Lifestyle Choices in Relation to BMI and Blood Pressure

A Senior Project

presented to

the Faculty of the Statistics Department

California Polytechnic State University, San Luis Obispo

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Bachelor of Science

by

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Introduction

Cal Poly currently has one of the largest ongoing university health studies in the United States. Launched in Fall 2009, the Cal Poly FLASH study, led by the Kinesiology department and STRIDE, is a longitudinal study that tracks the classes of 2013 and 2014 through online surveys and physical assessments. The data collected covers various areas such as perceived health, lifestyle choices, and actual physical health.

This project analyzes the FLASH data to investigate the relationship between various perceived variables and actual health measures for Cal Poly freshmen. The motivation for this analysis is an interest in both diet and exercise and its impact on an individual's overall health. In particular, my interest lies in what a person perceives as their diet and exercise regimen and how that relates to overall health. To assess overall health, I examined both the Body Mass Index (BMI) and blood pressure of students. BMI was computed using the standard formula involving height and weight. Blood pressure was classified by using both systolic and diastolic blood pressure.

Conventional wisdom states that proper diet and exercise leads to better overall health. I was interested in the following research question: "Can we simultaneously model college students' BMI and blood pressure using various lifestyle variables?" The response variables chosen were BMI and blood pressure and the explanatory variables examined consisted of various lifestyle variables such as diet preference, activity level, marijuana use, cigarette use, and alcohol use. Before I simultaneously modeled BMI and blood pressure, I created several models that had univariate responses.

Methods and Materials

Data

The original data set used in my analysis is the result of merging six separate data sets: Fall 2009 Survey data, Spring 2010 Survey data, Fall 2010 Survey data, Fall 2009 Physical Assessment data, Spring 2010 Physical Assessment data, and Fall 2010 Physical Assessment data. These datasets were merged so that a student's first time physical assessment is linked with the online survey from that corresponding quarter. There were a total of three possible quarters present in the data: Fall 2009, Spring 2010, and Fall 2010. This data set contained 681 observations and 188 variables. Twenty six of these variables were the variables included in the Physical Assessment data sets. The other 162 variables were those from the Survey data sets and variables that were created for analysis. These variables included blood pressure class, physical activity, ethnicity, and BMI. The variables from the Survey data sets were organized into six sections. These sections are as follows: sociodemographic information, health perceptions and lifestyle, physical activity and lifestyles, stress, dietary habits and dining patterns, sun exposure and sun block use.

For my analysis, I wanted to explore the relationship between lifestyle, physical activity, and dietary habit variables and overall health measurements for Cal Poly freshmen. To do this, all analysis and data management was performed in SAS® 9.2. The descriptive statistics for demographics for the data set used can be found in Table 1. They have been classified by male, female, and overall.

	Levels	Male (n = 337)	Female (n = 341)	Overall (n = 678)
Sex		49.71 %	50.29 %	
Age (years)		18.24 (SD = 0.51)	18.17 (SD = 0.49)	18.20 (SD = 0.506)
Race	White/Asian (Non-Hispanic) Hispanic Other	82.64 % 13.83 3.54	84.24 % 12.54 3.22	83.49 % 13.14 3.37

Table 1: Descriptive Statistics of the Demographics of FLASH Hypertension Data Set

Response Variables of Interest

For my analysis, I wanted to examine measures of actual overall health. To do this, I chose to use variables from the physical assessment data sets. In particular, I chose to use Body Mass Index (BMI) and blood pressure. These variables existed in a "raw" form in the original data set. To utilize these variables, I created the categorical variables found in Tables 2 and 3. To classify these variables, I used the published CDC guidelines[1]. In these tables you can find the ranges which were used to categorize these responses, and also the percentage of males, females, and the overall percentage of who represent each group.

	BMI Ranges	Male	Female	Overall
Normal	24.9 kg/m^2 and Below	75.37 %	84.46 %	79.94 %
Overweight/Obese	25.0 kg/m^2 and Above	24.63	15.54	20.06

Table 2: Classification of BMI into Different Categories and its Descriptive Statistics

	Systolic	Diastolic	Male	Female	Overall
Normal	Below 120 mmHg	Below 80 mmHg	35.01 %	82.99 %	59.18 %
Pre-Hypertensive/ Hypertensive	120 mmHg and Above	80 mmHg and Above	64.99	17.01	40.82

Table 3: Classification of Blood Pressure into Different Categories and its Descriptive Statistics

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[1] Center for Disease Control, www.cdc.gov

Explanatory Variables under Consideration

Although various types of variables were present in the data set, I examined those variables that involved health perceptions, physical activity and lifestyles, and dietary habits and dining patterns. The variables that were considered in my analysis can be found in Table 4. Because of sample size issues (discussed in a later section), some of the original levels had to be collapsed. For Activity Level, light and very light were grouped into the same category while moderate and heavy activity levels were grouped into another category. Eating Preference is an interesting variable in that "vegetarian" encompasses students who consider themselves vegetarians versus non-vegetarians. However, under the category "vegetarian" students could classify themselves, for example, as vegan, lacto-ovo vegetarian, pescatarian, and pollo-vegetarian. So students who ate chicken were categorized as vegetarians because that is how they identify themselves. For the usage variables, Alcohol Use, Cigarette Use, and Marijuana Use, these students were categorized into two groups. The first consists of those who have used these items in the past or are currently using them. The second consists of students who have never used these items.

Variable	Levels
Activity Level	Light/Very Light Moderate/Heavy
Eating Preference	Vegetarian Non-Vegetarian
Alcohol Use	Current or Past User Never Used
Cigarette Use	Current or Past User Never Used
Marijuana Use	Current or Past User Never Used

Table 4: Variables with Their Respective Levels That Were Under Consideration for Analysis

Statistical Analysis

Demographics

Observations of the data reveal interesting patterns, especially when you look at the data grouped by variables such as sex. In the study, there were a total of 681 observations. Of these, 337 were males, 341 were females (three had missing genders). It was found that 83.49% of these individuals were White or Asian, 13.14% were Hispanic, and 3.37% were of an "Other" race. The data showed that 59.18% of the individuals had normal blood pressure, 40.82% were pre-hypertensive or hypertensive. Plots and tables of descriptive statistics and breakdowns of blood pressure class by sex and BMI category by sex, appear in Figures 1 through 7 and Tables 5 through 11 .
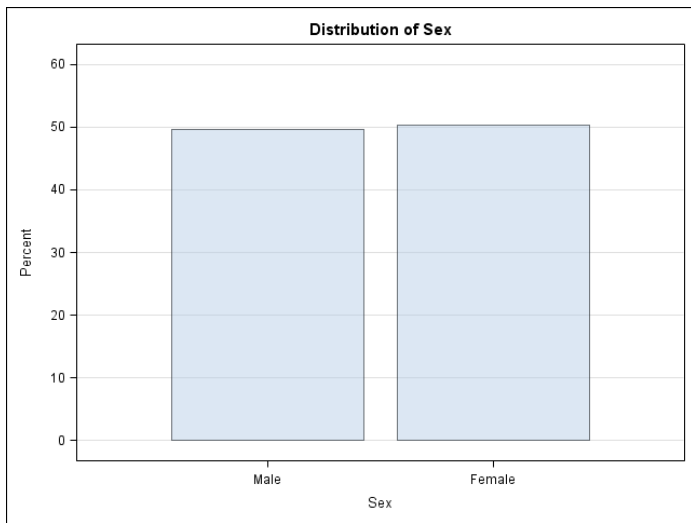
Figure 1: Bar Chart of the Distribution of Sex

