Visual Data Mining at REI- Exploring Customer Patterns and Key Insights

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Background

REI is a member-owned co-op focused on love for the outdoors-

+ Mission is to "inspire, educate and outfit for a lifetime of outdoor adventure and stewardship"

+ 7 million active customers

+ 100+ retail stores and online at rei.com

+ $1.4 billion in sales

+ 10% Member dividend every year ($72m in 2008)

+ On the Fortune 100 Best Companies list every year since the list was created, #12 in 2008

Background

The Marketing Analytics Team

+ Customer research across all marketing programs (~$50m in 2008) and for REI.com

+ Data warehouse- DB2, multi-terabyte system with seven years of customer data

+ Data prep, data-mining and modeling- SAS, SAS STAT, JMP and Tableau

+ Business intelligence- Excel, Business Objects, Tableau

+ Web analytics- Coremetrics- feed into data warehouse for multi-channel exploration

+ Visual analytics- Tableau

Really cool stuff, amazing how I can view data the way I want so quickly and clearly!
Great for exploration without a lot of overhead.

- Team Statistician

Marketing Analytics at REI

Business Objects is useful for reporting and widely distributing standard data access for ad-hoc analysis

- However, it is weak in visualization, especially rapid interactive visualization
- JMP is an interactive visualization alternative, but fairly technical in our opinion

At Netflix, I discovered the strengths of Tableau: Interactive Exploration and Visualization

- Awesome for presenting key findings
- Useful for "visual data mining" due to ability to quickly alter views in a multitude of ways
- Rapid view-shifting unlike any other application I have used

Visual Analytics at REI

The plan

+ Web analytics experts would use Tableau for visual data mining and pattern exploration

+ Statisticians would use Tableau for visual data mining and explanation of results

+ Direct to DB2 data warehouse and leverage SAS data prep capabilities as needed

+ Radically improve the explanation of key findings via visual exploration and presentation of results

The data extract capability is simple and powerful. Even better, it's automatic!

- Team Statistician

About the example slides

All the data are from actual projects and views used by the team.

The data and results in this presentation have been randomized and "scrambled" to hide actual outcomes.

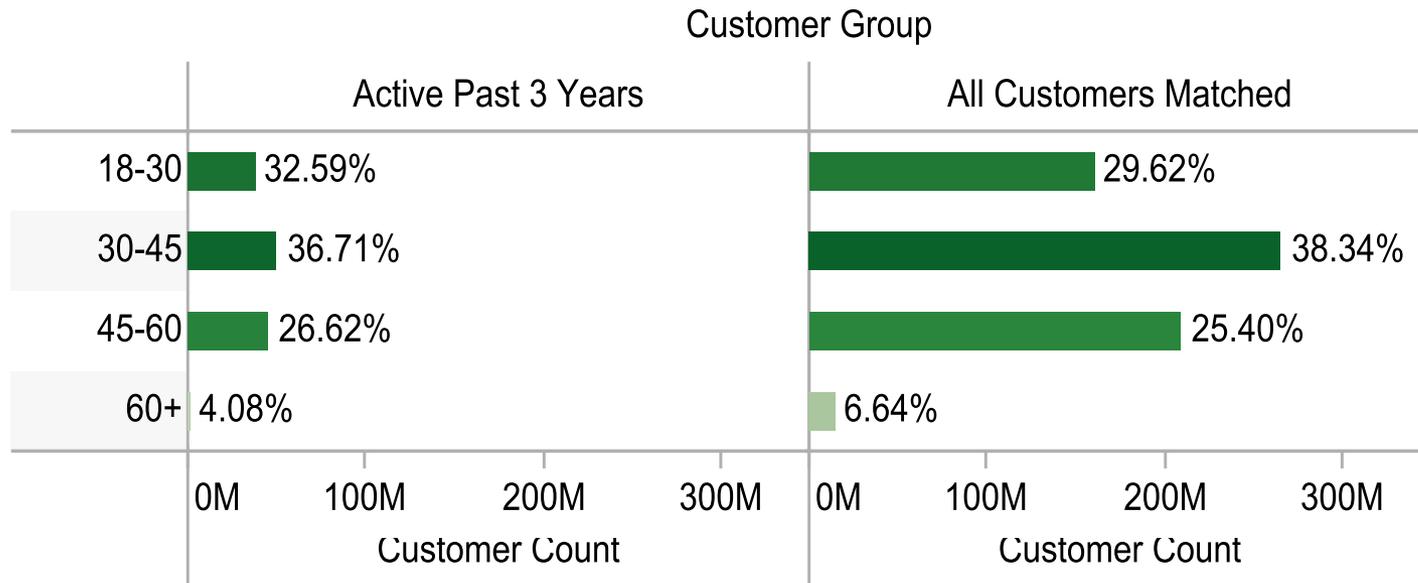**However, these are great examples of results that REI has achieved with Tableau in just 6 months!**

Fast like me, can almost keep up with my thoughts!

