

Food Choices and the Obesity from Overwork

Group 2:

Xin Liao

Xuechen He

Jian Li

Yuru Li

Jindong Yu

Yuzhou Huang



Structure

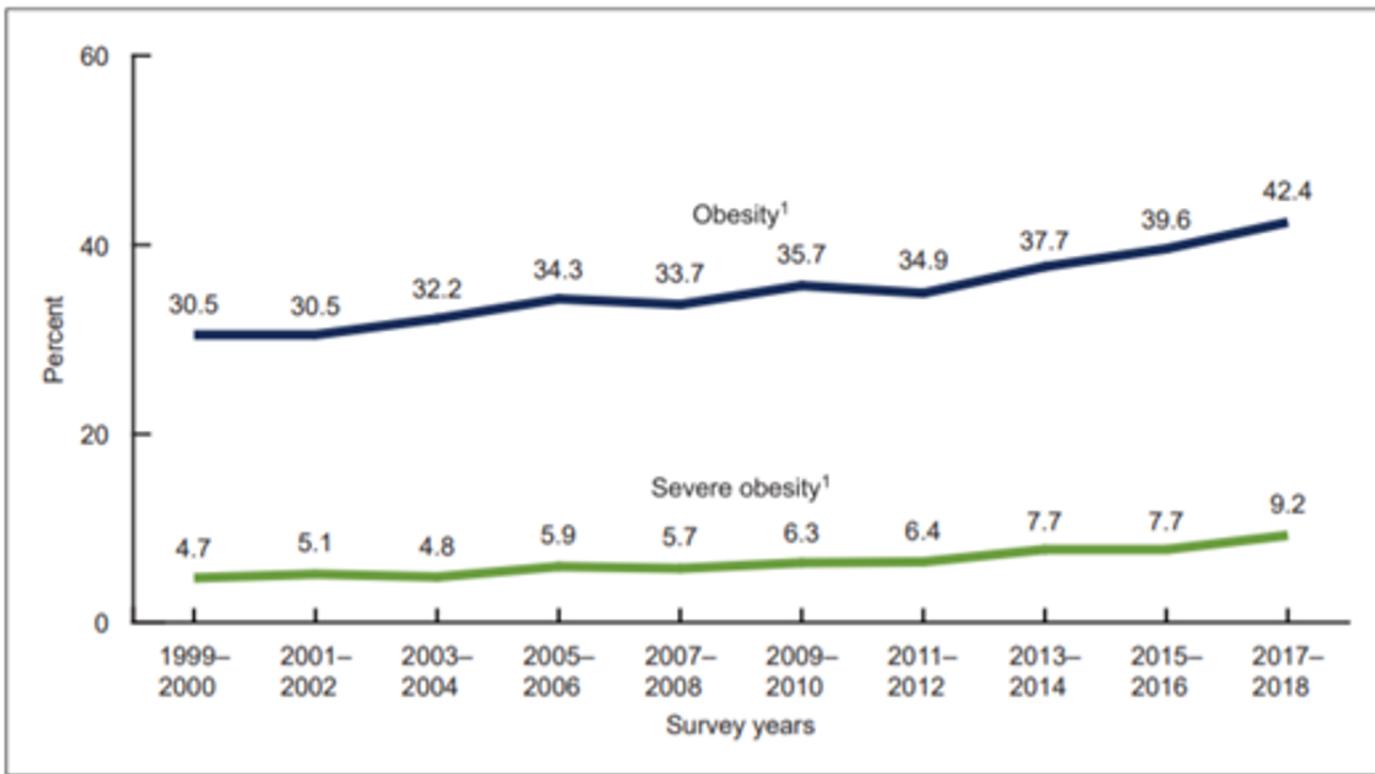
Background

Data Analysis

Customer Portrait

Strategy

Background



¹Significant linear trend.

