



How do groceries sell online?

Reading between 3 Million Instacart Orders

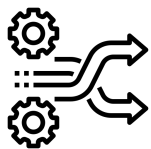
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Agenda

- Key Findings
- Motivation
- Dataset
- Objectives
- Process Walkthrough
- Conclusion and Next Steps

Key Findings



Buying trends change rapidly and exhibit seasonality across the day and week



There is a strong trend in when certain foods are bought (such as healthy foods)



There are some odd outliers in items that aren't be reordered very often.



A small chunk of users drive a large chunk of business.

Motivation



Courtesy [Washington Post](#)

Being routine users of Instacart, we wanted to investigate how Instacart could be (or already is) leveraging data-driven decisions to control our buying habits

The Data

- Sourced from [Instacart Market Basket Analysis](#)
- Time Span: 2017
- Five tables : Orders, Orders_prior, Aisles, Department, Product, Order_train
- 3M+ orders; 200k+ customers; 50K+ products
- Anonymized



Historical Orders (orders_prior) and Training Set (order_train) were merged to form the master dataset

```
1 products.head()
```

	product_id	product_name	aisle_id	department_id
0	1	Chocolate Sandwich Cookies	61	19
1	2	All-Seasons Salt	104	13
2	3	Robust Golden Unsweetened Oolong Tea	94	7
3	4	Smart Ones Classic Favorites Mini Rigatoni Wit...	38	1
4	5	Green Chile Anytime Sauce	5	13

```
1 orders_prior
```

	order_id	product_id	add_to_cart_order	reordered
0	2	33120	1	1
1	2	28985	2	1
2	2	9327	3	0
3	2	45918	4	1
4	2	30035	5	0

```
1 orders_train
```

	order_id	product_id	add_to_cart_order	reordered
0	1	49302	1	1
1	1	11109	2	1
2	1	10246	3	0
3	1	49683	4	0
4	1	43633	5	1

```
1 aisles.head()
```

	aisle_id	aisle	department_id	department
0	1	prepared soups salads	0	frozen
1	2	specialty cheeses	1	other
2	3	energy granola bars	2	bakery
3	4	instant foods	3	produce
4	5	marinades meat preparation	4	alcohol
			5	international