- Team Statistician

Contrast Active vs. All customer profiles

Active Customers Counts

Customer Group

	Active Past 3 Years	All Customers Matched
18-30	32.59%	29.62%
30-45	36.71%	38.34%
45-60	26.62%	25.40%
60+	4.08%	6.64%

0M 100M 200M 300M	0M 100M 200M 300M
Customer Count	Customer Count

All data significantly randomized and/or modified from original views

% of Total Sum of Count

4.08%   38.34%
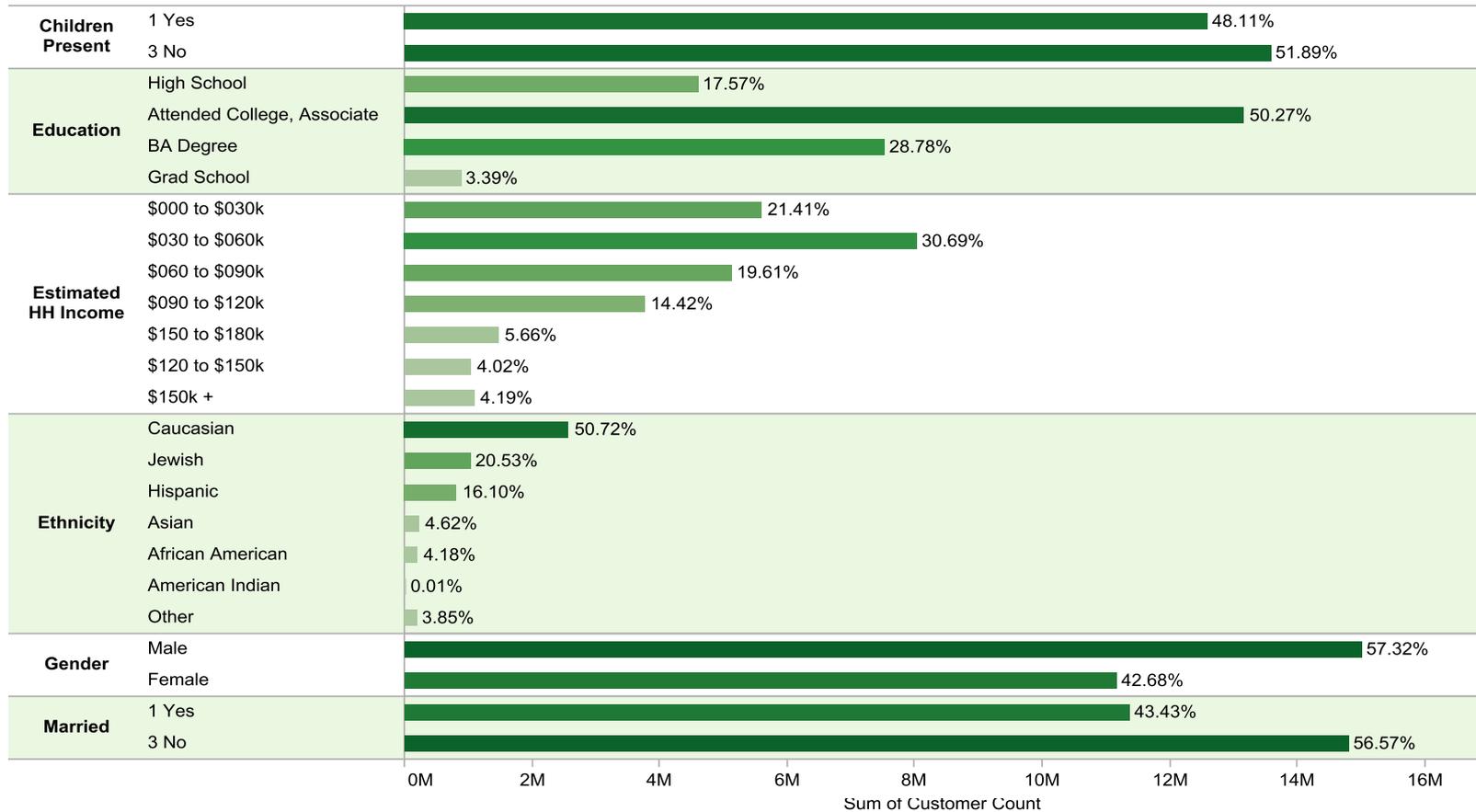
- Trending younger for active members

Customer descriptive metrics

All Active and Matched Customer Counts

Category	Subcategory	%
Children Present	1 Yes	48.11%
	3 No	51.89%
Education	High School	17.57%
	Attended College, Associate	50.27%
	BA Degree	28.78%
	Grad School	3.39%
Estimated HH Income	$000 to $030k	21.41%
	$030 to $060k	30.69%
	$060 to $090k	19.61%
	$090 to $120k	14.42%
	$150 to $180k	5.66%
	$120 to $150k	4.02%
	$150k +	4.19%
Ethnicity	Caucasian	50.72%
	Jewish	20.53%
	Hispanic	16.10%
	Asian	4.62%
	African American	4.18%
	American Indian	0.01%
	Other	3.85%
Gender	Male	57.32%
	Female	42.68%
Married	1 Yes	43.43%
	3 No	56.57%

Sum of Customer Count (axis: 0M, 2M, 4M, 6M, 8M, 10M, 12M, 14M, 16M)