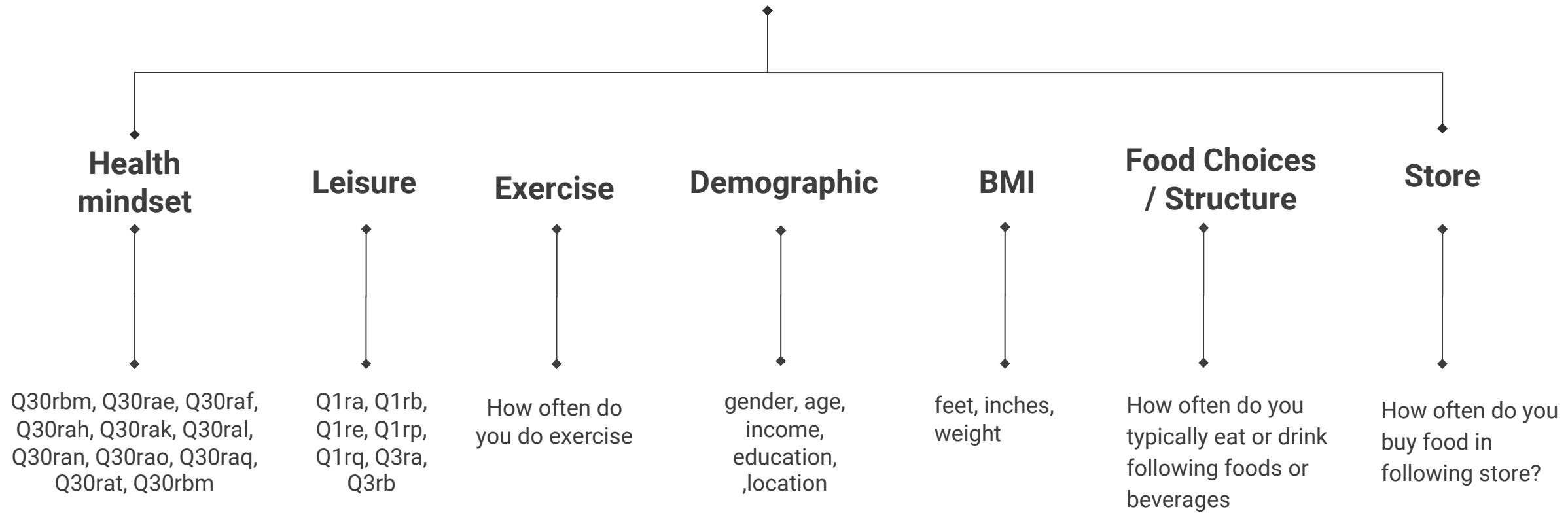
NOTES: Estimates were age adjusted by the direct method to the 2000 U.S. Census population using the age groups 20–39, 40–59, and 60 and over. Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db360_tables-508.pdf#4.

SOURCE: NCHS, National Health and Nutrition Examination Survey, 1999–2018.

- Recently, the overweight and obesity problem have become one of the biggest threats to health and wellness with the economic prosperity and lifestyle changes.
- What are the causes of overweight and obesity, and how to help people keep away from obesity and obtain a great health level are important questions that all consumer product companies care about the most. It is a booming market with great potential.