Sex	Frequency/ %
Male	337 49.71%
Female	341 50.29%

Table 5: Sex Frequencies
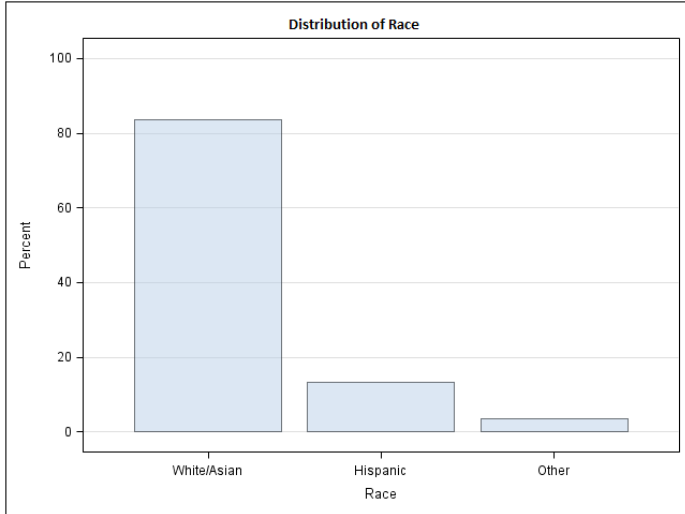
Figure 2: Bar Chart of the Distribution of Race

Race	Frequency /%
White/ Asian	521 83.49%
Hispanic	82 13.14%
Other	21 3.37%

Table 6: Race Frequencies
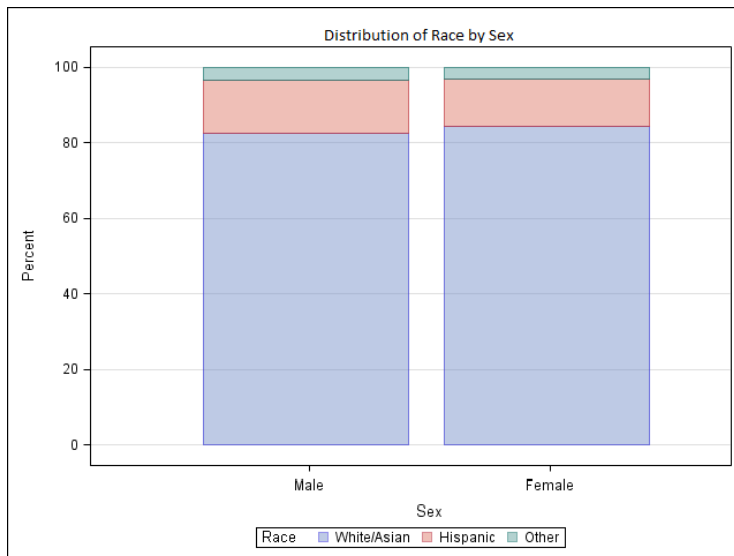
Figure 3: Bar Chart of Race by Sex

	White/ Asian	Hispanic	Other
Male	257 82.64%	43 13.83%	11 3.54%
Female	262 84.24%	39 12.54%	10 3.22%

Table 7: Cross Tabulation of Race by Sex
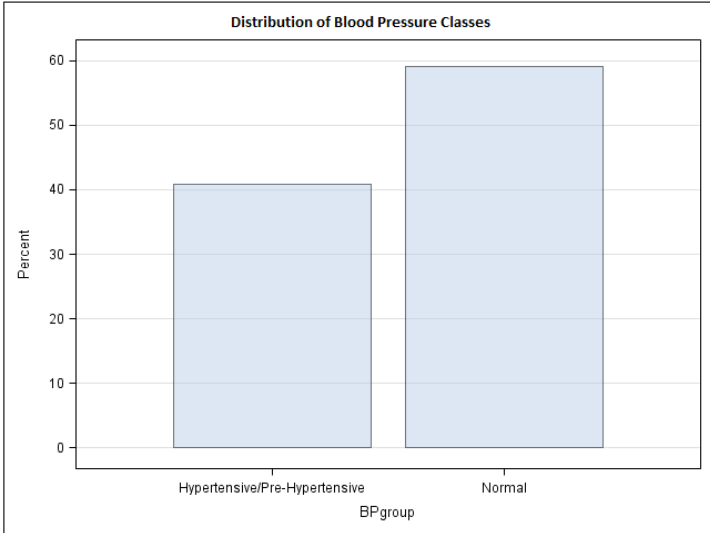
Figure 4: Bar Chart of the Distribution of Blood Pressure Class

Hypertensive Class	Frequency/ %
Normal	403 59.18%
Hypertensive /Pre- Hypertensive	278 40.82%

Table 8: Hypertension Frequencies
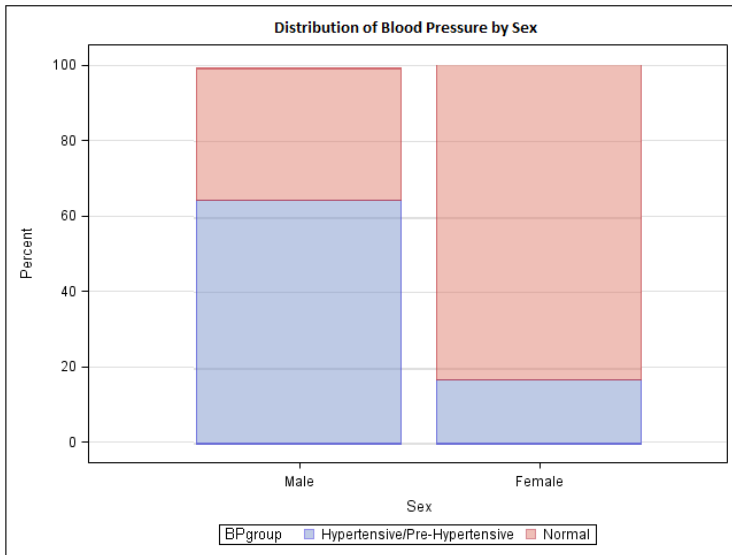
Figure 5: Bar Chart of Blood Pressure Class by Sex

	Normal	Pre-Hypertensive/ Hypertensive
Male	118 35.01%	219 64.99%
Female	283 82.99%	58 17.01%

