America	Western Europe	0.001
Southern Europe	Western Europe	0.001

Categories:

Statistically

Group 1	Group 2	Adj-P	Effect	
Beverages	Dairy Products	0.001	0.352	
Condiments	Dairy Products	0.045	0.277	
Confections	Dairy Products	0.001	0.341	
Dairy Products	Grains/Cereals	0.005	0.350	
Beverages	Meat/Poultry	0.001	0.596	
Condiments	Meat/Poultry	0.001	0.517	Reject Null Hypothesis: True
Confections	Meat/Poultry	0.001	0.600	
Dairy Products	Meat/Poultry	0.001	0.311	
Grains/Cereals	Meat/Poultry	0.001	0.564	
Beverages	Produce	0.001	0.521	
Condiments	Produce	0.001	0.490	
Confections	Produce	0.001	0.560	
Grains/Cereals	Produce	0.001	0.571	
Dairy Products	Seafood	0.001	0.525	
Meat/Poultry	Seafood	0.001	0.755	
Produce	Seafood	0.001	0.798	

Significant

Equal

Group 1	Group 2	MeanDiff	Adj-P	
Beverages	Condiments	55.7712	0.9	
Beverages	Confections	27.0669	0.9	
Beverages	Grains/Cereals	21.4034	0.9	
Beverages	Seafood	-46.1557	0.9	
Condiments	Confections	-28.7043	0.9	
Condiments	Grains/Cereals	-34.3678	0.9	Reject Null Hypothesis: False
Condiments	Seafood	-101.927	0.3439	
Confections	Grains/Cereals	-5.6635	0.9	
Confections	Seafood	-73.2226	0.6099	
Dairy Products	Produce	102.0142	0.5181	
Grains/Cereals	Seafood	-67.5591	0.831	
Meat/Poultry	Produce	-114.9365	0.5359	

Performers

*Revenue is calculated by multiplying sales price and quantity, taking into account discounts.

Background:

Worldwide Provisioner
Of Fine Foods

- *77 products, 8 Categories*
- *9 Sales Staff serving 9 Regions Globally*

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