

COMPARING THE SERVING SIZES OF PROTEIN, VEGETABLES, FRUIT,
GRAINS, AND DAIRY FROM VARIOUS FORT WORTH
RESTAURANTS TO RECOMMENDED
SERVING SIZES FROM MYPLATE

By

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ABSTRACT

Today, the average restaurant serving size is four times as large as it was in the 1950's, and as a result consumer portion size has increased. The consumption of larger portion sizes is associated with the increased incidence of obesity currently seen in the United States. This study is an observational parameter estimation study that compared the serving sizes of proteins, grains, vegetables, fruits, and dairy from various casual Fort Worth restaurants to the serving sizes recommended by USDA's *MyPlate* for each food group measured. Dinner plates including servings of chicken, rice, vegetables, fruit, and milk were obtained as a takeout order at five casual dining restaurants in the Fort Worth area. After weighing and measuring the foods, statistics were used to evaluate serving size among the food groups in comparison to *MyPlate* which allowed for a possible conclusion to be drawn on whether or not serving size is correlated to obesity in the U.S. population. The results of the study found that for each food group, the mean serving size of the restaurant food always ($p < 0.05$) exceeded the *MyPlate* recommended serving size. Health conscious consumers, individuals on weight loss/management regimens, as well as patients with diabetes and cardiovascular disease may need to restrict or decrease consumption of such large servings (with the exception of healthy fruit/vegetable options) served by restaurants.

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INTRODUCTION

Following the creation of the *2010 Dietary Guidelines for Americans*, the United States Department of Agriculture developed the tool known as *MyPlate* in hopes of implementing healthy eating habits¹. Research has shown that over the past 20 years, portion sizes have doubled, or even tripled, and the average American is now consuming nearly double the amount of required calories². Restaurants have adopted these oversized portions, and strong evidence shows that they are contributing to the obesity epidemic in America. Dietetic professionals must understand appropriate portion sizes, to educate Americans on adequate consumption of calories and other nutrients in order to prevent obesity.

The need for this research study is related to increased restaurant portion sizes and how they may affect obesity in the United States. It is an observational parameter estimation study that compared the serving sizes of proteins, grains, vegetables, fruits, and dairy from various casual Fort Worth restaurants to the serving sizes recommended by USDA's *MyPlate*. In order to conduct this research it was important to choose five restaurants that can be found nationwide in order to compare these statistics to obesity in America. The study intended to provide people that eat at local chain restaurants with data about the actual portion sizes of foods served at Chili's, Luby's, BJ's Restaurant and Brewhouse, Cotton Patch Cafe, and Zoe's Kitchen. Descriptive statistics were used to evaluate serving sizes among all five food groups from each restaurant and compare to *MyPlate* serving sizes. Thereafter, inferential statistics were used to draw conclusions on whether or not the serving sizes are associated with obesity in the United States.

Research Objectives

The objectives for this research include:

1. To determine average serving sizes of proteins, vegetables, fruit, grains, and dairy from various Fort Worth restaurants.
2. To determine the difference between the *MyPlate* serving size compared to actual serving sizes of each food group served at each restaurant.

REVIEW OF LITERATURE

Extensive literature related to *MyPlate*, restaurants, portion sizes, and obesity was collected to support the development of this research project. The information obtained through background research was used to formulate research objectives to evaluate portion sizes from various Fort Worth restaurants. The literature provided the researcher with knowledge that aided in completion of the study.

MyPlate

The theory is that restaurants serve portion sizes that are much larger than the government recommended serving sizes. The general population believes that what they are served at restaurants is the correct portion size, when in fact that is not always true. *MyPlate* is used as the reference to what the correct portion sizes are. There are also many articles that discuss the contribution of portion sizes to obesity in the United States. There is also data supporting the idea that increased portion sizes leads to increased calorie intake in a restaurant meal¹.