Objectives



Identify hidden or obvious trends that define consumer behavior



Articulate questions to explain peculiarities found in the data

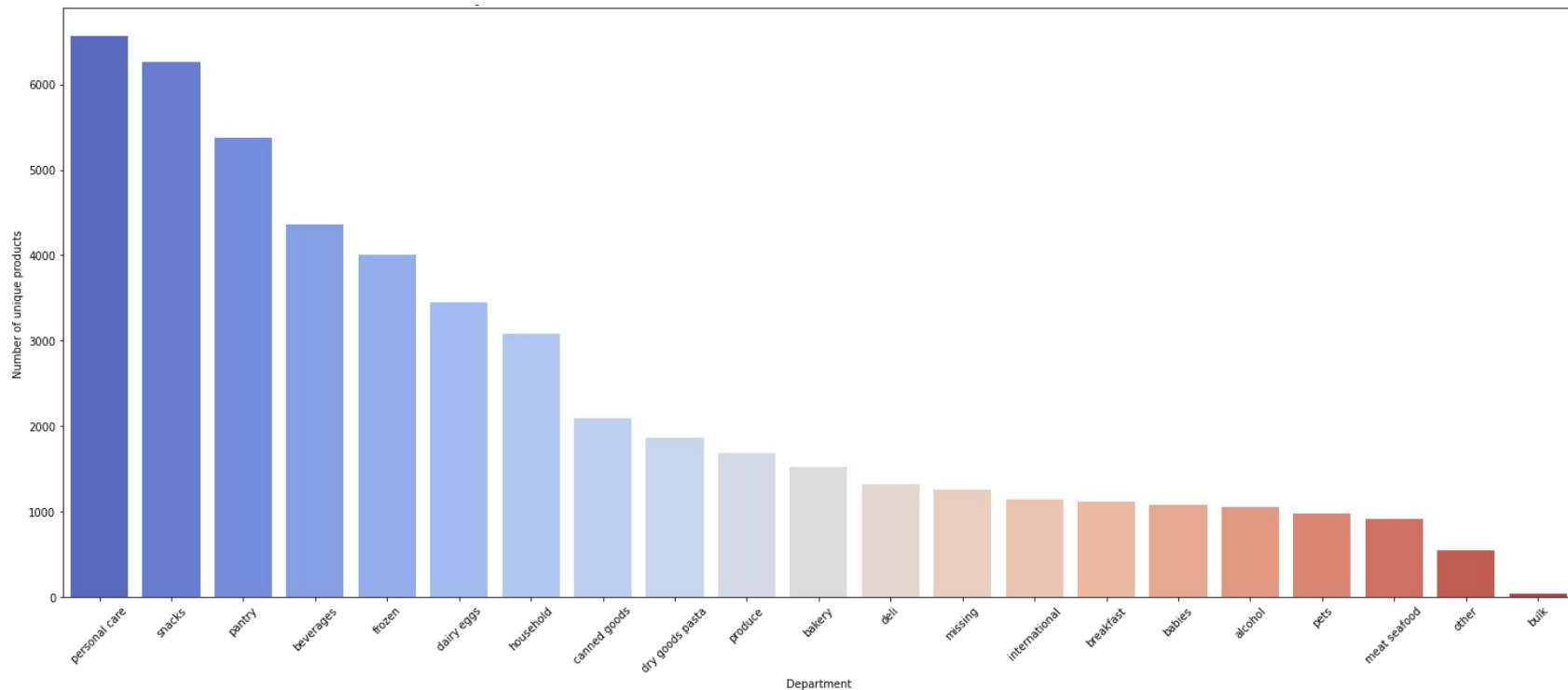


Influence revenue generating decisions for Instacart

Process Walkthrough

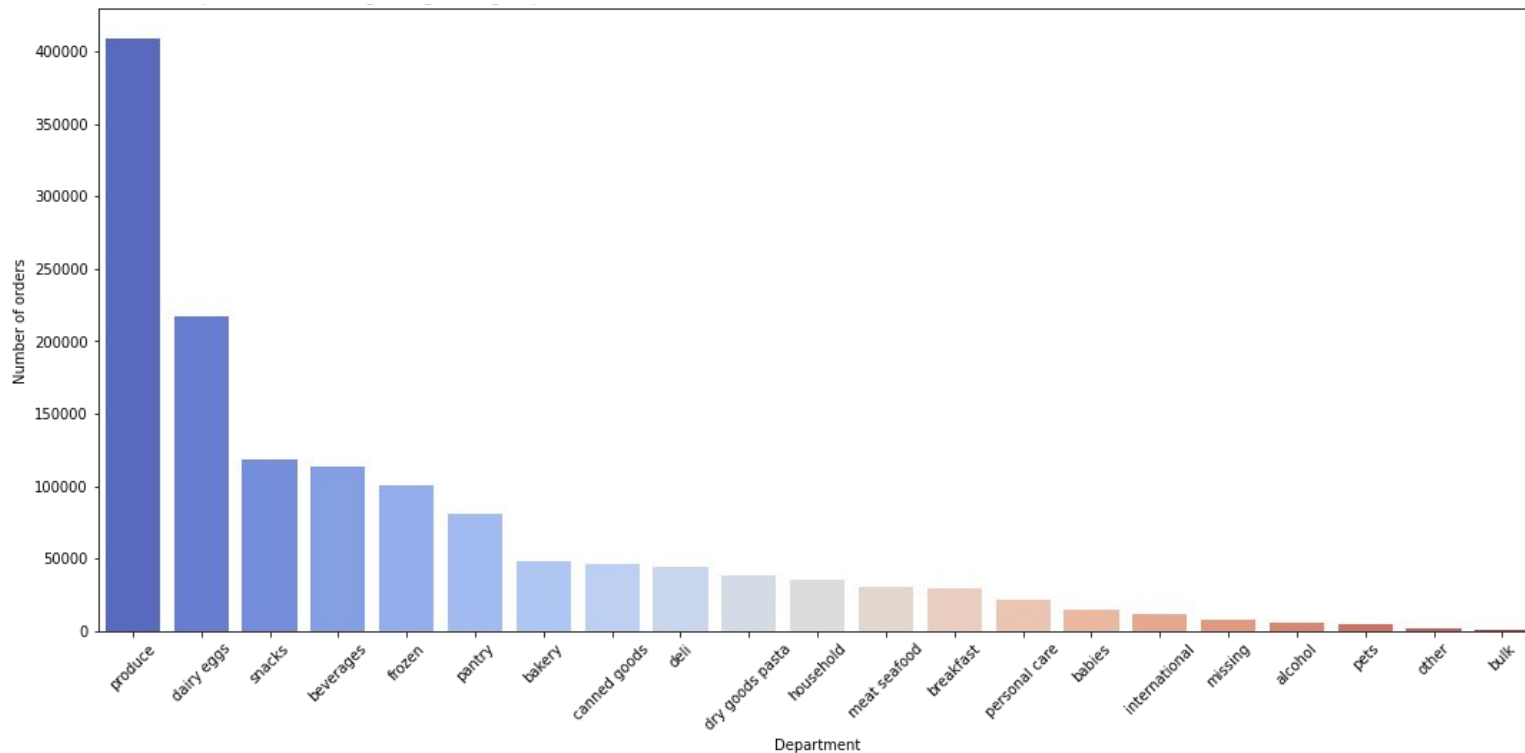
Choice Overload