Table 9: Cross Tabulation of Blood Pressure by Sex
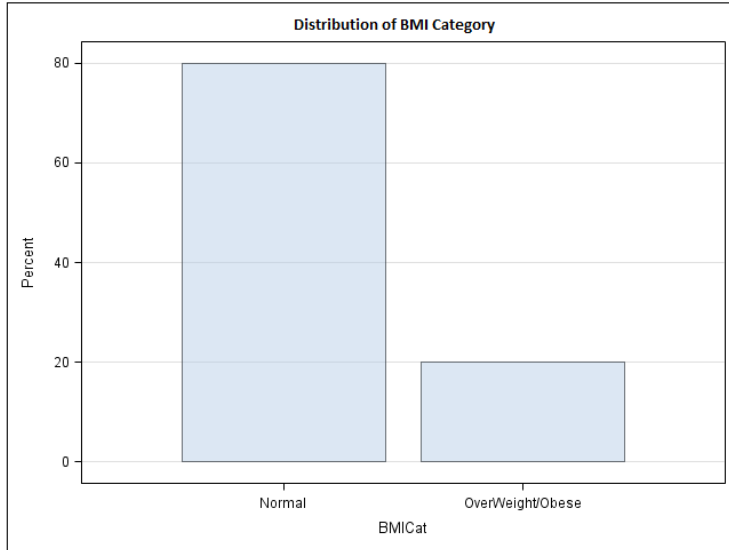
Figure 6: Bar Chart of the Distribution of BMI Category

BMI Category	Frequency/ %
Normal	544 79.94%
Overweight /Obese	137 20.06%

Table 10: BMI Category Frequencies
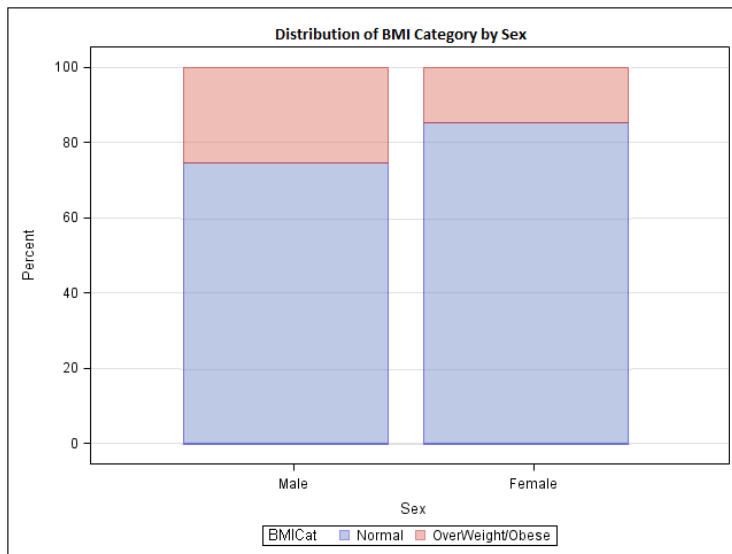
Figure 7: Bar Chart of BMI Category by Sex

	Normal	Overweight/Obese
Male	254 75.37%	288 24.63%
Female	83 84.46%	53 15.54%

Table 11: Cross Tabulation of BMI by Sex

Results

Univariate Logistic Model 1

To first model the data, I decided to look at a logistic model with blood pressure as the response. Logistic regression models are used when the response is categorical. It models the log odds of an event occurring. In the model I found, the response is log odds of being hypertensive. After examining various models, I chose to model the log odds of hypertension with the factors race, sex, and BMI. In this model, 622 of the 681 observations were used (for reasons such as missing observations, not all were used). A total of 253 people were hypertensive or pre-hypertensive while 369 were normal. Table 12 contains the relevant output. As displayed in Table 12, 34.7% of the observations were male while 65.29% were female. Also, 84.66% of the observations were White or Asian, 11.64% were Hispanic, and 3.71% defined themselves as "other".

Explanatory Variable	p-value	Percent or Mean (SD)	95% Odds Ratio
Race: Hispanic Other (REF = White/Asian)	0.8939 0.8037	84.66% 11.64% 3.71%	- (0.024, 1.907) (0.479, 9.323)
Sex: Female (REF = male)	<0.0001	34.7% 65.29%	- (0.006, 0.120)
BMI	<0.0001	22.9317 (3.2505)	(1.103, 1.430)

Table 12: Logistic Model Modeling Hypertension with Race, Sex, and BMI

Sex and BMI are both statistically significant variables with p-values that are less than a significance level of 0.01. An example of an interpretation of the odds ratio for BMI is as follows:

"We are 95% confident that the true odds of being hypertensive or pre-hypertensive are between 10% and 43% higher for each one unit increase in BMI."

Univariate Logistic Model 2

To compute the second univariate logistic model, I used PROC CATMOD in SAS. This logistic model is a generalized logit. I computed this model in order to better understand the model located in the Discrete Multivariate Model section. The response is the log odds of having a normal BMI. The form of the model appears in Equation 1:

$$log\left[\frac{Pr(BMI = Normal)}{Pr(BMI = Overweight/Obese)}\right] = \beta_0 + \beta_1 Sex$$

$$where \begin{cases} Sex = 1 : Male \\ Sex = -1 : Female \end{cases}$$

Equation 1: Logistic Model for BMI

The model estimates obtained can be found in Table 13. Sex is a significant explanatory variable with a p-value of 0.0034. The odds ratio for sex is 0.5632. To find this number, you multiply the parameter estimate for sex by two and exponentiate. The reason for multiplying by 2 is because SAS parameterizes this model with a +1/-1 parameterization. That is, to move from male to female, it is a two unit change. To interpret this odds ratio, we would say:

> "The odds of having a normal BMI are 43.7% lower for males when compared to females."

Analysis of Maximum Likelihood Estimates				
Parameter	Estimate	Chi-Square	Pr > ChiSq	Odds Ratios
Intercept	1.4056	206.22	<.0001	.
Sex	-0.2871	8.60	0.0034	0.5632

Table 13: Model Output for the Model predicting BMI from Sex

Discrete Multivariate Model

Recall my research question:

"Do particular lifestyle variables have an association with BMI and Blood Pressure?"

To investigate this research question I examined various explanatory variables such as activity level, eating preference, sleep quantity, sleep quality, videogame use, alcohol use, cigarette use, and marijuana use. In particular, I fit a model with sex (Male or Female), activity level (light or moderate), and eating preference (vegetarian or non-vegetarian). I chose these variables because of my interest in the association between diet and exercise with overall health.

My goal in particular was to simultaneously model BMI and Blood Pressure, using Multivariate Analysis. The benefits of Multivariate Analysis are controlling for Type 1 error and taking into account any correlation that exists between the response variables. However, because both BMI and Blood Pressure are categorical variables, an analysis technique called Discrete Multivariate Analysis was used. This means fitting separate logit functions for each response variable. This model takes the form in Equation 2 , where the responses are the log odds for each response, the betas are the parameter estimates for each explanatory variable, and the epsilon terms are the random error terms that are associated with generalized logit models.

$$\log(\vec{y_i}) = \vec{\beta_{ij}} \cdot \vec{x_j} + \vec{\varepsilon_i}$$

$$\log\begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} \beta_{10} & \beta_{11} & \beta_{12} & \beta_{13} \\ \beta_{20} & \beta_{21} & \beta_{22} & \beta_{23} \end{bmatrix} \begin{bmatrix} 1 \\ x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \end{bmatrix}$$

$$where \begin{cases} y = odds\ of\ response\ i \\ i = 1: BMI \\ i = 2: Blood\ Pressure \\ j = 1: Sex \\ j = 2: Activity\ Level \\ j = 3: Eating\ Preference \end{cases}$$

Equation 2: Discrete Multivariate Model

By simultaneously modeling both responses, the model takes into account any correlation that exists between BMI and Blood Pressure before fitting any model estimates. In Table 14 there is a test of independence for BMI and blood pressure. Based on the small p-value, we would reject the null hypothesis that BMI and blood pressure are independent. There is strong evidence that BMI and blood pressure are not independent. After taking into account any correlation, two separate logit models are then fit: one for BMI and one for Blood Pressure. These models are displayed in Equation 3.