The focus of the research compared the portion size of grains, protein, vegetables, fruit, and dairy served in restaurants to serving sizes that *MyPlate* recommends. According to choosemyplate.gov, *MyPlate* has determined the serving size for grains at a

meal to be two ounces and servings size for protein to be two ounces as well. The recommended fruit serving size is $\frac{3}{4}$ cup, vegetable servings size is $\frac{2}{3}$ cup, and dairy is one cup¹. Eating these serving sizes at each meal, three times a day, will typically ensure adequate nutrition without over-exceeding on caloric intake. The body needs a certain amount of energy from food to keep up basic life functions. Over time, when people eat and drink more calories than they burn, the energy balance tips toward weight gain, overweight, and obesity³.

Eating At Restaurants

Eating in restaurants offers many opportunities to encounter large portion sizes. The number of eating establishments in the United States increased by 75 percent between 1977 and 1991². In an article titled “Chefs’ Opinions on Restaurant Portion Sizes,” chefs were found to be primarily responsible for establishing portion sizes in restaurants. Although chefs believe the serving size is “normal” or “correct” according to *MyPlate*, they were actually two to four times larger than serving sizes recommended by the U.S. government⁴. Because of the increasing amount of restaurants available and increased portion sizes, customers are consuming larger portions and this can be a problem for weight control in the United States.

There have been more studies done on the subject of eating frequently in restaurants. One study found that eating frequently in restaurants is one of the behaviors associated with obesity. The study examined whether increasing the portion size of an entrée affected energy intake at a restaurant meal⁵. This does not only affect adults in society, but children as well. It was found that the number of restaurants within a mile from the school can significantly affect and increase school level obesity rates⁶.

This study focuses on the portion sizes at restaurants compared to what is recommended by *MyPlate*. In a restaurant setting, increasing the size of an entrée results in increased energy intake and this type of results suggests that large restaurant portions may be contributing to the obesity epidemic.

Portion Sizes

This research will involve the trend of the portion sizes. Portion size is the amount of a single food item served in a single eating occasion, such as a meal or a snack. Many people today confuse portion size with servings size, which is a standardized unit of measuring foods – recommended by *MyPlate*². Studies have found that marketplace food portions have increased in size and now exceed federal standards. Portion sizes began to grow in the 1970s, rose sharply in the 1980s, and have continued in parallel with increasing body weights⁷. The prevalence of overweight and obesity has increased sharply among United States adults and children in recent years. Many of these observations and the research completed will hint that out-of-home portion sizes are increasing. These larger portions not only contain more energy but also encourage people to eat more, contributing to the obesity epidemic.

One study, titled “Patterns and Trends in Food Portion Sizes, 1977-1998”, has found that between 1977 and 1996 the food portion sizes have increased both inside and outside of the home for all food categories studied with the exception of pizza. The results also showed that marketplace food portions have increased in size and now exceed the federal standards for a serving⁸. There has also been research conducted to show how the size of dishes that restaurants serve impacts the health of the American population. In Lisa Young’s article “The Contribution of Expanding Portion Sizes to the US Obesity

Epidemic” a study that analyzed how large food portions could be contributing to the increasing prevalence of overweight and obesity in the United States. The conclusion is that since energy content increases with portion size, education should focus on the need for people to consume smaller portions⁷. Another study, titled “Increased Portion Size Leads to Increased Energy Intake in a Restaurant Meal”, focused on whether the increasing portion sizes in restaurants affected the energy intake while eating at restaurants. The conclusion was that the portion size had a significant effect on the intake of calories from the entrée compared with customers who purchased the standard portion⁵.

Much research shows that there is a definite need for portion size identification education from dietetic professionals. This research will be beneficial for providing education about identifying appropriate portion sizes at restaurants.