Products stocked by Instacart vary heavily across departments. We can see maximum inventory in personal care and snacks, while pets and meat/seafood sections have very less variety.



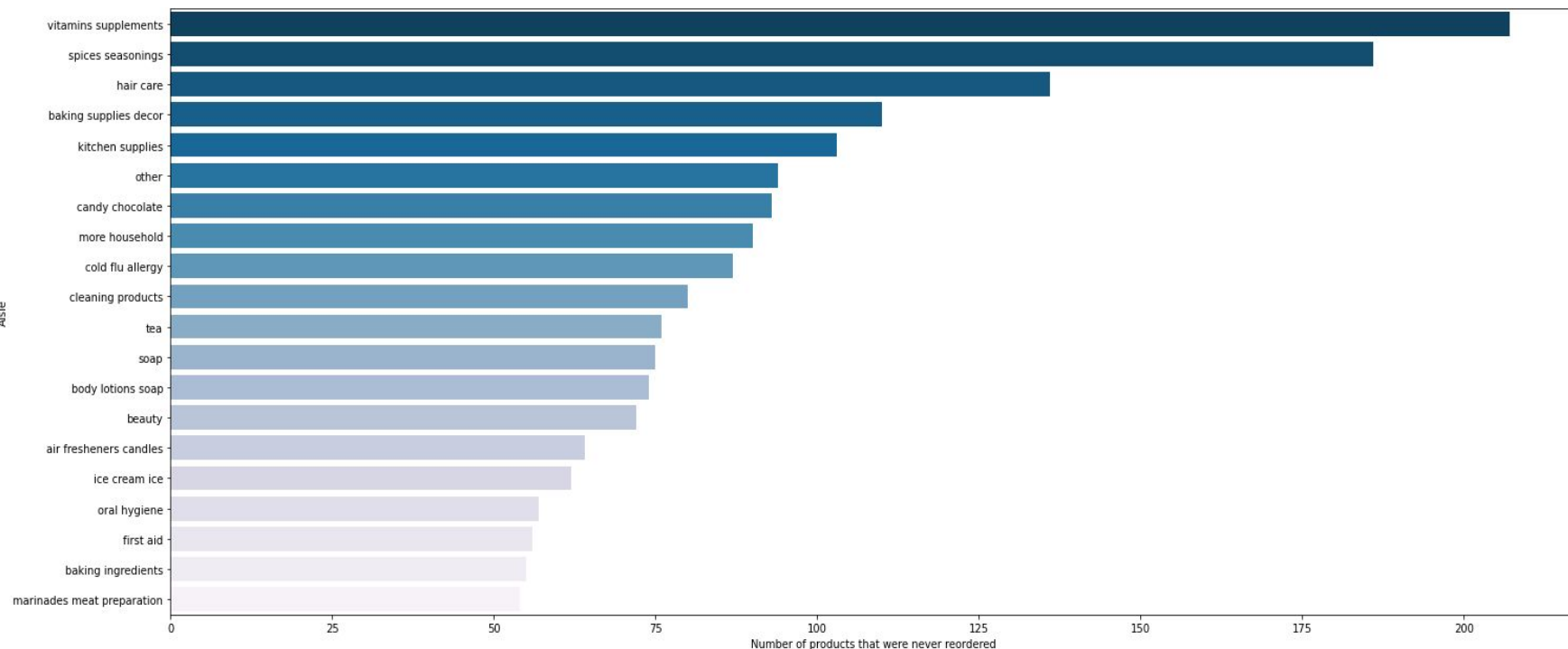
More options ≠ More sales

We saw an obvious trend in how online stores like to stock their inventory. Should this be related to the order volumes?
Apparently not!