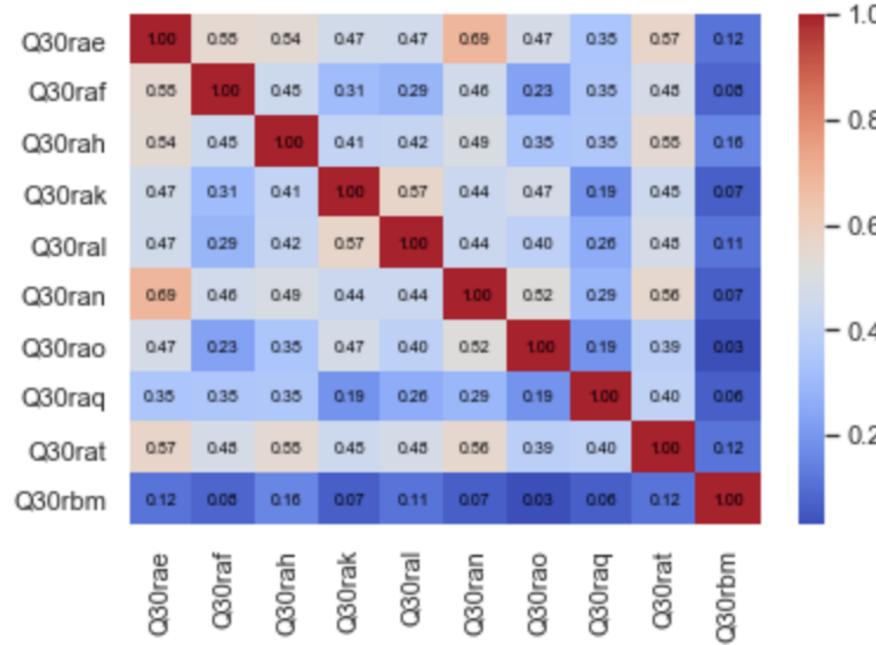
Data Overview

Selected Data

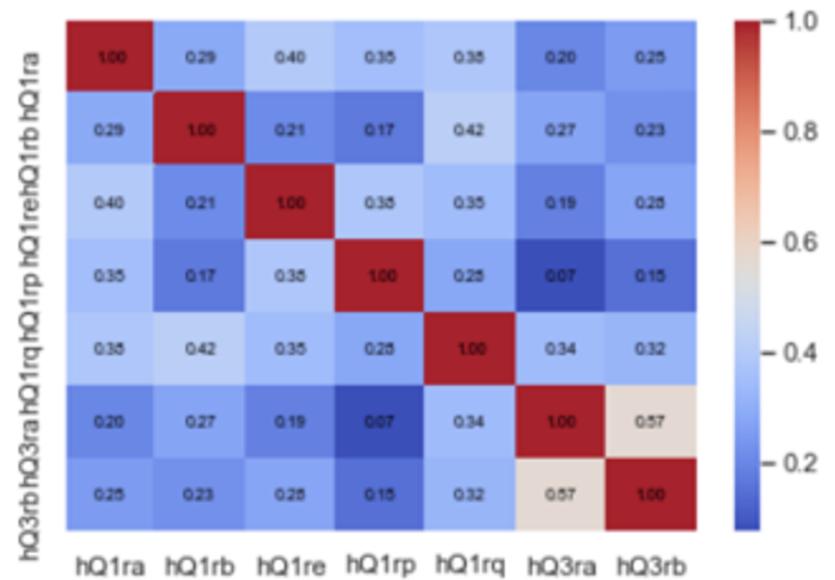


Aggregated Variables