Obesity

The major health and financial consequences that are secondary to obesity makes reducing the high prevalence a definite priority. On average, Americans today consume 300 more calories than they did in 1985 and according to the Center for Disease Control, more than one-third (35.7%) of American adults are obese⁹. Overweight and obesity result from an energy imbalance. The body needs a certain amount of energy (calories) from food to keep up basic life functions. Body weight tends to remain the same when the number of calories eaten equals the number of calories the body uses or “burns.” Over time, when people eat and drink more calories than they burn, the energy balance tips toward weight gain, overweight, and obesity³. This research focused on how increasing

calories consumed at restaurants due to portion sizes could correlate with the increasing obesity epidemic in America.

Since the early 1960s, the prevalence of obesity among adults more than doubled, increasing from 13.4 to 35.7 percent in United States for adults age 20 and older⁹. Overweight and obesity are risk factors for type 2 diabetes, heart disease, high blood pressure, and other health problems³.

METHODS

The researcher of this project identified five casual dining restaurants in Fort Worth, Texas. These five restaurants included Chili's, Luby's, BJ's Restaurant and Brewhouse, Cotton Patch Cafe, and Zoe's Kitchen. Dinner servings of chicken, rice, vegetables, fruit, and milk were ordered to mimic the five sections of *MyPlate*: protein, grains, vegetables, fruit, and dairy.

All five component dinner plates were taken to the Texas Christian University Nutritional Science food laboratory and immediately weighed/measured. The foods were individually put onto the scale and weighed in ounces or measured out into dry or liquid measuring cups (depending on the food). The results were recorded. These results were compared against the *MyPlate* recommendations: 2 oz of protein, 2 oz of grains, $\frac{3}{4}$ cup vegetables, $\frac{2}{3}$ cup fruit, and 1 cup dairy.

Statistical Analyses

The data was recorded and analyzed to determine if research objectives were met. Descriptive statistics were used to evaluate serving size among the food groups in comparison to *MyPlate*. A $p < 0.05$ was considered significant. Inferential statistics

allowed for a possible conclusion to be drawn on whether or not serving size is correlated to obesity in the U.S. population.