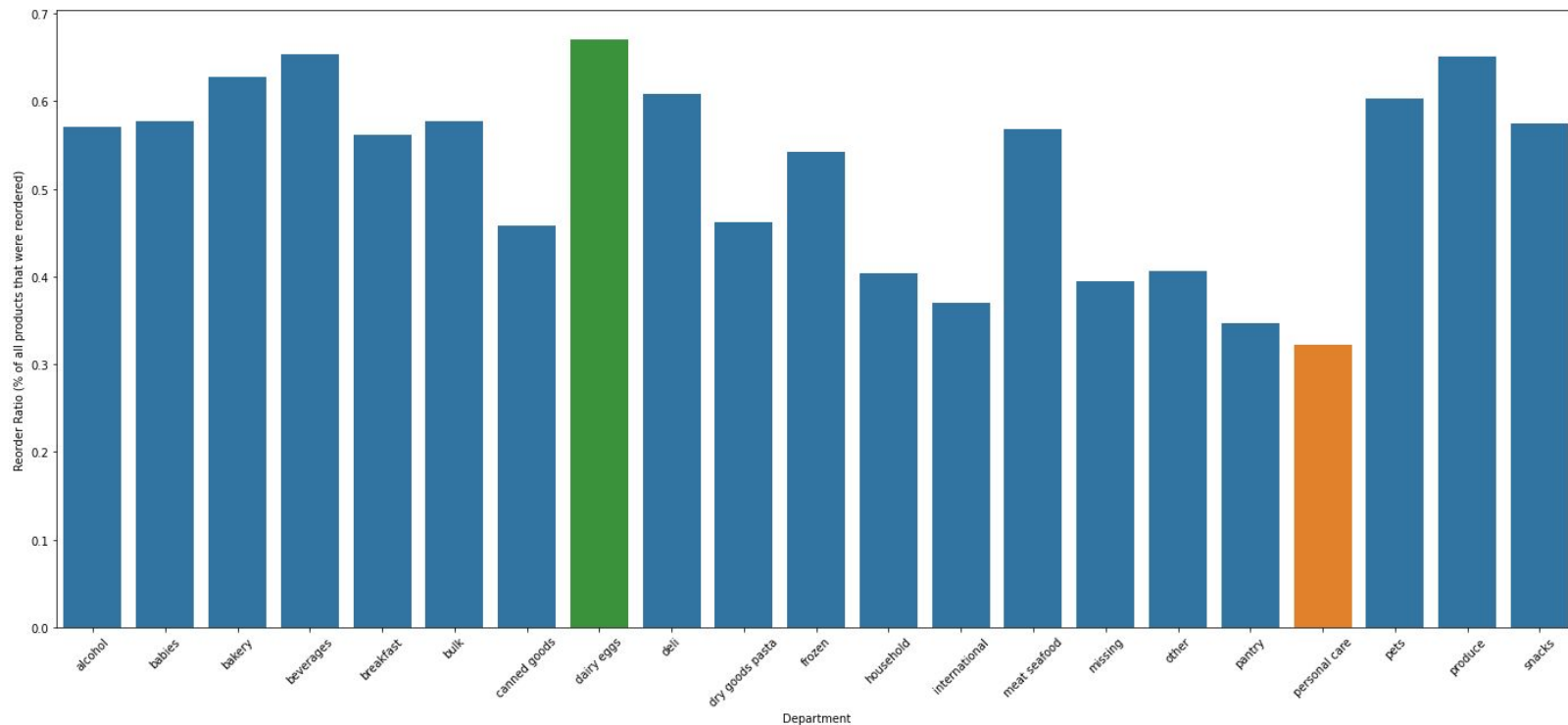
Let's take a deeper look at order volumes

There are several kinds of products that customers are not reordering.
Some of these make sense, others leave some unanswered questions.