Chi-Square Test of Independence	
Chi-Square	31.9716
Degrees of Freedom	1
Asymptotic Pr > ChiSq	<0.0001
Exact Pr > ChiSq	1.860E-8

Table 14: Output Testing the Relationship between BMI and Blood Pressure

$$\log\left[\frac{\Pr(BMI = Normal)}{\Pr(BMI = Overweight/Obese)}\right]$$
$$= \beta_0 + \beta_1 Sex + \beta_2 ActivityLevel + \beta_3 EatingPreference$$

$$\log\left[\frac{\Pr(BP = Hypertensive/Prehypertensive)}{\Pr(BP = Normal)}\right]$$
$$= \beta_0 + \beta_1 Sex + \beta_2 ActivityLevel + \beta_3 EatingPreference$$

$$where \begin{cases} Sex = 1: Male \\ Sex = -1: Female \\ Activity\ Level = 1: Light \\ Activity\ Level = -1: Moderate \\ EatingPreference = 1: NonVegetarian \\ EatingPreference = -1: Vegetarian \end{cases}$$

Equation 3: Logit Models for BMI and Blood Pressure

I obtained several tables of output. The first table is found in Table 15. While called an "Analysis of Variance" table, it is not an ANOVA table in the general form. Rather, it partitions variance among the response functions into different sources (Recall that traditional ANOVA partitions variance among the means). In this table, sex has a significant p-value of <0.0001. This means that the association between sex and at least one response variable (BMI, blood pressure) is significant. The source called "residual" is a way to check goodness of fit for a model. Here, we would like to have a large p-value to indicate that there is not enough evidence to determine that the model does not fit the data. With a p-value of 0.1143 there is not enough evidence to conclude that the model does not fit the data.

Analysis of Variance			
Source	DF	Chi-Square	Pr > ChiSq
Intercept	2	84.59	<.0001
Sex	2	113.90	<.0001
Activity Level	2	2.36	0.3075
Eating Preference	2	1.74	0.4190
Residual	8	12.93	0.1143

Table 15: ANOVA Table for Discrete Multivariate Model

The next tables of output are found in Tables 16 and 17. Table 16 contains the parameter estimates for a model with log odds of normal BMI as the response. In this model, sex is a significant explanatory variable with a p-value of 0.0115 and an odds ratio of 0.609. This means that the estimated odds of having a normal BMI decrease by 39.1% for males compared to females, after adjusting for Activity Level and Eating Preference.

Variable	Estimate	P-value	Odds Ratio
Sex (ref = male)	-0.2482	0.0115	0.609
Activity Level (ref = moderate)	-0.1329	0.1995	0.767
Eating Preference (ref = vegetarian)	0.0613	0.6580	1.130

Table 16: Logit 1: BMI

Table 17 contains the parameter estimates for the model with log odds of Pre-Hypertension/Hypertension as the response. Sex is a significant predictor for this model as well, with a p-value < 0.0001 and an odds ratio of 7.335. After adjusting for Activity Level and Eating Preference, the odds of being Hypertensive or Pre-Hypertensive are 7.335 times higher for males than females.

Variable	Estimate	P-value	Odds Ratio
Sex (ref = male)	0.9963	<0.0001	7.335
Activity Level (ref = moderate)	-0.0508	0.6041	0.903
Eating Preference (ref = vegetarian)	0.1465	0.2723	1.340

Table 17: Logit 2: Blood Pressure

There are limitations when working with a Discrete Multivariate Model. For example, there are sample size limitations. Each cross-tabulation table must have at least one observation in each cell. If there is no observation for a cell, the model will not compute and the result is error messages. Fortunately, in PROC CATMOD there is an ADDCELL option that allows you to increase each cell quantity by any number (I used one). This is similar to an Agresti-Coull +2/+4 adjustment, where we add 2 to each cell so that we increment both successes and failures.

Cluster Analysis

In addition to using Discrete Multivariate Analysis to model BMI and Blood Pressure, I also performed a cluster analysis to cluster variables based on their similarities to each other. To find the similarities between variables, I first transposed the data set so that I had 681 observations for each variable (if you will recall there were 681 people in the study) based on lifestyle variables, sex, and race. Then, I computed a measure of distance called Jaccard's distance, which is useful for measuring the distance between categorical data when other measures (such as Euclidean Distance) would not be appropriate. Jaccard's distance measures how dissimilar variables are. Once these dissimilarities are computed, then an appropriate dendrogram can be constructed to illustrate which variables are similar. The dendrogram I constructed appears in Figure 8. After examining the dendrogram it is interesting to note that Marijuana Use and Cigarette Use are grouped together. Farther up that cluster these two are also grouped with Alcohol Use. Sleep Quantity and Sleep Quality are also clustered together.
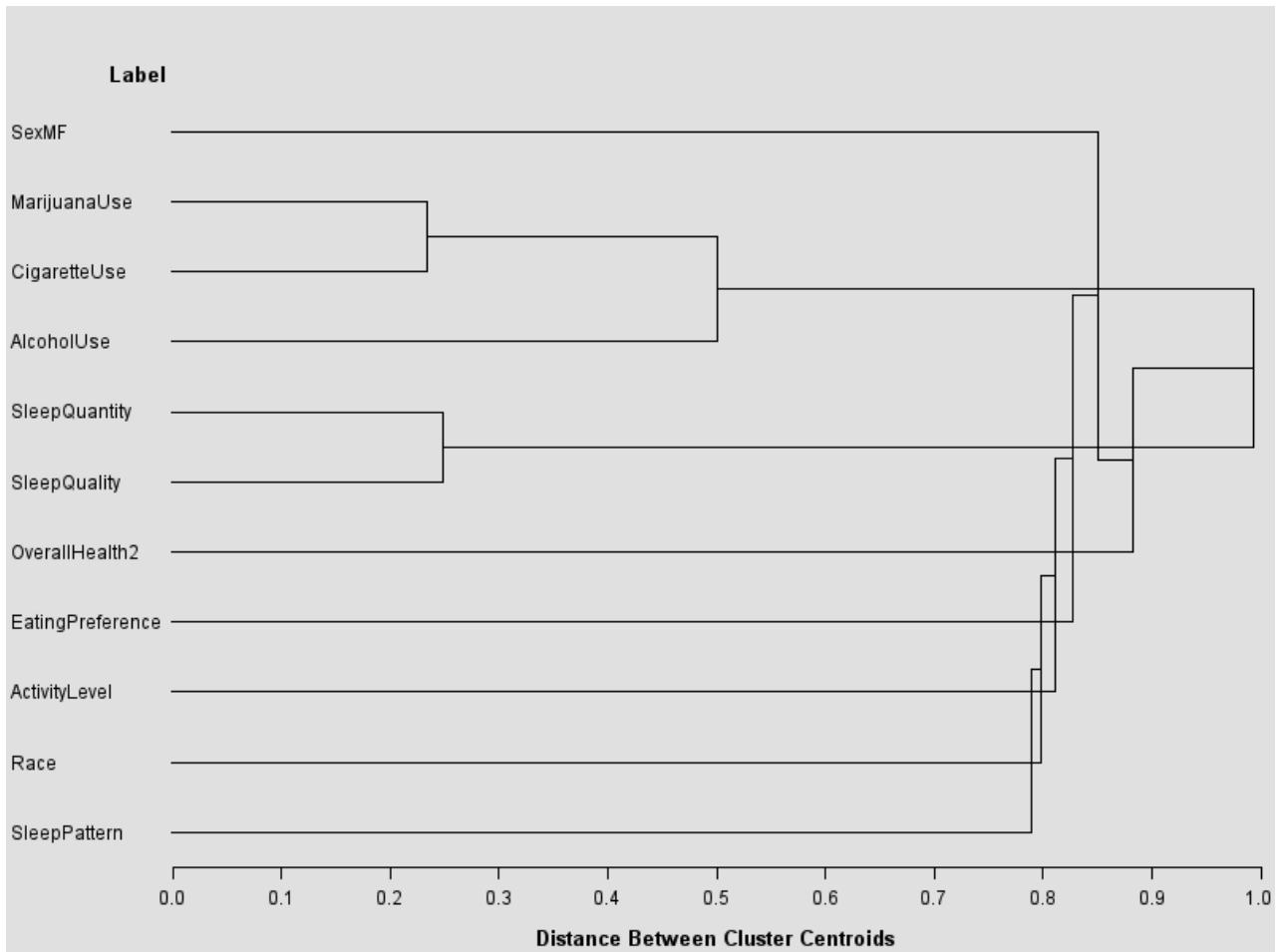
Figure 8: Dendrogram of Lifestyle Variables