**Mindset
Correlation Matrix**



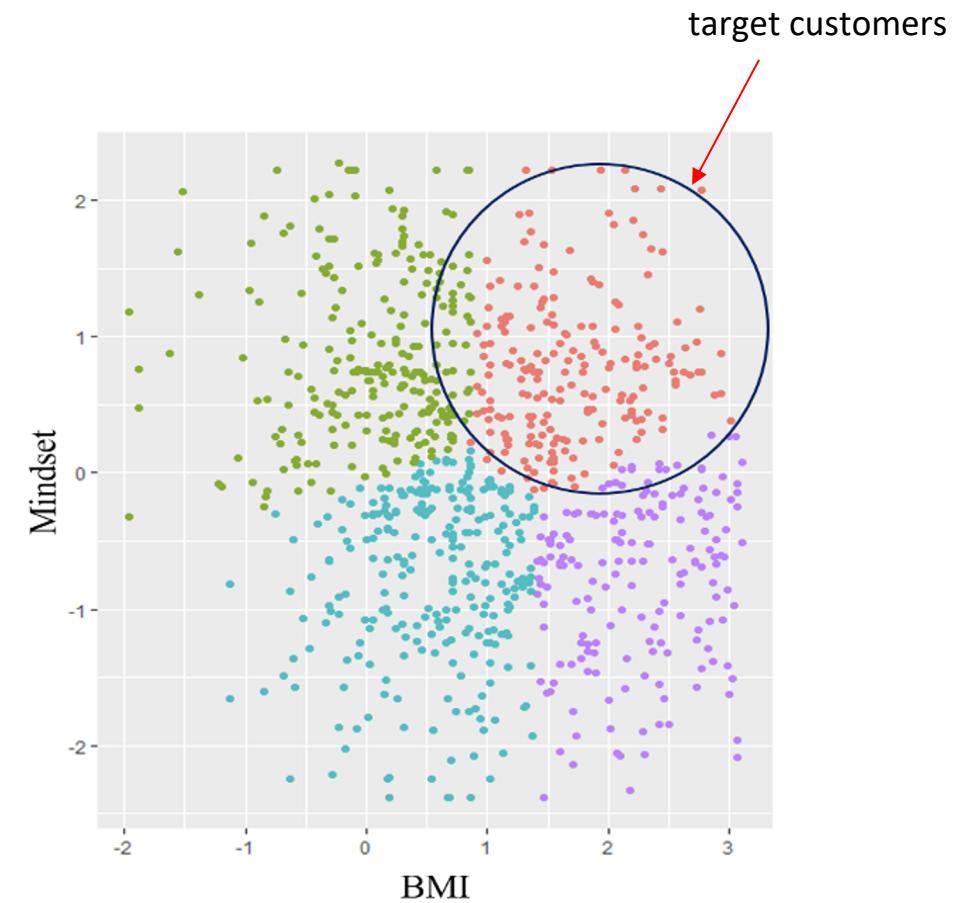
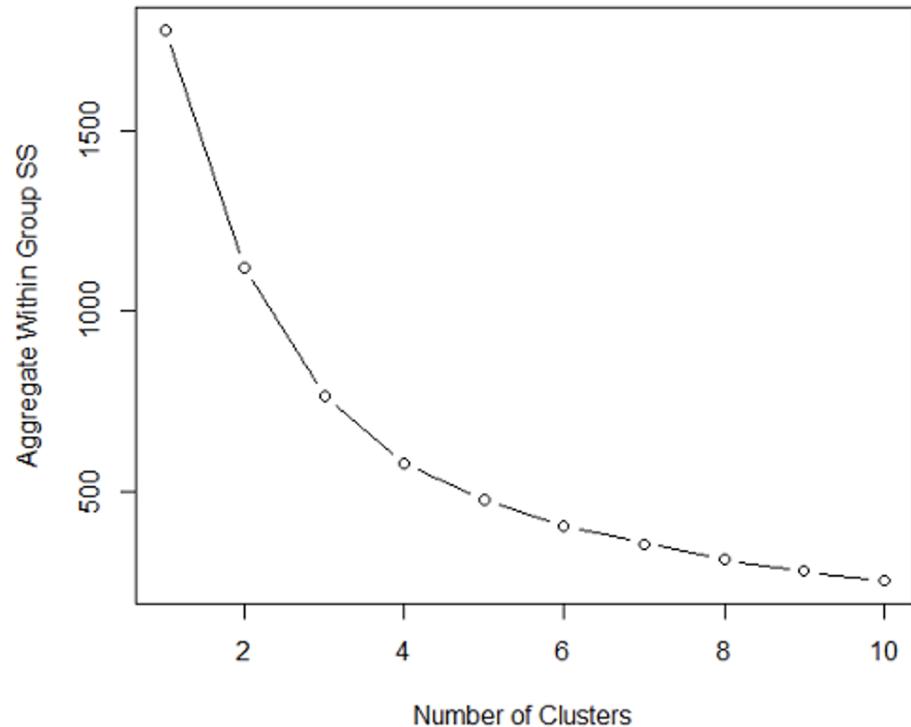
**Leisure
Correlation Matrix**