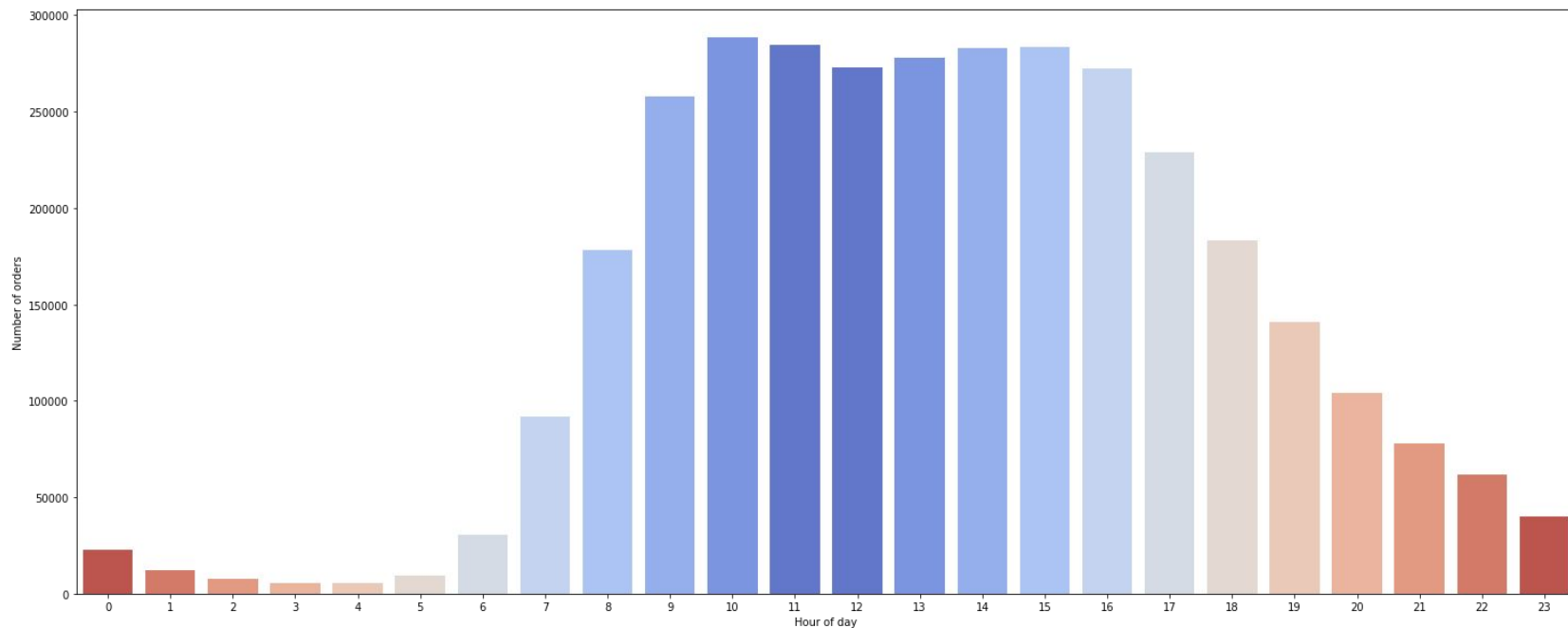
Is this trend consistent across departments?

We see the most reorders coming in from dairy/eggs department. While this doesn't fall very low in terms of “variety”, we can infer that customers tend to stick to the brands they love for their breakfast.

