

# A1: SQL ANALYSIS ASSIGNMENT

BUSINESS ANALYSIS WITH STRUCTURED DATA

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MBAN DUAL DEGREE

## INTRODUCTION

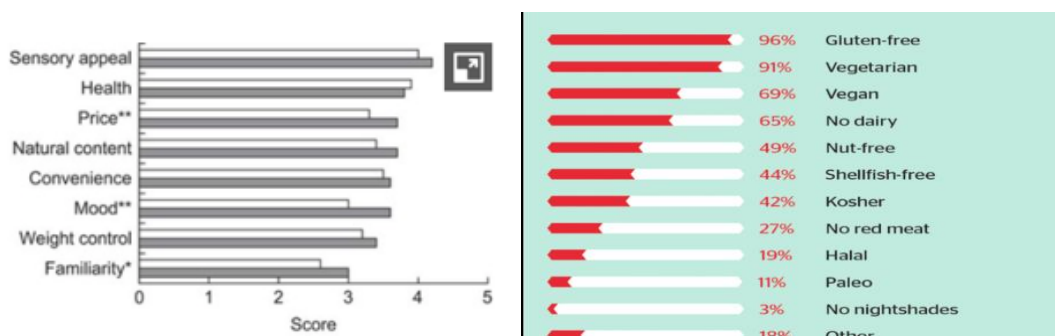
Food or dietary preferences are the measures and evaluations that people express towards their meals daily. It defines as making a food choice based on what you enjoy the most and what is most satisfying and healthy for you based on your preferences and requirements. It includes the quantitative evaluation of food and variety of food based on the diet we are following. Dietary preferences are also determined by a body index and complex interplay between genes, environment, lifestyle and culture.

According to article behavioral variation in humans is usually explained as the consequence of individual variation in their physiology, behavior diet preferences can cause the differences in physiological and morphological traits. Recent research also tells that diet preferences were proposed to underline differences in digestive organ mass and movement pattern which is a muscular part of human stomach. Hence the diet preferences are based on different human behaviors and may well function on basis of individual health variation and availability of different food sources.

## DIETARY PREFERENCES WITH PRICE

The dietary preferences are primarily influenced by taste, cost, income level and nutritional value of foods. There is high level of increase in obesity due to the excessive consumption of sugars and fat due to availability of low cost. Hence food pricing does affect the dietary preferences as price reduction and affordability of healthy food is critical. Hence the article researched on USA food consumption quantifies the food and dietary choices based on the income level stating price distortions are likely to be the main aspect of diet differences.

The global food price crisis happened in USA focuses on how the change in food prices effects the nutrition and choices, in 2008-2012 more than 40 million people have pushed in less vegetable and more frozen food consumption due to affordability.



From the above two images we can observe the price, health effects and diet preferences choose by different income range and other image depicts that 96% of the sample collected chooses gluten free options over the rest provided health options due to less price values.

## RESULTS PROVING THE PRICE RANGE EFFECTING THE DIET

When we compare the vegan products with the non-vegan which is rest of the dietary options and compare the average prices, we see that the non-vegan prices are on higher note compared to vegan options hence there is an impact where people are choosing more vegan options even if its not their preference cause of the price.

category	avg_vegan_y	avg_vegan_n	FORMAT(AVG(new_price),2)	FORMAT(AVG(new_price),2)
Produce	3.39	NULL	NULL	3.39
Dairy and Eggs	5.90	6.91	6.91	5.90
Meat	6.32	9.00	9.00	6.32
Prepared Foods	8.42	10.24	10.24	8.42
Bread Rolls & Bakery	5.48	6.24	6.24	5.48
Desserts	8.99	7.06	7.06	8.99
supplements	21.36	39.26	39.26	21.36
Frozen Foods	4.98	56.42	56.42	4.98

According to the t test performed we can observe that the comparison of the prices between the low fat products and the keto friendly products we see that the p value is less than alpha hence we accept the alternate hypothesis stating that there is sig pricing change between keto and low fat and keto mean > low fat mean stating the average price id higher for keto products hence people are not able to choose keto as their dietary preference even when they want to.

t-Test: Two-Sample Assuming Unequal Variances		
	sample 1 low fat	sample 2 keto
Mean	520.7866667	1109.706667
Variance	1135653.035	2044818.994
Observations	75	75
Hypothesized Mean Difference	0	
df	137	
t Stat	-2.859836106	
P(T<=t) one-tail	0.002451277	
t Critical one-tail	1.65605208	
P(T<=t) two-tail	0.004902554	
t Critical two-tail	1.977431212	