Data explanation:

We choose 10 questions about the healthy mindset and 7 questions about busy level and use PCA to extract one component from these questions as a measure for health mindset and leisure.

Clustering Result



Data explanation:

From the elbow plot and two dimensions clustering, we use a reasonable cluster number 4 in the k-means algorithm.

Target customers: with a great health mindset but high average BMI (overweight)

BMI-Mindset Model

What are the factors that contribute to high BMI (overweight)?

	BMI	leisure	mindset	age	exercise	education	income
BMI	1						
leisure	-0.0468	1					
mindset	-0.147	-0.0749	1				
age	0.165	0.198	-0.164	1			
exercise	-0.12	0.0839	0.291	-0.0333	1		
education	-0.0277	0.0155	0.0652	0.0555	0.156	1	
income	-0.0908	-0.0495	0.0988	-0.013	0.173	0.367	1

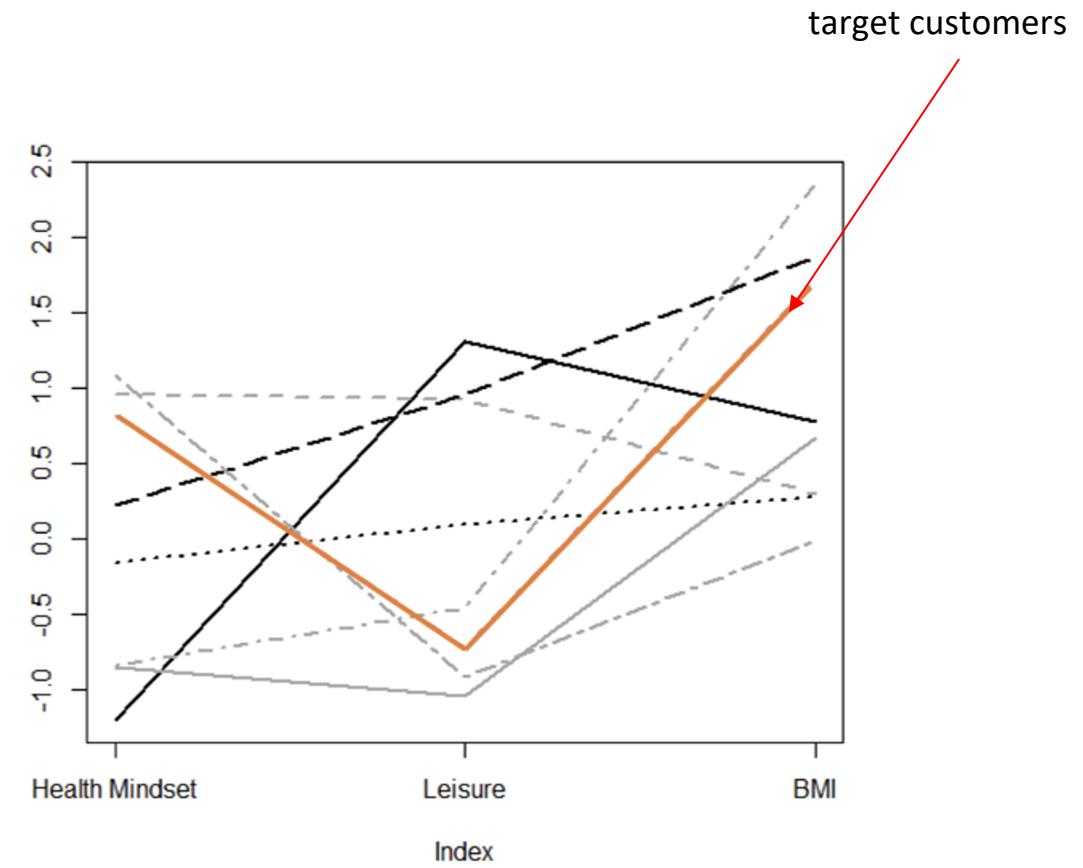
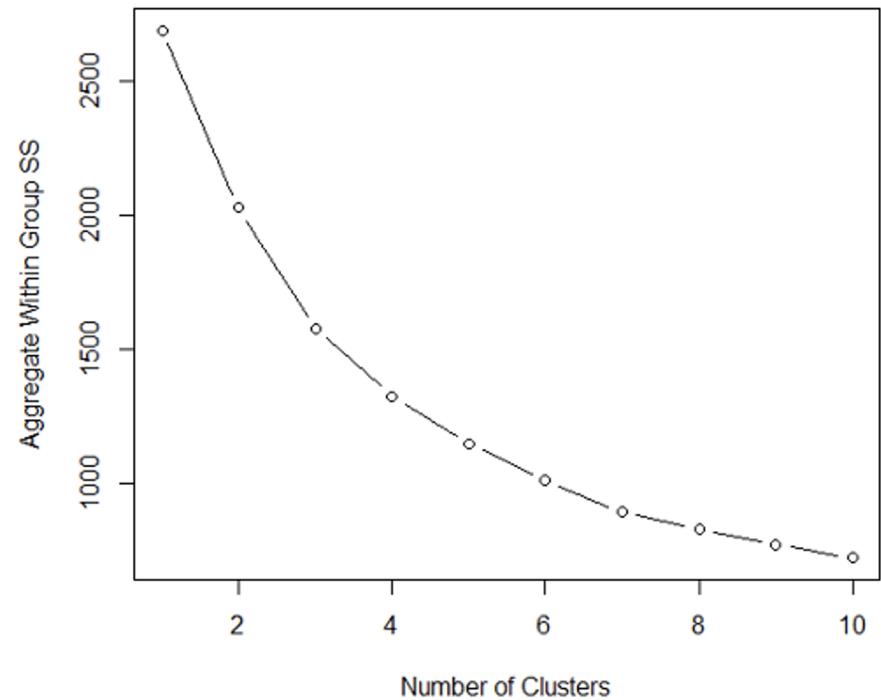
Linear regression						
	Robust					
bmi	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Leisure	-.406943	.1675792	-2.43	0.015	-.7358634	-.0780227
Mindset	-.4691972	.1802195	-2.60	0.009	-.8229275	-.1154669
1.Gender	-.9569605	.3360442	-2.85	0.005	-1.61654	-.2973812
Age	.0630383	.0130452	4.83	0.000	.0374335	.0886431
Exercise	-.1533328	.0708916	-2.16	0.031	-.2924771	-.0141884
Education	.0262646	.1392456	0.19	0.850	-.2470432	.2995724
Income	-.2013383	.0910374	-2.21	0.027	-.3800243	-.0226524
_cons	25.44022	.8131816	31.28	0.000	23.84412	27.03631

Model 1

Data explanation:

- people who are leisure have a lower BMI than people who are busy;
- female have a lower BMI than male and older people have a higher BMI than young people;
- people who exercise more have a lower BMI, and people who are richer have a lower BMI, holding other factors fixed.

Clustering Result



Data explanation:

- From the elbow plot and three dimensions clustering, we use a reasonable cluster number 8 in the k-means algorithm.
- Target customers: with a great health mindset and busy, but high average BMI (overweight)

Model Features

How the food choices / structures influence people's BMI?

frozen and canned food

includes all kinds of frozen food, and Canned soup, canned fruit, Canned vegetables, Canned pasta

carbohydrate

includes majority items in "Bakery", such as Bakery bread, Premade desserts, Bagels, etc.

candy and sugar

includes caramel candy, chocolate candy, fruit flavor candy and sugar

beer

include domestic beer, imported beer and microbrew or craft beer

We regress BMI on the aggregated frequency of the food category, adding the interaction items and keeping other factors controlled.