All data significantly randomized and/or modified from original views
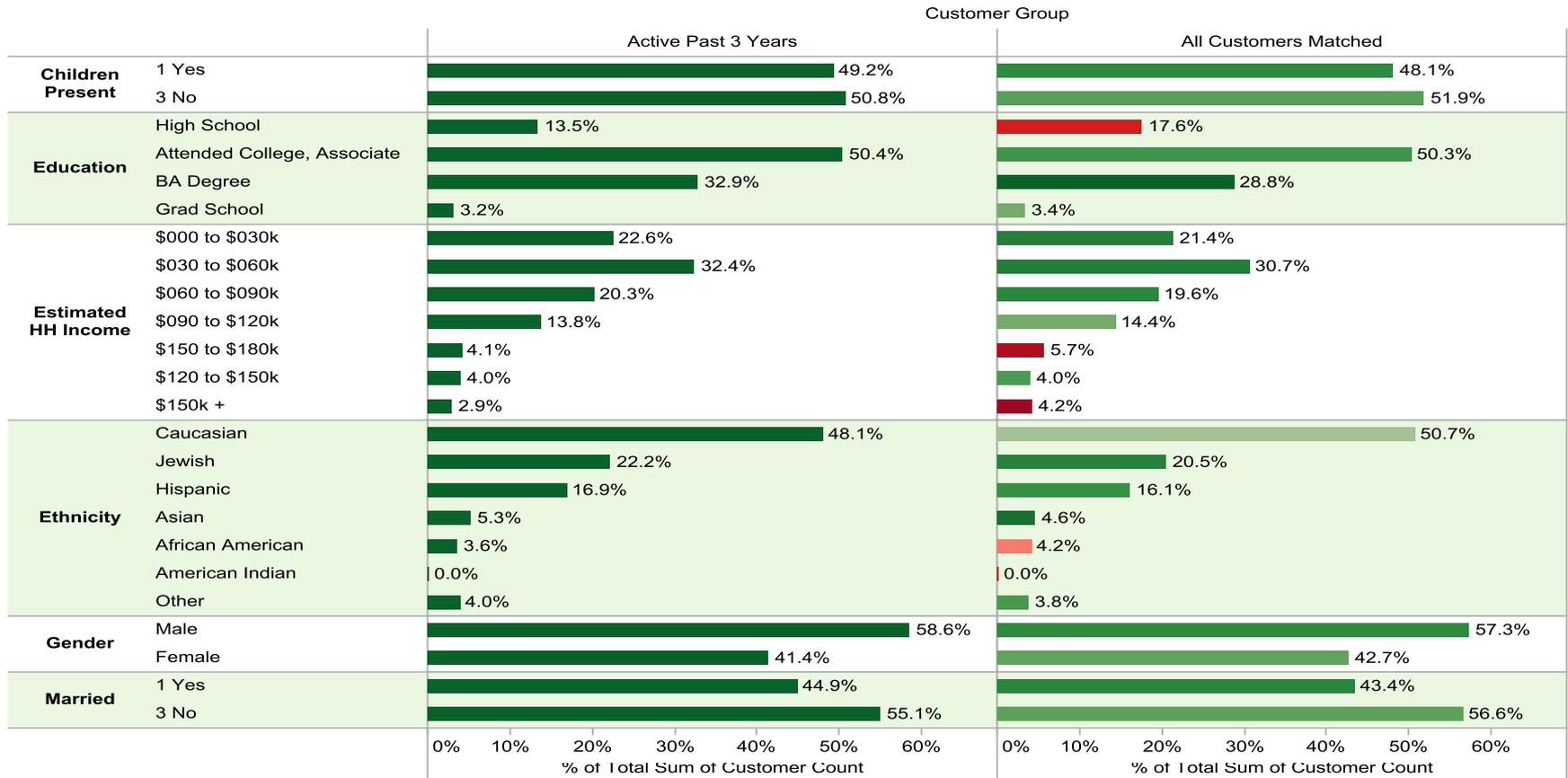
% of Total Sum of Count
0.01% — 57.32%

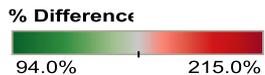- Median customer has no children, some college/ Associate's, $30-60k, caucasian, male, and is not married

Contrast and highlight differences between Active and All customers

All Active and Matched Customer Counts

Customer Group

		Active Past 3 Years	All Customers Matched
Children Present	1 Yes	49.2%	48.1%
	3 No	50.8%	51.9%
Education	High School	13.5%	17.6%
	Attended College, Associate	50.4%	50.3%
	BA Degree	32.9%	28.8%
	Grad School	3.2%	3.4%
Estimated HH Income	$000 to $030k	22.6%	21.4%
	$030 to $060k	32.4%	30.7%
	$060 to $090k	20.3%	19.6%
	$090 to $120k	13.8%	14.4%
	$150 to $180k	4.1%	5.7%
	$120 to $150k	4.0%	4.0%
	$150k +	2.9%	4.2%
Ethnicity	Caucasian	48.1%	50.7%
	Jewish	22.2%	20.5%
	Hispanic	16.9%	16.1%
	Asian	5.3%	4.6%
	African American	3.6%	4.2%
	American Indian	0.0%	0.0%
	Other	4.0%	3.8%
Gender	Male	58.6%	57.3%
	Female	41.4%	42.7%
Married	1 Yes	44.9%	43.4%
	3 No	55.1%	56.6%