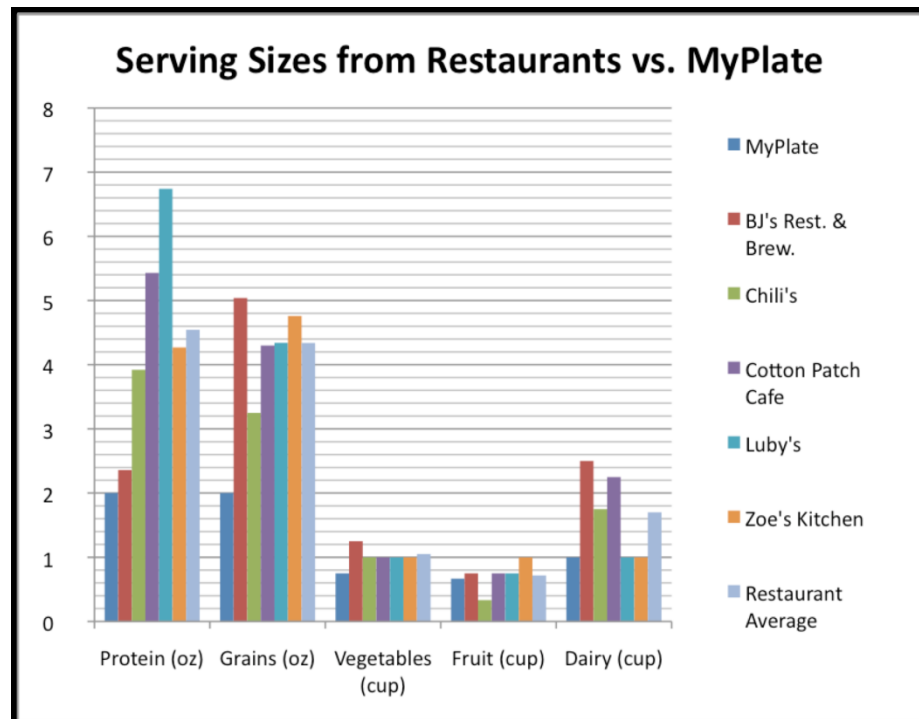
RESULTS

For each food group, the mean serving size of the restaurant food always ($p < 0.05$) exceeded the *MyPlate* recommended serving size. The mean serving size for protein was 227% of the *MyPlate* recommendation which was significantly higher ($p < 0.05$) than the *MyPlate* recommended serving size. The mean serving size for grains was 217% which was significantly higher ($p < 0.05$) than the *MyPlate* recommended serving size. The mean serving size for vegetables was 140% of the *MyPlate* recommendation which was significantly higher ($p < 0.05$) than the *MyPlate* recommended serving size. The mean serving size for fruit was 108% of the *MyPlate* recommendation which was significantly higher ($p < 0.05$) than the *MyPlate* recommended serving size. And lastly, the mean serving size for dairy was 170% of the *MyPlate* recommendation which was significantly higher ($p < 0.05$) than the *MyPlate* recommended serving size.

Results from the present study suggest that serving sizes of protein, grains, vegetables, fruit, and dairy from local chain restaurants are all greater than the amount recommended by *MyPlate*. Health conscious consumers, individuals on weight loss management/regimens, as well as patients with diabetes and cardiovascular disease may need to restrict/decrease consumption of such large servings (with the exception of healthy fruit/vegetable options) served by restaurants. Dietitians and nutritionists should educate consumers regarding correct portion sizes to ensure that appropriate amounts of food and nutrients are consumed. The tables below as well as the additional appendixes

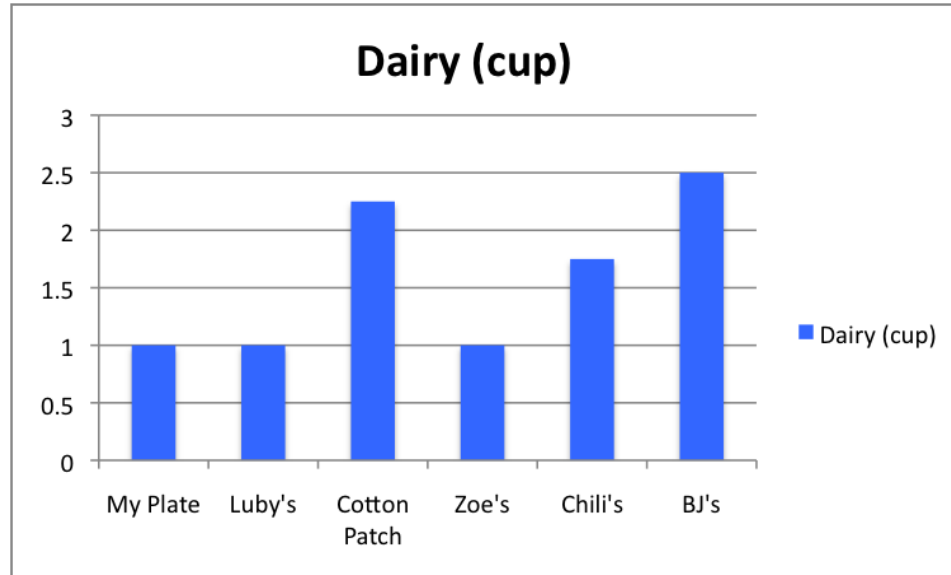
illustrate the statistical difference between all the restaurants (including individual food groups) and USDA serving size.