Regression Model

	Interaction Regression Model	not significant variables
Model 2	BMI= 25.906 + 0.11leisure - 0.921mindset - 0.758female + 0.056age - 0.153exercise - 0.121education - 0.201income + 0.007target1*age + 0.167target1*exercise + 0.691target1*edu + 0.084Target1*Income - 0.0006frozen + 0.0014target1*frozen	leisure,education,target1*exercise,target1*age, frozen
Model 3	BMI= 26.034 + 0.006leisure - 0.897mindset - 0.787female + 0.056age - 0.157exercise - 0.099education - 0.19income + 0.008target1*age + 0.138target1*exercise + 0.668target1*edu + 0.081Target1*Income - 0.001candy + 0.003target1*candy	leisure,education,target1*exercise,target1*age, target1*income
Model 4	BMI= 26.086 + 0.014leisure - 0.892mindset - 0.759female + 0.056age - 0.153exercise - 0.113education - 0.198income + 0.007target1*age + 0.128target1*exercise + 0.659target1*edu + 0.085Target1*Income - 0.001carbohydrate + 0.002target1*carbohydrate	leisure,education,target1*exercise,target1*age, target1*income
Model 5	BMI= 25.697 + 0.044leisure - 0.975mindset - 0.881female + 0.054age - 0.159exercise - 0.098education - 0.173income + 0.023target1*age + 0.12target1*exercise + 0.62target1*edu + 0.11Target1*Income - 0.002beer + 0.007target1*beer	leisure,education,target1*exercise,target1*age, target1*income
Model 6	BMI= 26.077 - 0.013leisure - 0.897mindset - 0.805female + 0.055age - 0.153exercise - 0.102education - 0.173income + 0.011target1*age + 0.135target1*exercise + 0.617target1*edu + 0.084Target1*Income + 0.001target1*frozen - 0.001candy + 0.001target1*candy - 0.001beer + 0.004target1*beer	leisure,education,target1*exercise,target1*age, target1*income, target1*frozen, candy, target1*candy, carbohydrate, beer

Regression Model

Model 7

Linear regression

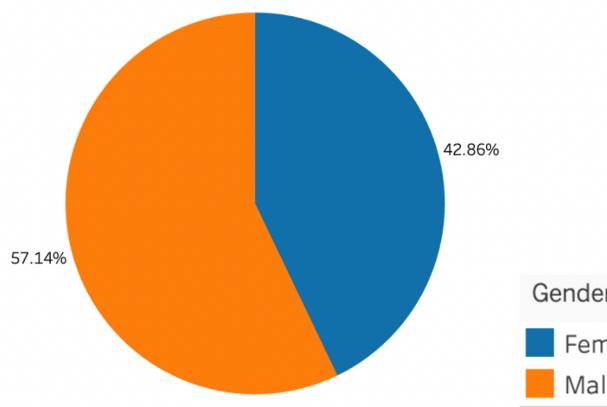
Number of obs	=	853
F(13, 839)	=	25.18
Prob > F	=	0.0000
R-squared	=	0.1917
Root MSE	=	4.5493

		Robust				
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Leisure	-.0077241	.1775476	-0.04	0.965	-.3562137	.3407655
Mindset	-.8769611	.1842145	-4.76	0.000	-1.238536	-.5153858
1.Gender	-.8182458	.3138801	-2.61	0.009	-1.434328	-.2021634
Age	.0530318	.0132324	4.01	0.000	.0270593	.0790044
Exercise	-.1556107	.07254	-2.15	0.032	-.2979918	-.0132295
Education	-.1313543	.1446316	-0.91	0.364	-.4152365	.1525278
Income	-.1806791	.0959418	-1.88	0.060	-.3689932	.0076349
Commonfactor	-.3480398	.1204423	-2.89	0.004	-.5844434	-.1116362
Target#c.Age						
1	.0241389	.0210487	1.15	0.252	-.0171755	.0654533
Target#c.Exercise						
1	.1549119	.1464137	1.06	0.290	-.1324683	.4422921
Target#c.Education						
1	.7447365	.2328053	3.20	0.001	.2877873	1.201686
Target#c.Income						
1	.1128895	.1592026	0.71	0.478	-.1995926	.4253717
Target#c.Commonfactor						
1	.6963494	.1489896	4.67	0.000	.4039132	.9887855
_cons	25.62752	.7824142	32.75	0.000	24.0918	27.16323