% of Total Sum of Customer Count

All data significantly randomized and/or modified from original views

% Difference

94.0% 215.0%

- Versus median customer, active customers are more educated, less affluent, more Jewish & Asian and less African-American

Explore seasonally-trended discount sales growth- branding push in Q3 2008 and inventory concerns in Q4 2008
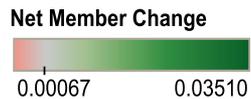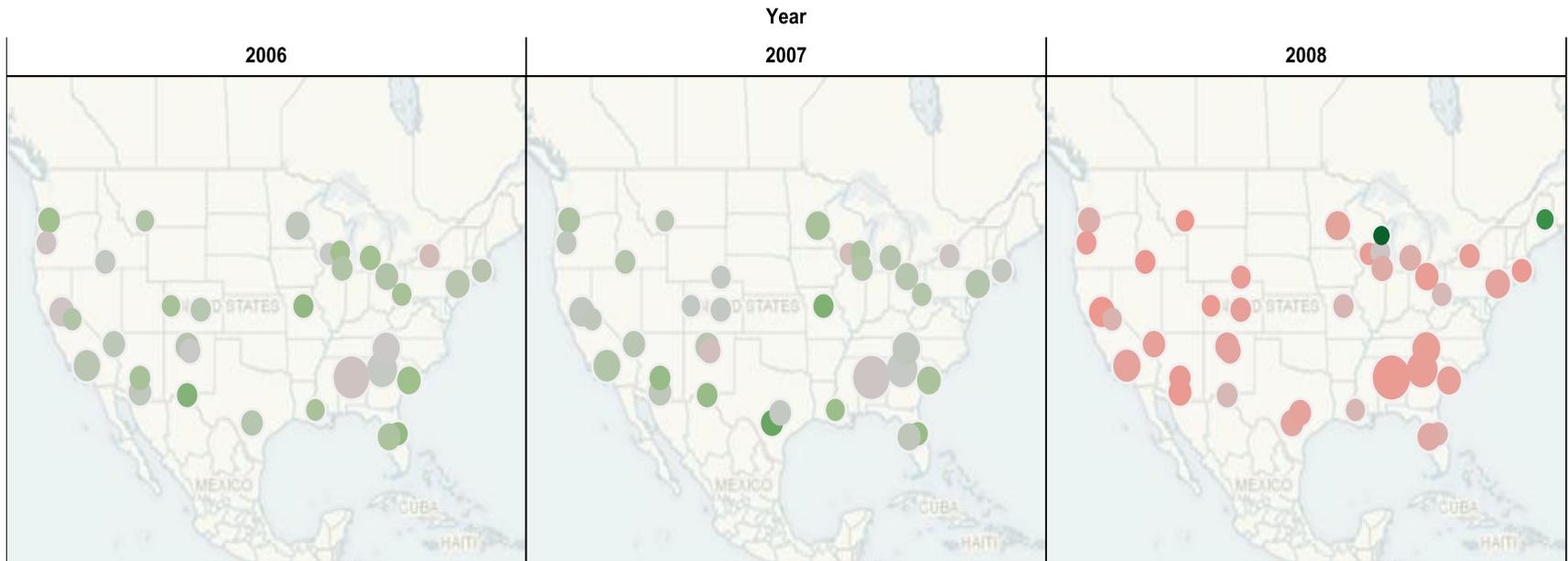
Sales Attributed to Coupons
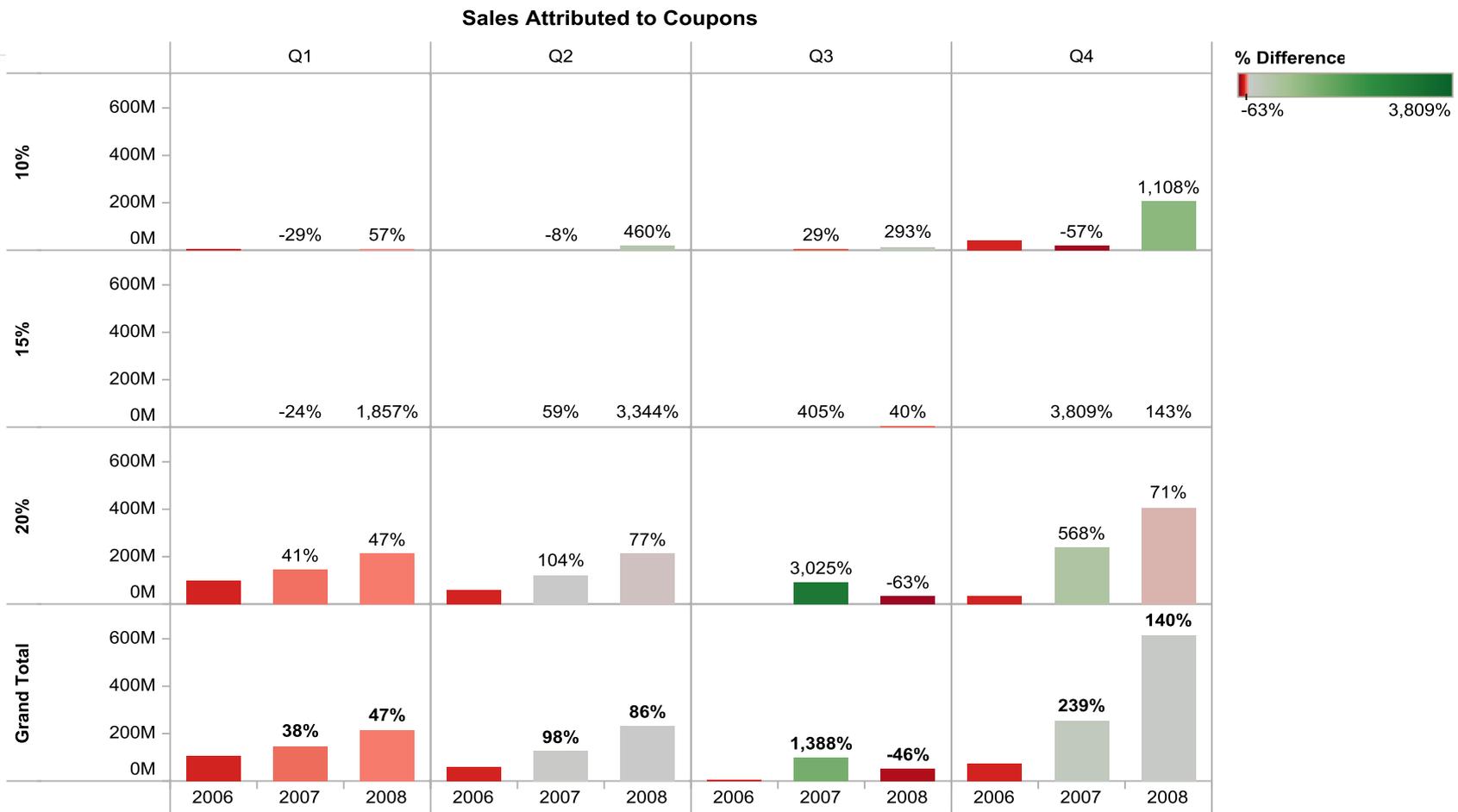
All data randomized and/or modified from original views