	Protein	Grains	Vegetables	Fruit	Dairy
MyPlate	2 oz	2 oz	$\frac{3}{4}$ cup	$\frac{2}{3}$ cup	1 cup
BJ's Restaurant & Brewhouse	2.36 oz	5.04 oz	1 $\frac{1}{4}$ cup	$\frac{3}{4}$ cup	1 cup
Chili's	3.92 oz	3.25 oz	1 cup	$\frac{1}{3}$ cup	1 $\frac{3}{4}$ cup
Cotton Patch Cafe	5.43 oz	4.30 oz	1 cup	$\frac{3}{4}$ cup	2 $\frac{1}{4}$ cup
Luby's	6.74 oz	4.34 oz	1 cup	$\frac{3}{4}$ cup	1 cup
Zoe's Kitchen	4.27 oz	4.76 oz	1 cup	1 cup	1 cup



CONCLUSIONS

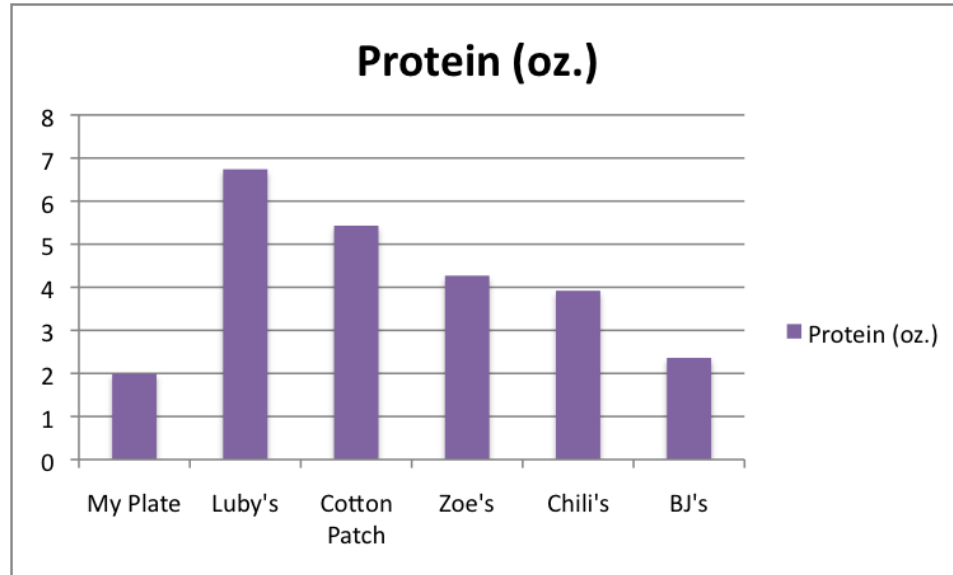
Industry marketing may convince the consumer that they are getting a good deal for the price they pay when dining out, but in reality the cost to health is high when serving sizes exceed what our bodies need. As this trend continues, consumers may start to become desensitized to the large serving sizes they receive at restaurants. Negative health outcomes will continue to result if consumers continue to increase their portion sizes secondary to the enlarged serving sizes. *MyPlate* recommends evidenced-based serving sizes that are conducive to positive health outcomes. Since the sample size was small and not entirely random, caution should be taken when inferring this to the entire population. However, the results indicate there is a possible correlation with large serving portions in restaurants and obesity in the United States. The food industry should consider adjusting restaurant portion sizes to align with the recommendations from *MyPlate*. This will help promote positive public health and reduce the risk and incidence of obesity in the United States.