229	glutenfree = 1
230	-- the degree of freedom is 51 for the gluten free hence when we check the t table the p value is 0
231	-- t test between price of low fat and keto --
232	SELECT
233	(AVG(ketofriendly) - AVG(price)) / (SQRT((STDDEV(ketofriendly) ^ 2 / COUNT(ketofriendly)) + (STDDEV(price) ^ 2 / COUNT(price)))) AS t_value
234	FROM
235	ddmban_data
236	WHERE
237	ketofriendly = 1
238	AND (SELECT
239	(AVG(lowfat) - AVG(price)) / (SQRT((STDDEV(lowfat) ^ 2 / COUNT(lowfat)) + (STDDEV(price) ^ 2 / COUNT(price)))) AS t_value
240	FROM
241	ddmban_data
242	WHERE
243	lowfat = 1); -- comparing the prices between the keto and low fat
244	-- the resulted t test value is compared with df and the p value is 0.004
245	
246	
100%	1:245 1 error found
Result Grid	
t_value	-253.6627262625731

When we observe the correlation between the prices of produce fresh vegetables and frozen vegetables there is negative 27% which states that the increase in price of fresh vegetables effects decrease in the price of frozen veggies. Further when we perform the t test between the fresh vegetables and meat to prepared food and frozen meat, we see that compared to fresh vegetables the frozen food is more affordable attracting customers to buy more.

fresh veggies and fruits		frozen fruits and veg																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Finally, when we perform the t test on the wholefoods database, we observe that the price of organic food is cheaper than price of the non-organic food, but customers assume that the price of organic is higher and choose for processed food. We also observe from the data base that organic options are limited hence whole food should increase the organic food options with controlled temperature for storing its purity.

t-Test: Two-Sample Assuming Unequal Variances		
	price of organic food	price of non organic food
Mean	562.3589744	781.0545455
Variance	66135.2888	212970.2007
Observations	39	55
Hypothesized Mean Difference	0	
df	88	
t Stat	-2.930838263	
P(T<=t) one-tail	0.002153135	
t Critical one-tail	1.662354029	
P(T<=t) two-tail	0.00430627	
t Critical two-tail	1.987289865	

Hence finally we can state that the products and dietary preferences are affected by the prices as for different food items there are different health benefits fluctuating with the price differences. When we also compare the average price and max prize between the organic good and non-organic food we see that non organic food few categories are more costly than the organic food like supplements hence wholefoods can start production of organic or plant based supplements which attract the customers for average price.

category	subcategory	average_nonorganic_price	costly_nonorganic_price	category	subcategory	average_organic_price	costly_organic_price
Produce	Fresh Vegetables	345.6666666666667	399	Produce	Fresh Vegetables	340.6666666666667	499
Produce	Fresh Fruits	172.33333333333334	249	Produce	Fresh Fruits	240.2	649
Dairy and Eggs	Cheese	1064	2099	Dairy and Eggs	Butter & margarine	729	729
Dairy and Eggs	Eggs	459	429	Dairy and Eggs	Cheese	679	679
Dairy and Eggs	Yogurt	319	429	Dairy and Eggs	Eggs	699	699
Dairy and Eggs	Dairy alternatives	406.5	879	Dairy and Eggs	Dairy alternatives	689	1129
Dairy and Eggs	Milk & cream	699	699	Dairy and Eggs	Milk & cream	562.3333333333334	799
Meat	Beef	1024.25	1999	Meat	Turkey	839	999
Meat	Chicken	624.5	1249	Meat	Chicken	824	899
Meat	Bacon	799	799	Meat	Meat alternatives	614.7142857142857	729
Meat	Hoddogs & Saus.	649	649	Bread Rolls & Bakery	Breads	362	799
Meat	Pork	840.5714285714286	1699	Bread Rolls & Bakery	Rolls & Buns	699	699
Prepared Foods	Prepared meals	1167.75	1549	Bread Rolls & Bakery	Tortillas & Flat Br.	199	199
Prepared Foods	Prepared soups	93.66666666666667	1399	Desserts	Ice cream & Froz...	684	699
Bread Rolls & Bakery	Breads	612.3	800	supplements	specialty	1474	2549
Bread Rolls & Bakery	Breakfast Bakery	574	799	supplements	functional foods	2432.3333333333335	3999
Bread Rolls & Bakery	Rolls & Buns	419	469	supplements	sports-nutrition-w...	3249	3249
Bread Rolls & Bakery	Tortillas & Flat B.	699	799	Frozen Foods	Frozen Entrees &...	699	699
Desserts	Ice cream & Fro.	615.6666666666667	999	Frozen Foods	Frozen Fruits & V...	621.5	1099
Desserts	Cookies	800	899	Frozen Foods	Frozen Pizza	999	999
Desserts	Muffins & Scones	713.6666666666667	799	Frozen Foods	Ice Cream & froz...	724	979
Desserts	Pastries Breads...	709.6666666666667	800	Beverages	Kombucha & Tea	679	949
Desserts	Doritos	1000	1000	Beverages	Juice	475.6666666666667	549
Desserts	Cakes & Cupc.	1024	1299	Beverages	Water Seltzer &...	299	299
supplements	herb-homeopathy	2749	2749	Beverages	Tea	629	1499
supplements	specialty	4486.5	7199	Beverages	Soft Drinks	1024	1049
supplements	sports-nutrition...	3633	6499	NULL	NULL	7.4799999999999995	10.99
				flour	Hard Kamabucha	6.49	6.49