- Dark green=fastest growth in coupon sales
- Successful shifting heavy coupon growth towards 10% off in Q4 2008
- Able to decrease coupon growth in Q3 2008

Map net member growth past 3 years
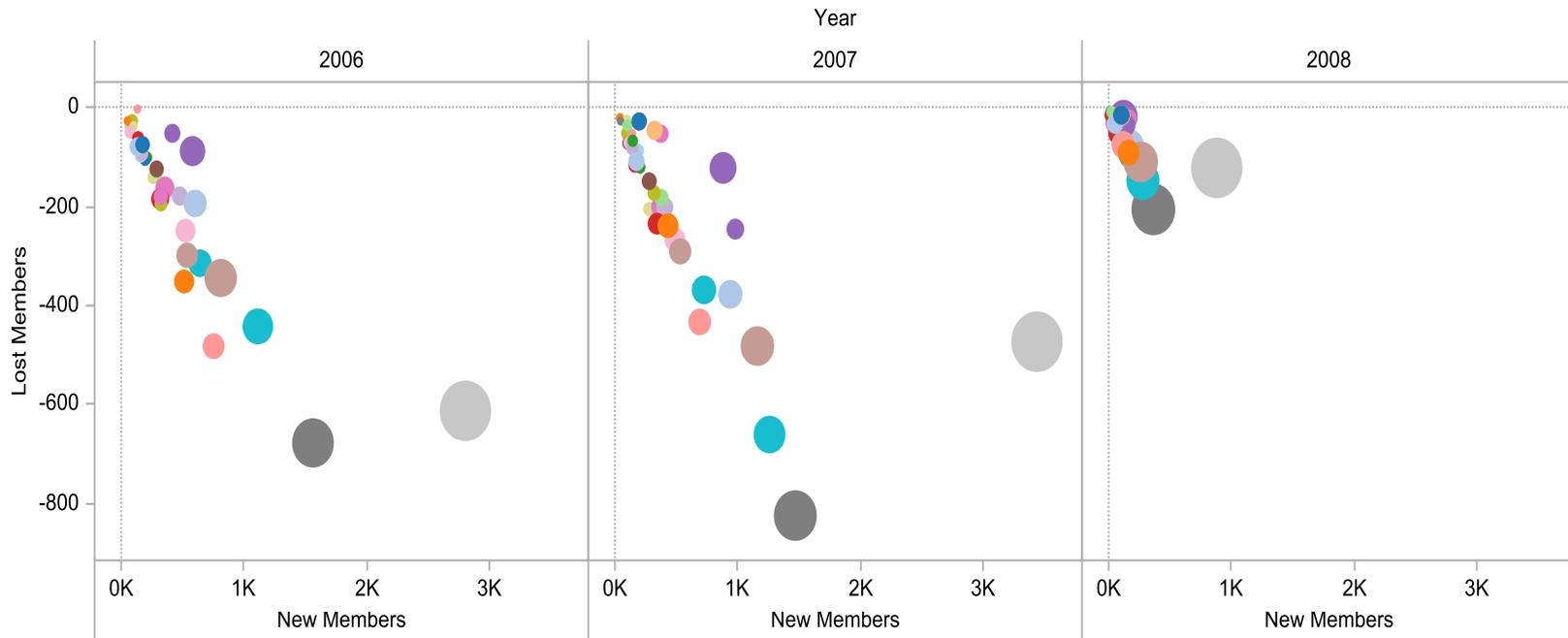
Membership Size and Net Member Growth by Year

- Similar growth patterns in 2006/2007
- Massive slowdown in 2008 in all but new markets
- Let's explore further!