APPENDIX ADAIRY SERVING SIZES AT VARIOUS FORT WORTH RESTAURANTS
COMPARED TO *MYPLATE* RECOMMENDATIONS

APPENDIX B

DAIRY SERVING SIZES FROM VARIOUS FORT WORTH RESTAURANTS
PHOTO

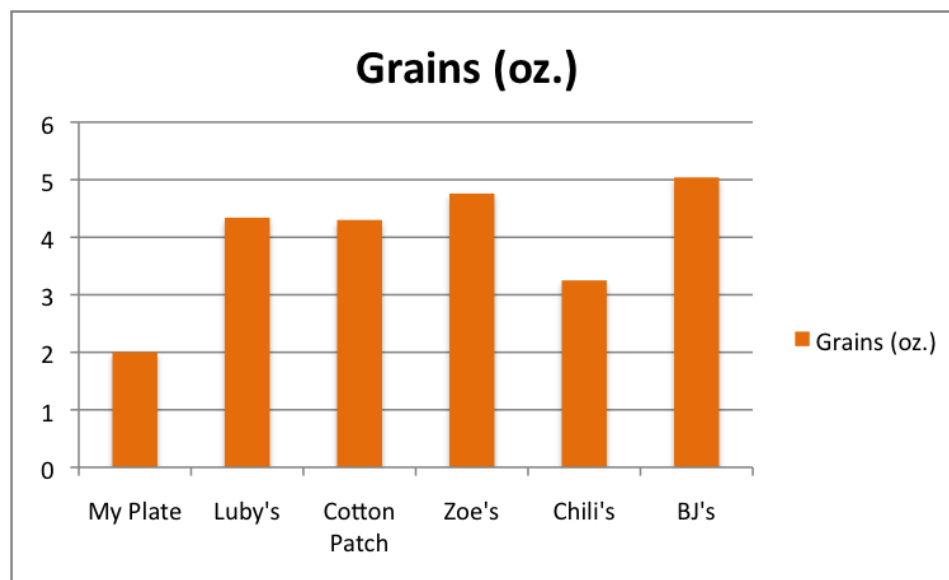


APPENDIX CPROTEIN SERVING SIZES AT VARIOUS FORT WORTH RESTAURANTS
COMPARED TO *MYPLATE* RECOMMENDATIONS

APPENDIX D

PROTEIN SERVING SIZES FROM VARIOUS FORT WORTH RESTAURANTS
PHOTO

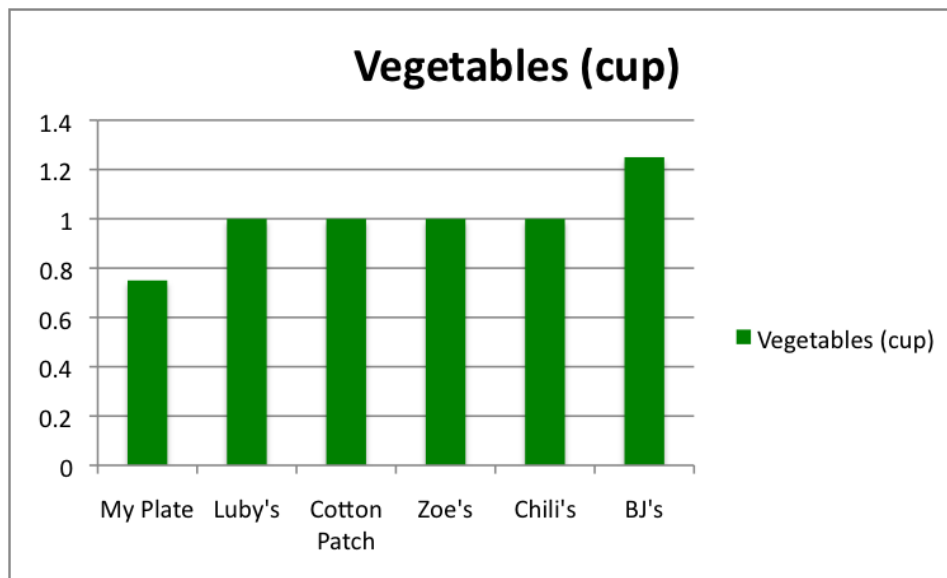


APPENDIX EGRAIN SERVING SIZES AT VARIOUS FORT WORTH RESTAURANTS
COMPARED TO *MYPLATE* RECOMMENDATIONS

APPENDIX F

GRAINS SERVING SIZES FROM VARIOUS FORT WORTH RESTAURANTS