Conclusion

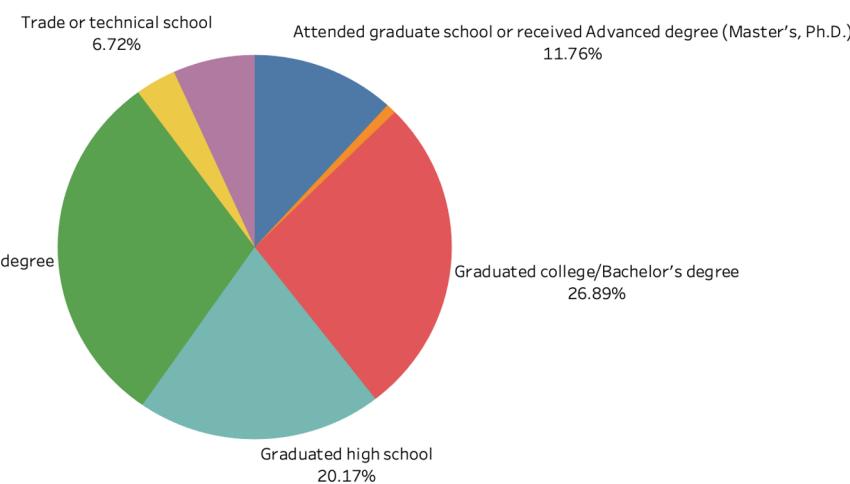
- Leisure-busy level, health mindset, gender, age, exercise, income, and food choices / structure have significant impact on BMI;
- For people in our target cluster, who have good health mindset, overweight and busy, are especially responsive to the unhealthy, high-calories foods.

Target Customer Profile



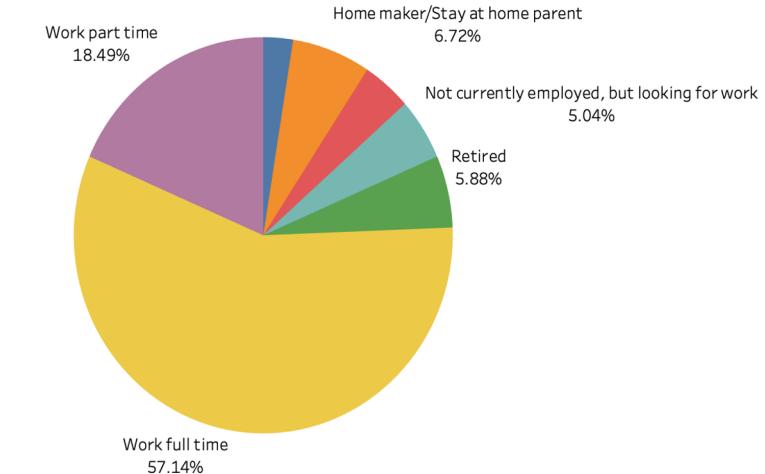
Gender distribution of cluster 8:

- Male: 68 (57.14%)
- Female: 51 (42.86%)



Education distribution of cluster 8:

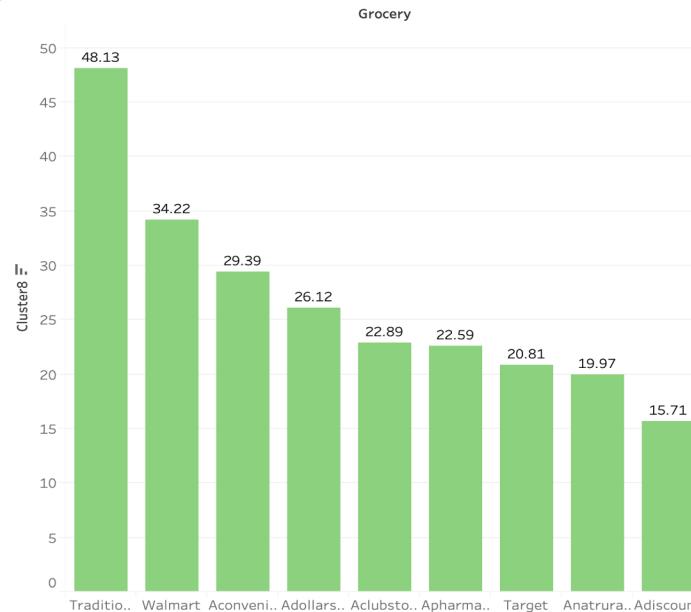
- Master's or Ph.D: 14 (11.76%)
- Graduated college/bachelor's degree: 32 (26.89%)
- College or associate degrees: 36 (30.25%)
- High school diploma: 24 (20.17%)



Work Status:

- 90 (75.63%) people are currently employed
- 11 (9.24%) people are not currently employed
- 8 (6.72%) people are home makers
- 7 (5.88%) people are retired