Member growth-
new and "lost" past 3 years

Members by DMA With New and Lost Members by Year

All data randomized and/or modified from original views

- Each bubble is a market
- Bubble size is market member count
- Solid new member growth across all markets in 2006, 2007 with moderate lost members
- Massive slowdown in growth in 2008
- Surprisingly, massive slowdown in member loss as well in 2008

Understand seasonal sales patterns by average coupon discount-percent
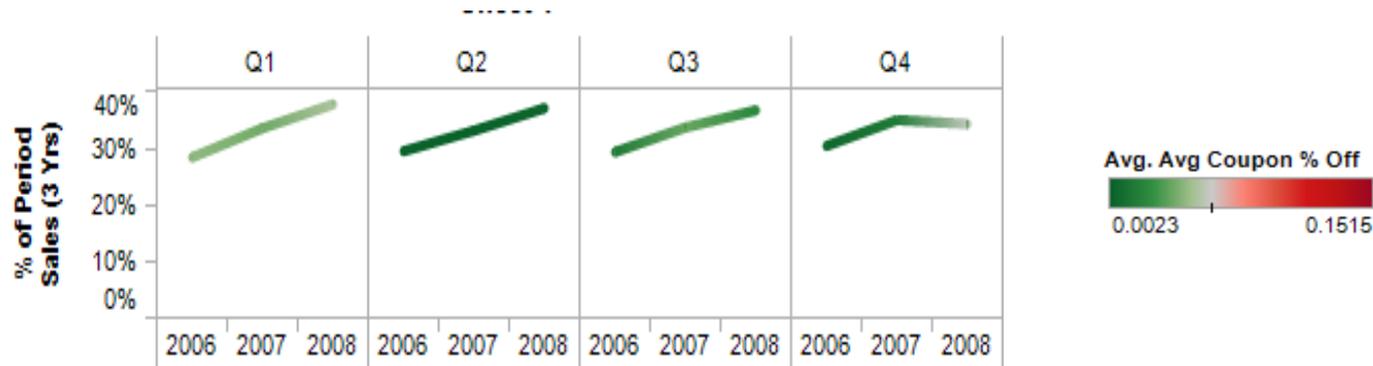
- Clear flattening in Q4 of 2008 along with more coupon usage
- Q1 coupon use is heavier for all years
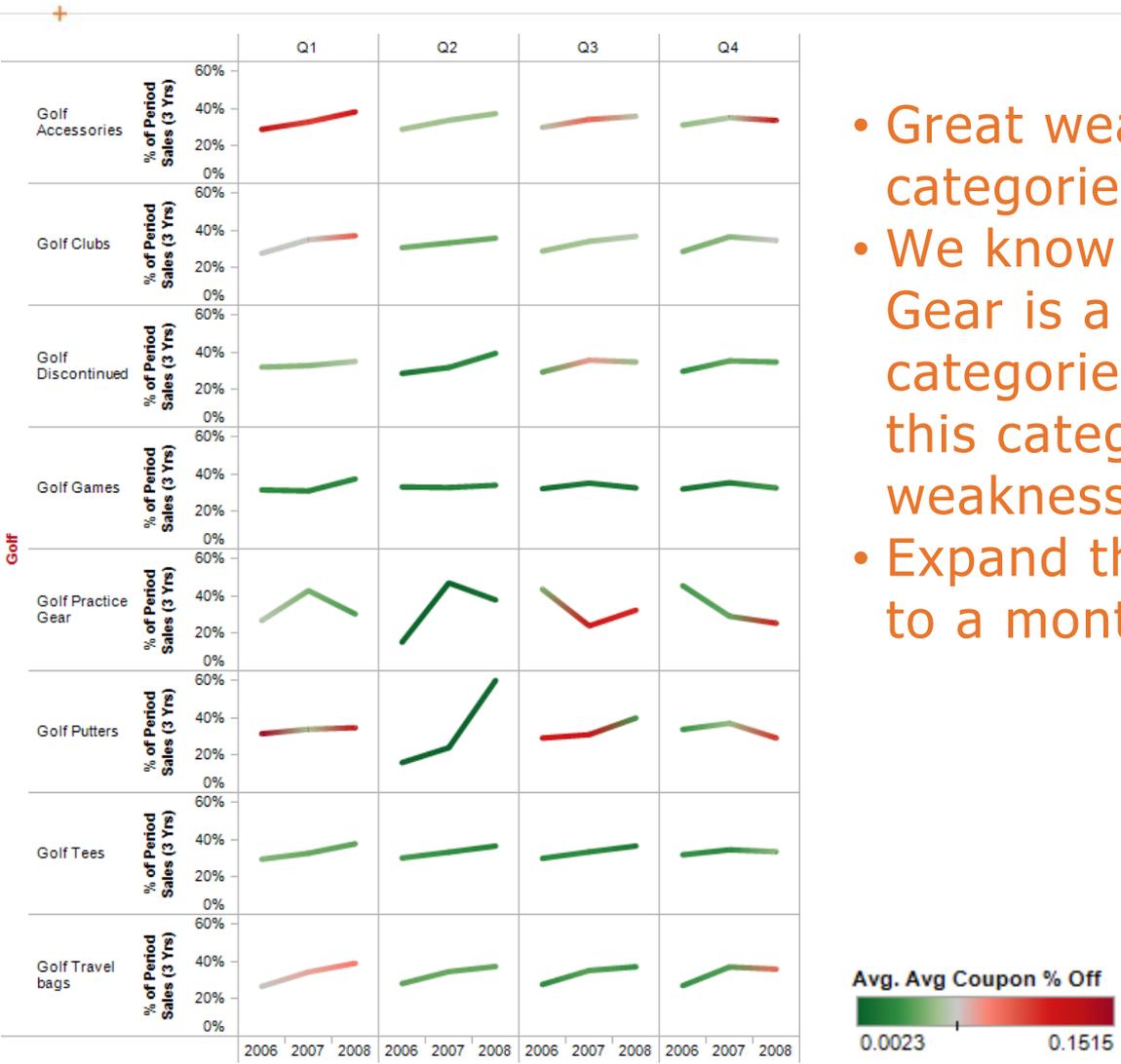- Expand the view for department detail