PHOTOS

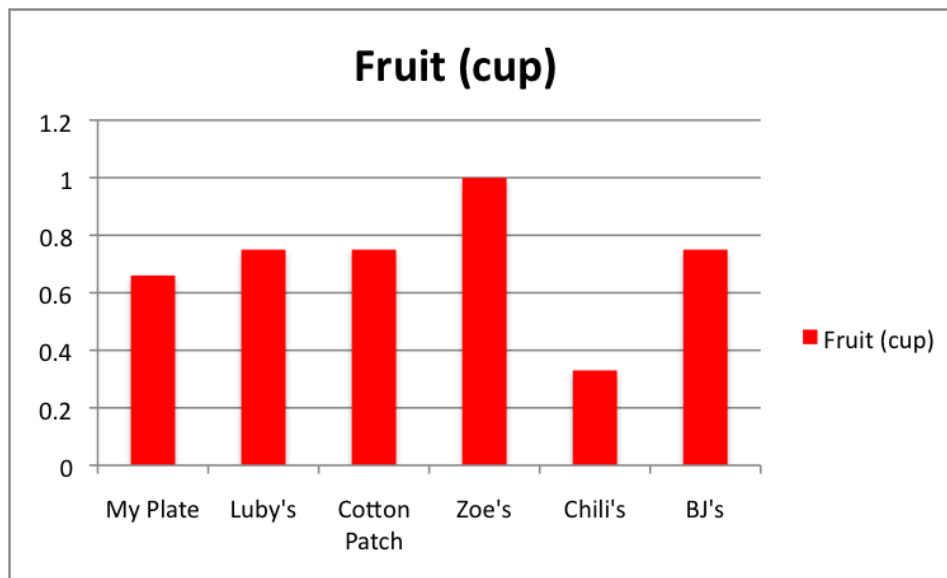


APPENDIX HVEGETABLE SERVING SIZES AT VARIOUS FORT WORTH RESTAURANTS
COMPARED TO *MYPLATE* RECOMMENDATIONS

APPENDIX J

VEGETABLE SERVING SIZES FROM VARIOUS FORT WORTH RESTAURANTS
PHOTO



APPENDIX KFRUIT SERVING SIZES AT VARIOUS FORT WORTH RESTAURANTS
COMPARED TO *MYPLATE* RECOMMENDATIONS

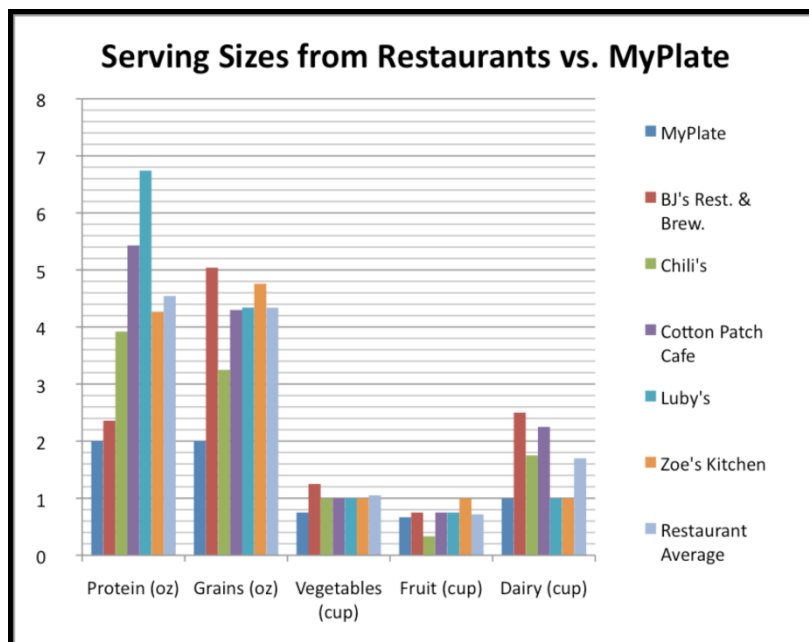
APPENDIX L

FRUIT SERVING SIZES FROM VARIOUS FORT WORTH RESTAURANTS PHOTO



APPENDIX M

COMPARISON OF RESTAURANT SERVING SIZES TO *MYPLATE*
RECOMMENDED SERVING SIZES



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