## ACTIONABLE INSIGHTS FOR WHOLEFOODS

### 1. Decrease in production of the Keto friendly food or combining the keto friendly food with other products like low carbohydrate at an average price.

Annals of internal medicine paper states that Keto diet doesn't create much impact compared to other diet options. Keto diet didn't show much serum levels change which is crucial factor for weight loss compared to other dietary products like low carbohydrates which helped in good water retention and high-density lipoprotein cholesterol. (Ref Williams, 2004)

2. As the price of the organic foods are cheaper than the non-organic food in terms of supplements and other hence the whole foods should spread awareness for the customers regarding organic food pricing, by spreading awareness about the pricing and sales of organic food and can also sell the organic food combining with the frozen foods or supplements which will make customers buy organic food as customers think frozen food is more affordable.

correlation_coefficient_organic	
-0.07406314707330283	

When we observe the correlation as the price increases the demand for organic food decreases hence there should be awareness.

There is demand for organic food and health enthusiasts have frequently been found to be the main motivation purchasing organic products, but research tells that consumer preference behavior selects organic food thinking it's healthy. Article states that healthy diet preferences are different understanding for people in terms of purity, pleasure and price There are several different reasons why consumers may choose to buy organic food, including concerns about

the environment and the use of pesticides, concerns about intensified farming methods, or the perception that organic food is safer or more nutritious than conventionally produced food. Furthermore, as some sectors of the population have become more interested in health and wellbeing, there has been an increased demand for more ‘natural’, less processed foods. This may also have contributed to the increased demand, as many people perceive organic foods as a more ‘natural’ alternative. Even though organic foods tend to be much higher in price (mainly owing to the lower productivity of organic crops), they seem to have become increasingly popular.

All foods show natural variation in nutrient levels, which depend on many different factors, such as the soil, climate, crop variety, degree of ripeness or the way animals are fed. The freshness, storage conditions and processing of foods also affect the nutrient content. Even processed foods which are produced under very controlled conditions show some variability owing to differences in the composition of ingredients and variations in processing, packaging and storage. (Ref C.S Williamson)

**3. When we performed the t-test on the gluten free products we see that the prices of the gluten free products are higher, but as per stats most of the population is consuming gluten free, whole foods should increase the production of more gluten free products but with better pricing strategy.**

t-Test: Paired Two Sample for Means			
	<i>price</i>	<i>dummy</i>	
Mean	1277.115385	0	
Variance	3091433.281	0	
Observations	52	52	
Pearson Correlation	#DIV/0!		
Hypothesized Mean Difference	0		
df	51		
t Stat	5.237835676		
P(T<=t) one-tail	0.00		
t Critical one-tail	1.67528495		
P(T<=t) two-tail	0.000		
t Critical two-tail	2.00758377		

correlation_coefficient_glutenfree	
-0.005253733465274915	

From the articles referred it states that to buy gluten free diet for some families it may be difficult due to the price discrepancy. Hence people 96% are likely to gluten friendly food hence whole food should increase the production and launch subsidiary plans for marketing and selling the gluten free products. (Ref Kelly Lambert).

Few articles state that gluten free diet is only treatment for the patients with the coeliac disease, but the cause of availability and high pricing has been caused of incomplete dietary compliance across wide stores. There was limited availability of gluten free products with 41%, most of the gluten free options are wheat based and expensive, but some other gluten free versions of everyday foods were more costly than other products. Hence whole food should increase more

gluten free options which are not only made with bread and come with better pricing strategies for those products promoting the diet. (Ref J Singh).

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