Understand seasonal sales patterns by average coupon discount-percent
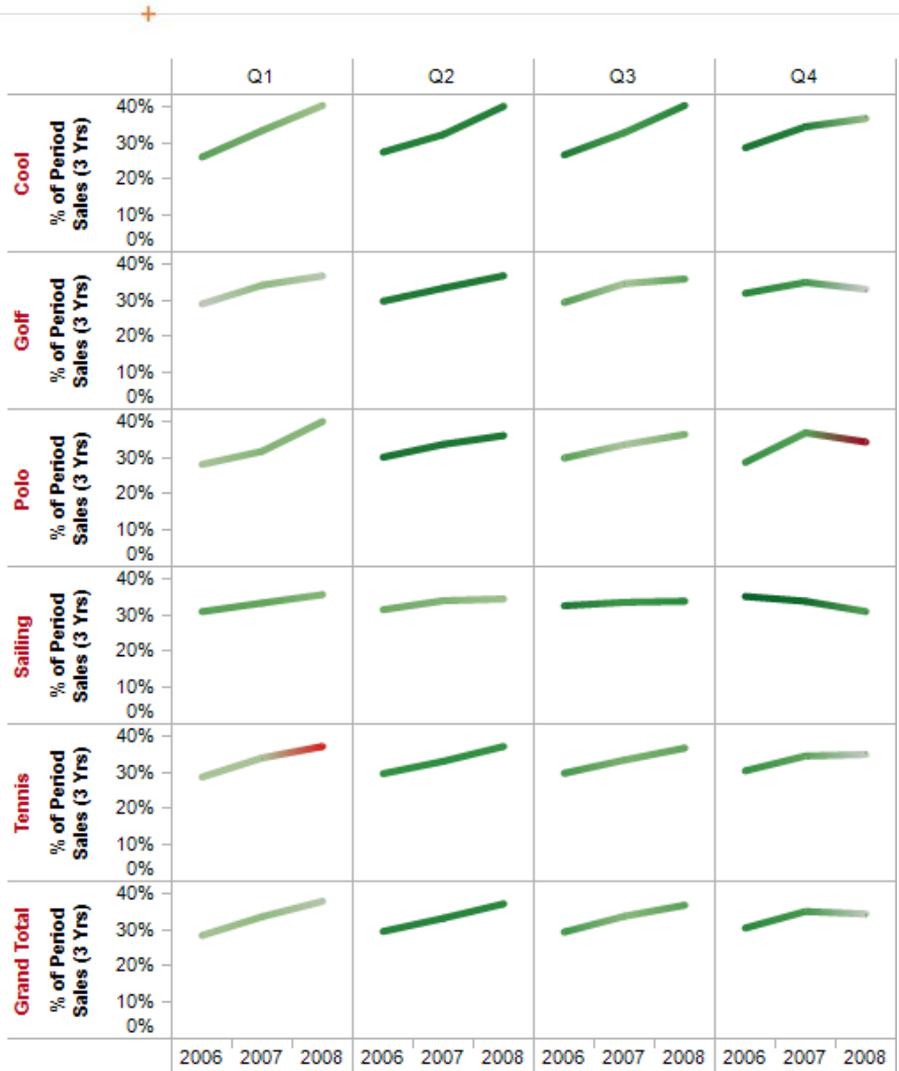
- Tennis had a weak Q1 2008 but still grew revenue
- Polo and Golf had huge revenue deceleration with increases in coupon usage in Q4 2008
- Expand the view for Golf categories