Target Customer Profile

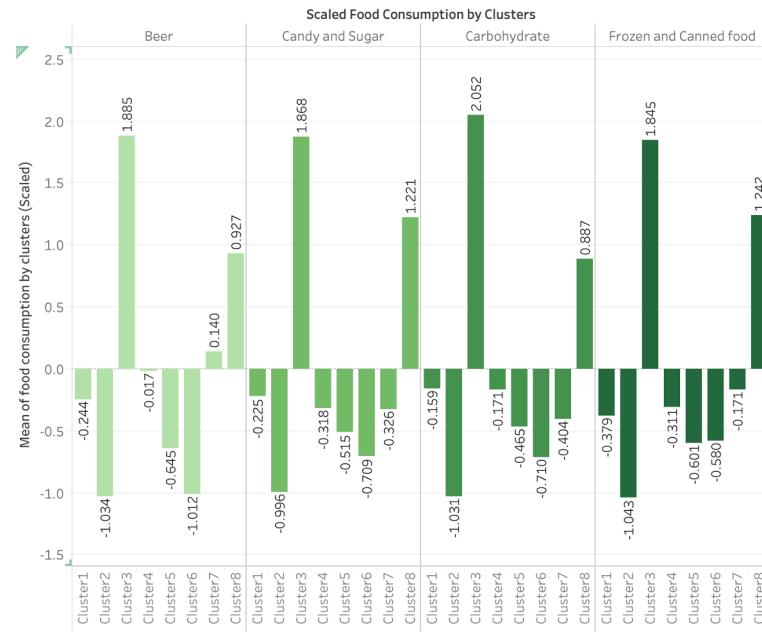


Vertical axis: Average frequency of grocery store visit

Horizontal axis: Type of grocery store

Grocery Consumption:

- Traditional Grocery Store like Kroger or Safeway
- Walmart
- Convenience Store
- Dollar Store

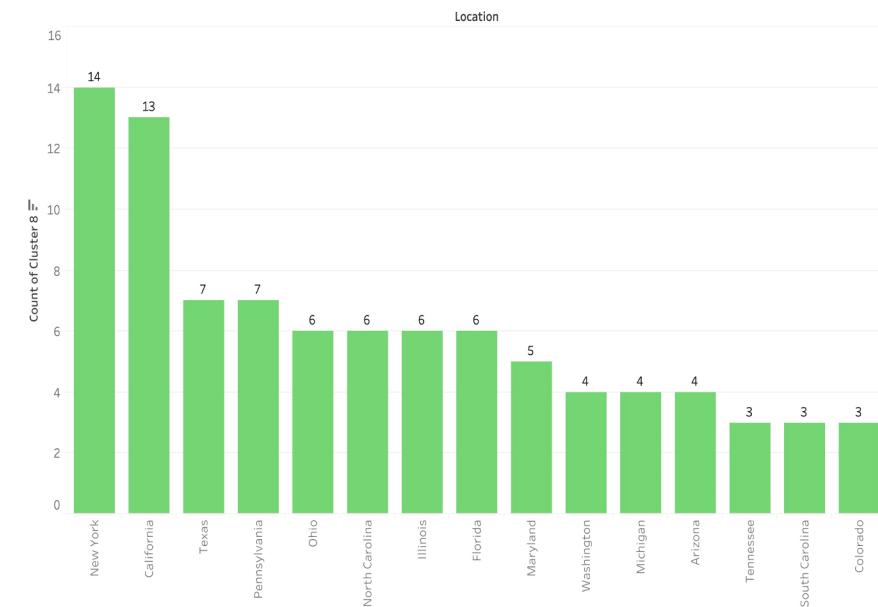


Vertical axis: Mean of food consumption by clusters (Scaled)

Horizontal axis: Food Category by Clusters

Food Consumption:

- Beer: Domestic Beer, Imported Beer, Microbrew or Craft Beer
- Carbohydrate: Pancake Syrup, Bakery Bread, Cake Mixes, etc.
- Frozen and Canned Food: Canned Soup, Frozen fish, etc.



Location distribution of cluster 8:

- New York: 14
- California: 13
- Pennsylvania: 7
- Texas: 7

Target Customer Profile

College or associate degrees

New york

Traditional Grocery Store like Kroger or Safeway

Graduated college/bachelor's degree

full-time/part-time job

California

beer

frozen and canned food

Bakery Bread

candy

Target Customer Profile

Product recommendation

- Convenient
- Healthy
- Flexible ordering system
- A combination of traditional and innovative flavor
- Fancy design with an attractive product name
- Appropriate Pricing

Marketing Strategy

- Providing delivery services
- Collaborating with grocery stores such as Kroger or Walmart
- Email and social media marketing



Thank You For Your Attention