Conclusion

My goal was to simultaneously model college students' BMI and blood pressure using various lifestyle variables. Using the FLASH data containing the first time physical assessment with its survey from that corresponding quarter, I was able to investigate this question.

In my investigation, I used Discrete Multivariate Analysis to compute two separate generalized logit functions for each response: BMI and blood pressure. By using Discrete Multivariate Analysis, I was able to take into account the relationship that existed between BMI and blood pressure. In each model, sex was a significant explanatory variable.

While an incredibly useful method, the sample size limitations that exist make it difficult to create models with multiple explanatory variables. I was only able to put at most three explanatory variables into the model without having to use a sample size adjustment procedure. For future analysis, it would be interesting to see the association of the overall health measures, BMI and blood pressure, with other lifestyle variables. Additionally, with further data cleaning, it might be interesting to add more lifestyle variables into the cluster analysis to see if more clusters form.

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Appendix

The code used in this project falls in the below table.

```sas
LIBNAME Datasets 'C:\Users\statlab05\Desktop\FLASH';


DATA fall09PA;   /*Reading in physical assessment data from all three
quarters*/
   SET Datasets.Fall2009pa;
   ID = F_2009_PA_ID;
RUN;

DATA spr10PA;
   SET Datasets.Spring2010pa;
   ID = S_2010_PA_ID;
RUN;

DATA fall10PA;
   SET Datasets.Fall2010pa;
   ID = F_2010_PA_ID;
RUN;

PROC SORT DATA=fall10PA;
by ID;
run;


DATA mergedPA;    /*Merging three quarters physical assessment data by ID*/
   MERGE fall09pa spr10pa fall10pa;
   BY ID;
RUN;

DATA Datasets.Flash_PA;   /*Selecting data from the quarter in which the
physical assessment was first taken*/
   SET MergedPA;
   LENGTH Quarter $ 11;
   IF ID=. THEN DELETE;
   IF F_2010_PA_ID~=.
       THEN DO;
               Quarter='Fall_2010';
               Date = F_2010_PA_Date;
               Residence = F_2010_PA_Residence;
               Floor = F_2010_PA_Floor;
               Age = F_2010_PA_Age;
               Gender = F_2010_PA_Gender;
               Exercise = F_2010_PA_Exercise;
               Alcohol = F_2010_PA_Alcohol;
               ABeverages = F_2010_PA_ABeverages;
               Height = F_2010_PA_HtAvg;
               Weight = F_2010_PA_WtAvg;
               Actlvl = F_2010_PA_ActLvl;
               Waist = F_2010_PA_WstAvg;
               RHR = F_2010_PA_RHRAvg;
```

```
                SBP = F_2010_PA_BPSAvg;
                DBP = F_2010_PA_BPDAvg;
                MBPS = F_2010_PA_MBPS;
                MBPD = F_2010_PA_MBPD;
                Wrist = F_2010_PA_Wrist;
                Side = F_2010_PA_Side;
                Resistance = F_2010_PA_Resistance;
                Reactance = F_2010_PA_Reactance;
                Frame = F_2010_PA_Frame;
                BMI = F_2010_PA_BMI;
                Bodyfat = F_2010_PA_Bodyfat;
        END;
 IF S_2010_PA_ID~=.
     THEN DO;
                Quarter ='Spring_2010';
                Date = S_2010_PA_Date;
                Residence = S_2010_PA_Residence;
                Floor = S_2010_PA_Floor;
                Age = S_2010_PA_Age;
                Gender = S_2010_PA_Gender;
                Exercise = S_2010_PA_Exercise;
                Alcohol = S_2010_PA_Alcohol;
                ABeverages = S_2010_PA_ABeverages;
                Height = S_2010_PA_HtAvg;
                Weight = S_2010_PA_WtAvg;
                Actlvl = S_2010_PA_ActLvl;
                Waist = S_2010_PA_WstAvg;
                RHR = S_2010_PA_RHRAvg;
                SBP = S_2010_PA_BPSAvg;
                DBP = S_2010_PA_BPDAvg;
                MBPS = S_2010_PA_MBPS;
                MBPD = S_2010_PA_MBPD;
                Wrist = S_2010_PA_Wrist;
                Side = S_2010_PA_Side;
                Resistance = S_2010_PA_Resistance;
                Reactance = S_2010_PA_Reactance;
                Frame = S_2010_PA_Frame;
                BMI = S_2010_PA_BMI;
                Bodyfat = S_2010_PA_Bodyfat;
     END;
 IF F_2009_PA_ID~=.
     THEN DO;
              Quarter ='Fall_2009';
                Date = F_2009_PA_Date;
                Residence = F_2009_PA_Residence;
                Floor = F_2009_PA_Floor;
                Age = F_2009_PA_Age;
                Gender = F_2009_PA_Gender;
                Exercise = F_2009_PA_Exercise;
                Alcohol = F_2009_PA_Alcohol;
                ABeverages = F_2009_PA_ABeverages;
                Height = F_2009_PA_HtAvg;
                Weight = F_2009_PA_WtAvg;
                Actlvl = F_2009_PA_ActLvl;