Understand seasonal sales patterns by average coupon discount-percent

- Great weakness in many Golf categories for Q4 2008
- We know that Golf Practice Gear is a harbinger for all Golf categories, this is visible by this category's early 2008 weakness
- Expand the Golf Practice Gear to a monthly view

Understand seasonal sales patterns by average coupon discount-percent
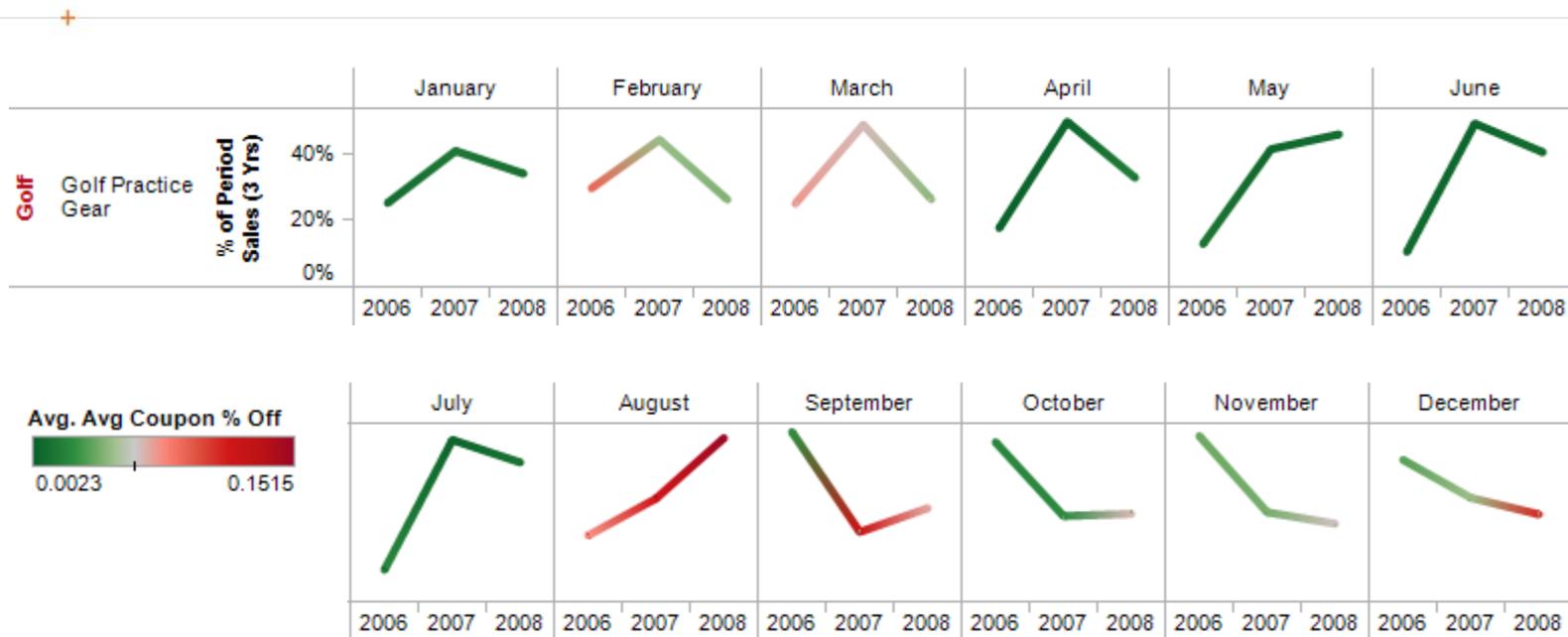
- Massive August clearance effort worked but at a high discount price
- A very clear trend that Golf will be weak in 2009

Final Thoughts

Various parts of Tableau functionality can be obtained in other products

However, Tableau has numerous advantages:

+ A purpose-driven product centered around rapid shifting of views
+ Extremely rapid development = more time for analysis
+ Intuitive interface and product behavior
+ Unprecedented flexibility in view appearance
+ Team has learned the application in a few weeks and used it for multiple executive project presentations
+ Presentation quality graphs a nice by-product of analyses with Tableau
+ Exceptional performance with databases, especially with Tableau extracts

Final Thoughts

Understanding and wide dissemination of in-depth customer behavioral insights is a revolution for REI

Tableau is a key part of this shift!

The team is excited.

Better customer insights lead to an improved customer experience, higher profitability and many exciting program opportunities!

Why will I ever use Excel for graphs again?

- Team Analyst

Forthcoming Book and More on Tableau

"Rapid Graphs With Tableau Software™:

Create Intuitive, Actionable Insights in Just 8 Days"

+ Forthcoming in July, 2009

Visit me at www.Freakalytics.com for updates on the book, applied analytics examples, and tips on SAS and Tableau

"SAS for Dummies 9.2: No Programming Required"

+ Forthcoming in early 2010 (co-author is Chris Hemedinger of SAS)
+ Current version of "**SAS for Dummies**" is available

Additional Resources

Web Seminar Resources

+ For a copy of the slide deck and to hear the web seminar on-demand go to http://www.tableausoftware.com/ama

Other Tableau Resources

+ For access to whitepapers, previously recorded web seminars and additional Tableau examples, go to

+ http://www.tableausoftware.com/database-marketing

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