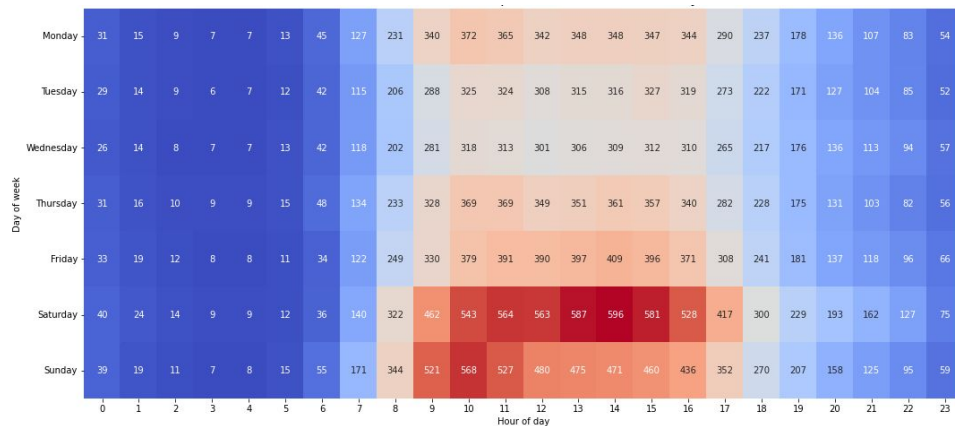


Every hour is rush hour

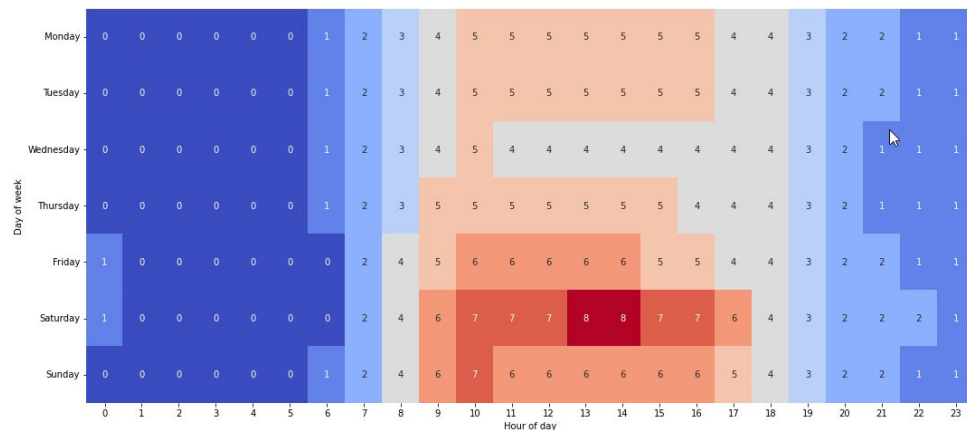
Online stores don't see as much of a difference in order volumes as traditional grocery stores do. During the peak business hours of 9 AM to 5 PM, the order volumes remain more or less consistent.



Every day isn't peak day



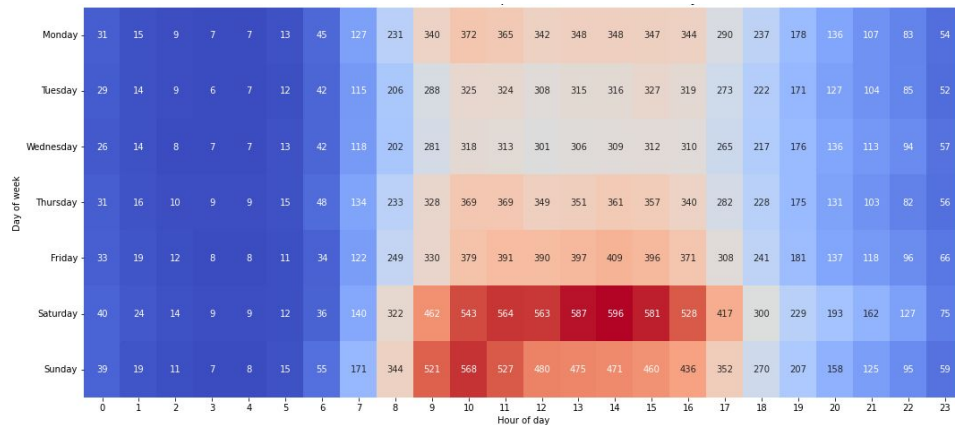
We see total order volumes being generally concentrated heavily towards the weekend.



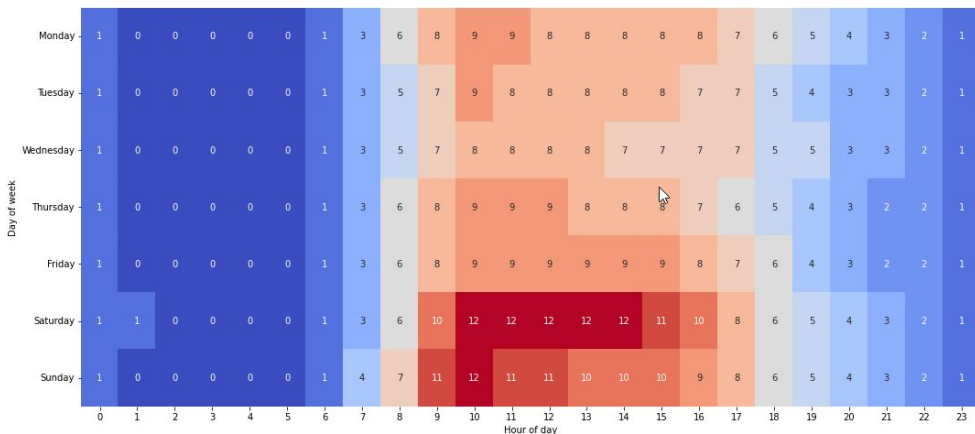
This trend isn't as pronounced for *personal care* products.

This is likely because personal care products aren't usually bought with groceries, and ordered when needed.