                Waist = F_2009_PA_WstAvg;
                RHR = F_2009_PA_RHRAvg;
```

```
                 SBP = F_2009_PA_BPSAvg;
                 DBP = F_2009_PA_BPDAvg;
                 MBPS = F_2009_PA_MBPS;
                 MBPD = F_2009_PA_MBPD;
                 Wrist = F_2009_PA_Wrist;
                 Side = F_2009_PA_Side;
                 Resistance = F_2009_PA_Resistance;
                 Reactance = F_2009_PA_Reactance;
                 Frame = F_2009_PA_Frame;
                 BMI = F_2009_PA_BMI;
                 Bodyfat = F_2009_PA_Bodyfat;
         END;
    KEEP ID Quarter Date Residence Floor Age Gender Exercise Alcohol
ABeverages
             Height Weight Actlvl Waist RHR SBP DBP MBPS MBPD Wrist Side
Resistance
             Reactance Frame BMI Bodyfat;
RUN;


DATA fall09SV;    /*Reading in survey data from all three quarters, creating
ID variable for merge*/
    SET Datasets.fall2009sv;
    ID = F_2009_SV_ID;
RUN;

DATA spr10SV;
    SET Datasets.spring2010sv;
    ID = S_2010_SV_ID;
RUN;

DATA fall10SV;
    SET Datasets.fall2010sv;
    ID = F_2010_SV_ID;
RUN;

DATA Datasets.PhysSurv;  /*Merging survey data and corresponding physical
assessment data, ...
                            creating new variable names, and keeping only
newly-named variables*/
    MERGE Datasets.Flash_PA fall09SV spr10SV fall10SV;
    BY ID;
    IF Quarter = '' THEN DELETE;
    ELSE IF Quarter = "Fall_2009" THEN DO;
         SurvDate = F_2009_SV_Date;
             BirthMonth = F_2009_SV_BM;
             BirthDay = F_2009_SV_BD;
             BirthYear = F_2009_SV_BY;
             Hispanic = F_2009_SV_5;
             AmIndian = F_2009_SV_6_1;
             Asian = F_2009_SV_6_2;
             Black = F_2009_SV_6_3;
             Hawaiian = F_2009_SV_6_4;
             White = F_2009_SV_6_5;
             ZipCode = F_2009_SV_7_W;
             *ZipCode = INPUT(ZipCodeC, 5.);
```

```
*ZipCode_W = F_2009_SV_7_W;
MotherEdu = F_2009_SV_8;
FatherEdu = F_2009_SV_9;
MotherInc = F_2009_SV_10;
FatherInc = F_2009_SV_11;
Residence2 = F_2009_SV_12;
Fund_Grants = F_2009_SV_13_1;
Fund_Schol = F_2009_SV_13_2;
Fund_Loans = F_2009_SV_13_3;
Fund_Self = F_2009_SV_13_4;
Fund_Family = F_2009_SV_13_5;
Fund_Other = F_2009_SV_13_W;
OverallHealth = F_2009_SV_14;
HeightFt = F_2009_SV_15_FT;
HeightIn = F_2009_SV_15_IN;
Weight = F_2009_SV_16;
WeightDesc = F_2009_SV_17;
WeightChange = F_2009_SV_18;
TabaccoCigarettes = F_2009_SV_19;
TabaccoOtherSmoke = F_2009_SV_20;
TabaccoSmokeless = F_2009_SV_21;
Marijuana = F_2009_SV_22;
Alcohol2 = F_2009_SV_23;
ABeverages2 = F_2009_SV_24;
AlchoholNum = F_2009_SV_25;
SexuallyActive = F_2009_SV_26;
SafeSex = F_2009_SV_27;
HormonalCont = F_2009_SV_28;
Pregnant = F_2009_SV_29;
SexContIssues = F_2009_SV_30;
SexContIssuesW = F_2009_SV_30_W;
DiffFallingAsleep = F_2009_SV_31;
DiffStayingAsleep = F_2009_SV_32;
OverallSleepQual = F_2009_SV_33;
OverallSleepQuan = F_2009_SV_34;
AvSleepWeekNights = F_2009_SV_35;
AvSleepWeekendNights = F_2009_SV_36;
NapWeekdays = F_2009_SV_37;
NapWeekdaysMin = F_2009_SV_37_MIN;
NapWeekends = F_2009_SV_38;
NapWeekendsMin = F_2009_SV_38_MIN;
EarlyBirdNightOwl = F_2009_SV_39;
AvTVMovieWeekday = F_2009_SV_40;
AvVideoGamesWeekday = F_2009_SV_41;
AvInternetWeekday = F_2009_SV_42;
AvTVMovieWeekend = F_2009_SV_43;
AvVideoGamesWeekend = F_2009_SV_43;
AvInternetWeekend = F_2009_SV_45;
TextsPerDayYN = F_2009_SV_46;
TextsPerDay_W = F_2009_SV_46_W;
    IF TextsPerDay_W = 0 THEN TextsPerDay = 0;
    ELSE IF TextsPerDay_W>0 AND TextsPerDay_W<=9 THEN TextsPerDay
=1;
    ELSE IF TextsPerDay_W>=10 AND TextsPerDay_W<=19 THEN
TextsPerDay =2;
    ELSE IF TextsPerDay_W>=20 AND TextsPerDay_W<=29 THEN
```

```
TextsPerDay =3;
              ELSE IF TextsPerDay_W>=30 AND TextsPerDay_W<=49 THEN
TextsPerDay =4;
              ELSE IF TextsPerDay_W>=50 AND TextsPerDay_W<=74 THEN
TextsPerDay =5;
              ELSE IF TextsPerDay_W>=75 AND TextsPerDay_W<=99 THEN
TextsPerDay =6;
              ELSE IF TextsPerDay_W>=100 AND TextsPerDay_W<=149 THEN
TextsPerDay =7;
              ELSE IF TextsPerDay_W>=150 AND TextsPerDay_W<=199 THEN
TextsPerDay =8;
              ELSE IF TextsPerDay_W>=200 AND TextsPerDay_W<=499 THEN
TextsPerDay =9;
              ELSE IF TextsPerDay_W>=500 THEN TextsPerDay =10;
              ELSE TextsPerDay= TextsPerDay_W;
          VigPhysActDays = F_2009_SV_47;
          VigPhysActHrs = F_2009_SV_48_HR;
          VigPhysActMins = F_2009_SV_48_MIN;
          ModPhysActDays = F_2009_SV_49;
          ModPhysActHrs = F_2009_SV_50_HR;
          ModPhysActMins = F_2009_SV_50_MIN;
          WalkingDays = F_2009_SV_51;
          WalkingHrs = F_2009_SV_52_HR;
          WalkingMins = F_2009_SV_52_MIN;
          SittingHrs = F_2009_SV_53_HR;
          SittingMins = F_2009_SV_53_MIN;
          AthleticsCP = F_2009_SV_54;
          AthleticsHS = F_2009_SV_55;