Every day isn't peak day



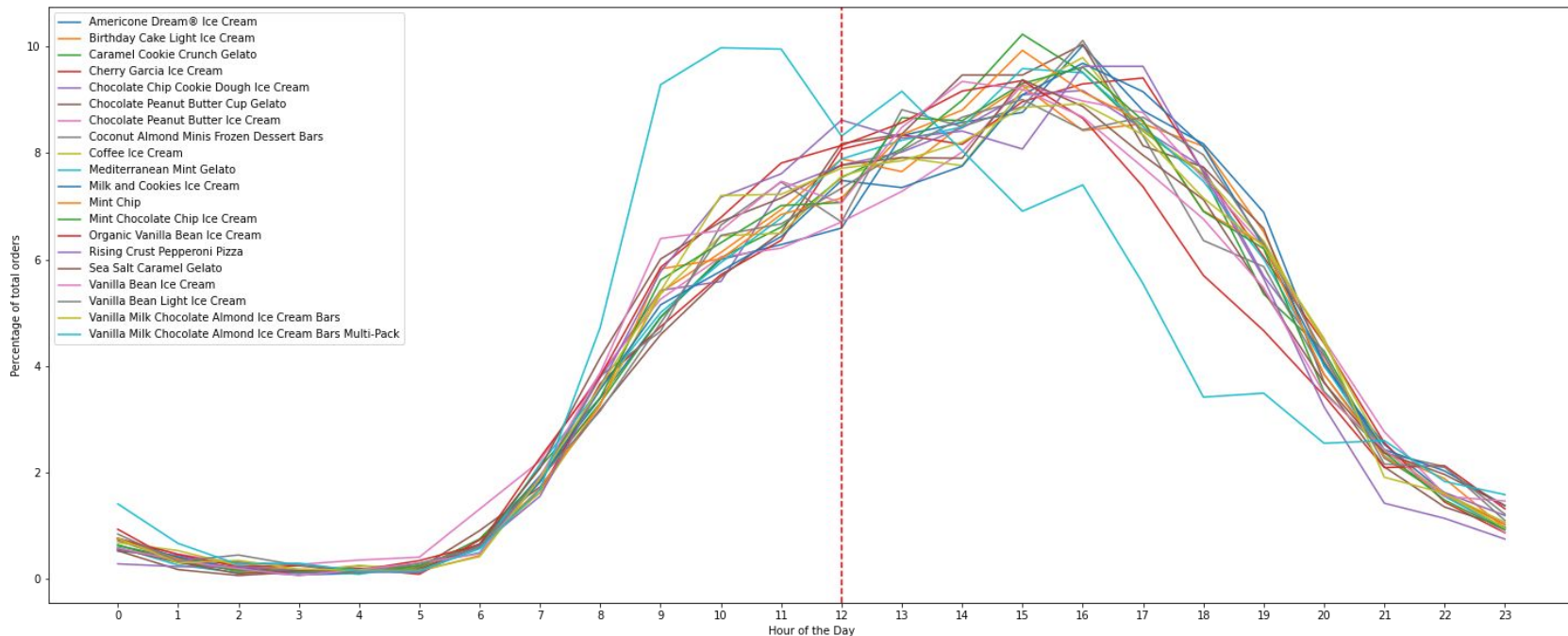
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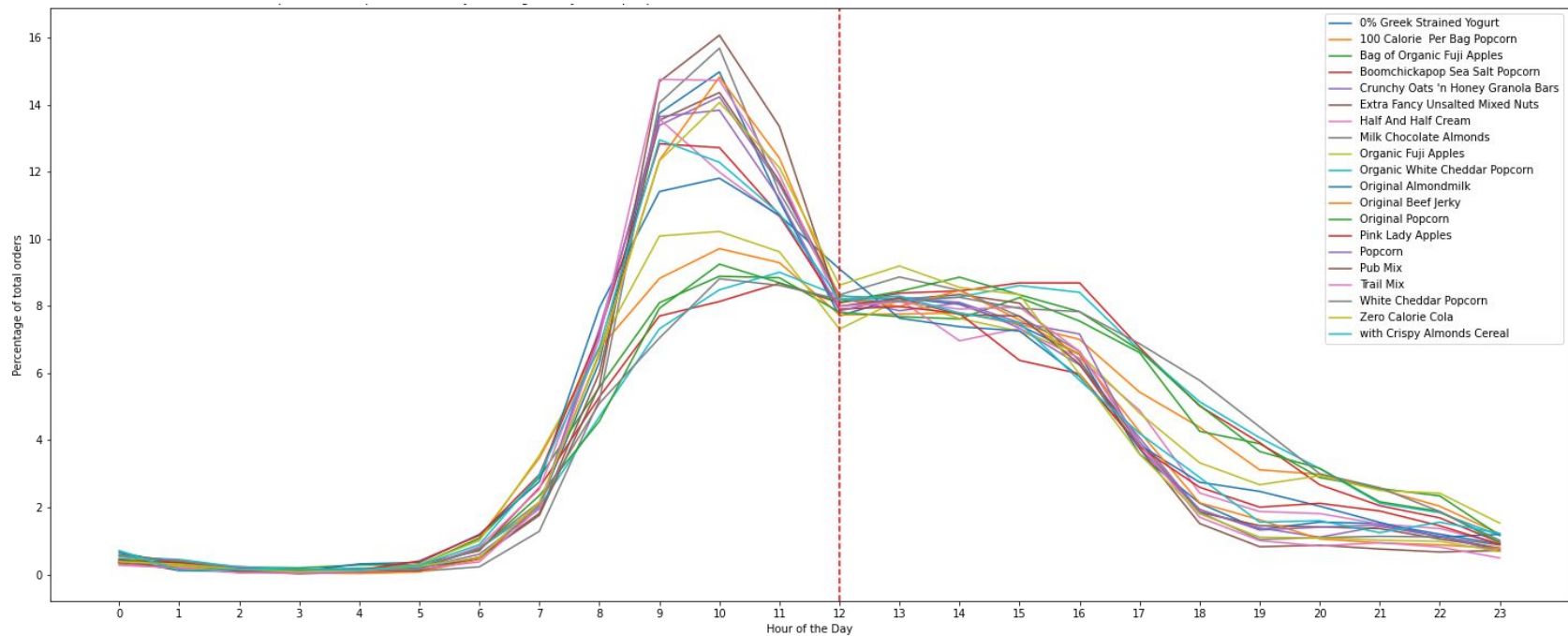
Or for *household* products.