          StrengthTrain = F_2009_SV_56;
          UpsetUnexpected = F_2009_SV_57;
          UnableControl = F_2009_SV_58;
          NervousStressed = F_2009_SV_59;
          DealtSuccHassles = F_2009_SV_60;
          CopingWithChanges = F_2009_SV_61;
          ConfPersonalProblems = F_2009_SV_62;
          GoingYourWay = F_2009_SV_63;
          CouldNotCope = F_2009_SV_64;
          AbleControlIrr = F_2009_SV_65;
          OnTopOfThings = F_2009_SV_66;
          Angered = F_2009_SV_67;
          ThinkingAbout = F_2009_SV_68;
          AbleControlTime = F_2009_SV_69;
          DiffPilingUp = F_2009_SV_70;
          OnCampusDiningHall = F_2009_SV_71;
          OnCampusRestaurant = F_2009_SV_72;
          OffCampusRestaurant = F_2009_SV_73;
          AlternDiet = F_2009_SV_74;
          CowMilk = F_2009_SV_75;
          Milk_Soy = F_2009_SV_76_1;
          Milk_Rice = F_2009_SV_76_2;
          Milk_Almond = F_2009_SV_76_3;
          Milk_Other =F_2009_SV_76_4;
          Milk_DontDrink = F_2009_SV_76_5;
          SoftDrinks = F_2009_SV_77;
          CoffeeAdditions= F_2009_SV_78;
          CoffeeSPEC = F_2009_SV_79;
```

```
ColdCereal = F_2009_SV_80;
Milk = F_2009_SV_81;
BaconSausage = F_2009_SV_82;
ProcessedMeat = F_2009_SV_83;
Hamburgers = F_2009_SV_84;
Pizza = F_2009_SV_85;
DeliSandwich = F_2009_SV_86;
FrenchFries = F_2009_SV_87;
Potatoes = F_2009_SV_88;
Beans = F_2009_SV_89;
Seafood = F_2009_SV_90;
RedMeat = F_2009_SV_91;
Chicken = F_2009_SV_92;
PeanutButter = F_2009_SV_93;
Jelly = F_2009_SV_94;
MayoSaladDressing = F_2009_SV_95;
Fruit = F_2009_SV_96;
LettuceSalad = F_2009_SV_97;
OtherVegies = F_2009_SV_98;
WhiteBread = F_2009_SV_99;
WheatWholeGrainBread = F_2009_SV_100;
Pasta = F_2009_SV_101;
NutsSeeds = F_2009_SV_102;
Chips = F_2009_SV_103;
BakedGoods = F_2009_SV_104;
FrozenDesserts = F_2009_SV_105;
FruitJuice100Per = F_2009_SV_106;
FruitFlavoredDrinks = F_2009_SV_107;
SoftDrinksRegular = F_2009_SV_108;
SoftDrinksDietLight = F_2009_SV_109;
CoffeeOrCoffeeBevs = F_2009_SV_110;
EnergyDrinks = F_2009_SV_111;
PlainWater = F_2009_SV_112;
DietarySupplements = F_2009_SV_113;
Supplem_None = F_2009_SV_114_1;
Supplem_MultiVit = F_2009_SV_114_2;
Supplem_BetaCarotene = F_2009_SV_114_3;
Supplem_FolicAcid = F_2009_SV_114_4;
Supplem_BVitamins = F_2009_SV_114_5;
Supplem_VitaminC = F_2009_SV_114_6;
Supplem_VitaminD = F_2009_SV_114_7;
Supplem_W1 = F_2009_SV_114_W_1;
Supplem_W2 = F_2009_SV_114_W_2;
Supplem_W3 = F_2009_SV_114_W_3;
Minerals_None = F_2009_SV_115_1;
Minerals_Multi = F_2009_SV_115_2;
Minerals_Calcium = F_2009_SV_115_3;
Minerals_Iron = F_2009_SV_115_4;
Minerals_Magnesium = F_2009_SV_115_5;
Minerals_Potassium = F_2009_SV_115_6;
Minerals_W1 = F_2009_SV_115_W_1;
Minerals_W2 = F_2009_SV_115_W_2;
Minerals_W3 = F_2009_SV_115_W_3;
HerbSupp_None = F_2009_SV_116_1;
HerbSupp_Echinacea = F_2009_SV_116_2;
HerbSupp_Ginko = F_2009_SV_116_3;
```

```
            HerbSupp_Ginseng = F_2009_SV_116_4;
            HerbSupp_StJohnsWort = F_2009_SV_116_5;
            HerbSupp_Guarana = F_2009_SV_116_6;
            HerbSupp_W1 = F_2009_SV_116_W_1;
            HerbSupp_W2 = F_2009_SV_116_W_2;
            HerbSupp_W3 = F_2009_SV_116_W_3;
            SuppOther_None = F_2009_SV_117_1;
            SuppOther_Creatine = F_2009_SV_117_2;
            SuppOther_Ephedrine = F_2009_SV_117_3;
            SuppOther_DHEA = F_2009_SV_117_4;
            SuppOther_Whey = F_2009_SV_117_5;
            SuppOther_AminoAcid = F_2009_SV_117_6;
            SuppOther_Omega3 = F_2009_SV_117_7;
            SuppOther_Fiber = F_2009_SV_117_8;
            SuppOther_WeightLoss = F_2009_SV_117_9;
            SuppOther_WeightGain = F_2009_SV_117_10;
            SuppOther_W1 = F_2009_SV_117_W_1;
            SuppOther_W2 = F_2009_SV_117_W_2;
            SuppOther_W3 = F_2009_SV_117_W_3;
            PrescriptionMeds = F_2009_SV_118;
            PrescriptionMedsWriteIn = F_2009_SV_118_W;
            TypicalSunExposure = F_2009_SV_119;
            OutdoorsTimeWeekdays = F_2009_SV_120;
            OutdoorsTimeWeekends = F_2009_SV_121;
            Sun_Face = F_2009_SV_122_1;
            Sun_Neck = F_2009_SV_122_2;
            Sun_Shoulders = F_2009_SV_122_3;
            Sun_Back = F_2009_SV_122_4;
            Sun_UpperArms = F_2009_SV_122_5;
            Sun_LowerArms = F_2009_SV_122_6;
            Sun_Hands = F_2009_SV_122_7;
            Sun_Stomach = F_2009_SV_122_8;
            Sun_UpperThigh = F_2009_SV_122_9;
            Sun_LowerThigh = F_2009_SV_122_10;
            Sun_Feet = F_2009_SV_122_11;
            Sunscreen = F_2009_SV_123;
            TanningBed = F_2009_SV_124;
            TanningBedDays = F_2009_SV_125;
            TanningBedDays_W = F_2009_SV_125_W;
            Flash_DormFlyer = F_2009_SV_126_1;
            Flash_Facebook = F_2009_SV_126_2;
            Flash_Email = F_2009_SV_126_3;