These products too, appear to be bought on-demand, and not cyclically.

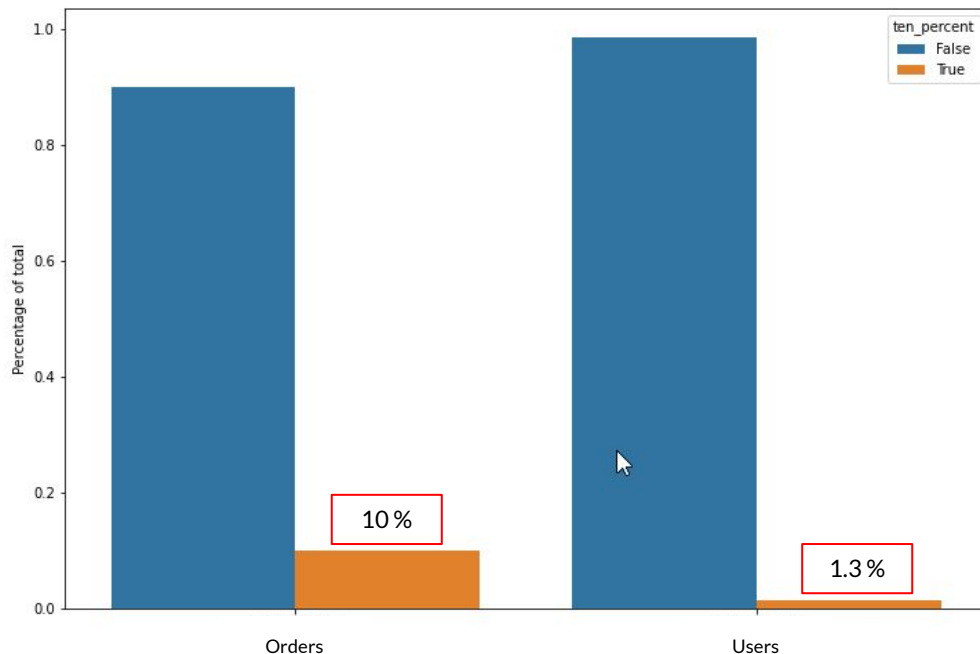
The peak orders for ice creams and pizza occurs at around 6 PM. Evening supper cravings aren't that uncommon after all!



Customers like to order healthy food early in the morning with the peak at 10 AM.



We've got some VIPs in the house



A whopping 10% of Instacart's order volume comes from just 1.3% of its users.

Should these high value users be given special treatment?

Conclusion & Next Steps

Action Items



The businesses should investigate why certain products are not being reordered.

Do we have quality issues?

If the customers really just want variety, we can employ stock rotation techniques to create an illusion of new products being made available



Product-level and aisle-level promotions are currently static on Instacart. These can be made dynamic in response to the changing demand.

Can we boost revenue by using sponsored listings for the most in-demand category at each hour of the day?

Should high volume customers be offered discriminatory pricing?



Some items, such as baby products are just not bought enough from Instacart. What do we lack?

Can we attract more buyers in this area by offering more variety?

Thank you!