            Flash_WordOfMouth = F_2009_SV_126_4;
            Flash_RA = F_2009_SV_126_5;
            Flash_Commercial = F_2009_SV_126_6;
            Flash_W = F_2009_SV_126_W;
    END;

    ELSE IF Quarter="Spring_2010" THEN DO;
            SurvDate = S_2010_SV_Date;
            BirthMonth = S_2010_SV_BM;
            BirthDay = S_2010_SV_BD;
            BirthYear = S_2010_SV_BY;
            Hispanic = S_2010_SV_5;
            AmIndian = S_2010_SV_6_1;
            Asian = S_2010_SV_6_2;
```

```
Black = S_2010_SV_6_3;
Hawaiian = S_2010_SV_6_4;
White = S_2010_SV_6_5;
ZipCode = S_2010_SV_7_W;
*ZipCode = INPUT(ZipCodeC, 5.);
*ZipCode_W = S_2010_SV_7_W;
MotherEdu = S_2010_SV_8;
FatherEdu = S_2010_SV_9;
MotherInc = S_2010_SV_10;
FatherInc = S_2010_SV_11;
Residence2 = S_2010_SV_12;
Fund_Grants = S_2010_SV_13_1;
Fund_Schol = S_2010_SV_13_2;
Fund_Loans = S_2010_SV_13_3;
Fund_Self = S_2010_SV_13_4;
Fund_Family = S_2010_SV_13_5;
Fund_Other = S_2010_SV_13_W;
OverallHealth = S_2010_SV_14;
HeightFt = S_2010_SV_15_FT;
HeightIn = S_2010_SV_15_IN;
Weight = S_2010_SV_16;
WeightDesc = S_2010_SV_17;
WeightChange = S_2010_SV_18;
TabaccoCigarettes = S_2010_SV_19;
TabaccoOtherSmoke = S_2010_SV_20;
TabaccoSmokeless = S_2010_SV_21;
Marijuana = S_2010_SV_22;
Alcohol2 = S_2010_SV_23;
ABeverages2 = S_2010_SV_24;
AlchoholNum = S_2010_SV_25;
SexuallyActive = S_2010_SV_26;
SafeSex = S_2010_SV_27;
HormonalCont = S_2010_SV_28;
Pregnant = S_2010_SV_29;
SexContIssues = S_2010_SV_30;
SexContIssuesW = S_2010_SV_30_W;
DiffFallingAsleep = S_2010_SV_31;
DiffStayingAsleep = S_2010_SV_32;
OverallSleepQual = S_2010_SV_33;
OverallSleepQuan = S_2010_SV_34;
AvSleepWeekNights = S_2010_SV_35;
AvSleepWeekendNights = S_2010_SV_36;
NapWeekdaysYN = S_2010_SV_37;
     IF NapWeekdaysYN>0 THEN DO;
   NapWeekdays=1;
          NapWeekdaysMin=NapWeekdaysYN;
        END;
        ELSE NapWeekdays=0;
NapWeekendsYN = S_2010_SV_38;
        IF NapWeekendsYN>0 THEN DO;
   NapWeekends=1;
          NapWeekendsMin=NapWeekendsYN;
        END;
        ELSE NapWeekends=0;
EarlyBirdNightOwl = S_2010_SV_39;
AvTVMovieWeekday = S_2010_SV_40;
```

```
AvVideoGamesWeekday = S_2010_SV_41;
AvInternetWeekday = S_2010_SV_42;
AvTVMovieWeekend = S_2010_SV_43;
AvVideoGamesWeekend = S_2010_SV_43;
AvInternetWeekend = S_2010_SV_45;
TextsPerDay = S_2010_SV_46;
VigPhysActDays = S_2010_SV_47;
VigPhysActHrs = S_2010_SV_48_HR;
VigPhysActMins = S_2010_SV_48_MIN;
ModPhysActDays = S_2010_SV_49;
ModPhysActHrs = S_2010_SV_50_HR;
ModPhysActMins = S_2010_SV_50_MIN;
WalkingDays = S_2010_SV_51;
WalkingHrs = S_2010_SV_52_HR;
WalkingMins = S_2010_SV_52_MIN;
SittingHrs = S_2010_SV_53_HR;
SittingMins = S_2010_SV_53_MIN;
AthleticsCP = S_2010_SV_54;
AthleticsHS = S_2010_SV_55;
StrengthTrain = S_2010_SV_56;
UpsetUnexpected = S_2010_SV_57;
UnableControl = S_2010_SV_58;
NervousStressed = S_2010_SV_59;
DealtSuccHassles = S_2010_SV_60;
CopingWithChanges = S_2010_SV_61;
ConfPersonalProblems = S_2010_SV_62;
GoingYourWay = S_2010_SV_63;
CouldNotCope = S_2010_SV_64;
AbleControlIrr = S_2010_SV_65;
OnTopOfThings = S_2010_SV_66;
Angered = S_2010_SV_67;
ThinkingAbout = S_2010_SV_68;
AbleControlTime = S_2010_SV_69;
DiffPilingUp = S_2010_SV_70;
OnCampusDiningHall = S_2010_SV_71;
OnCampusRestaurant = S_2010_SV_72;
OffCampusRestaurant = S_2010_SV_73;
AlternDiet = S_2010_SV_74;
CowMilk = S_2010_SV_75;
Milk_Soy = S_2010_SV_76_1;
Milk_Rice = S_2010_SV_76_2;
Milk_Almond = S_2010_SV_76_3;
Milk_Other = S_2010_SV_76_4;
Milk_DontDrink = S_2010_SV_76_5;
SoftDrinks = S_2010_SV_77;
CoffeeAdditions= S_2010_SV_78;
CoffeeSpec = S_2010_SV_79;
ColdCereal = S_2010_SV_80;
Milk = S_2010_SV_81;
BaconSausage = S_2010_SV_82;
ProcessedMeat = S_2010_SV_83;
Hamburgers = S_2010_SV_84;
Pizza = S_2010_SV_85;
DeliSandwich = S_2010_SV_86;
FrenchFries = S_2010_SV_87;
Potatoes = S_2010_SV_88;
```

```
            Beans = S_2010_SV_89;
            Seafood = S_2010_SV_90;
            RedMeat = S_2010_SV_91;
            Chicken = S_2010_SV_92;
            PeanutButter = S_2010_SV_93;
            Jelly = S_2010_SV_94;
            MayoSaladDressing = S_2010_SV_95;
            Fruit = S_2010_SV_96;
            LettuceSalad = S_2010_SV_97;
            OtherVegies = S_2010_SV_98;
            WhiteBread = S_2010_SV_99;
            WheatWholeGrainBread = S_2010_SV_100;
            Pasta = S_2010_SV_101;
            NutsSeeds = S_2010_SV_102;
            Chips = S_2010_SV_103;
            BakedGoods = S_2010_SV_104;
            FrozenDesserts = S_2010_SV_105;
            FruitJuice100Per = S_2010_SV_106;
            FruitFlavoredDrinks = S_2010_SV_107;
            SoftDrinksRegular = S_2010_SV_108;
            SoftDrinksDietLight = S_2010_SV_109;
            CoffeeOrCoffeeBevs = S_2010_SV_110;
            EnergyDrinks = S_2010_SV_111;
            PlainWater = S_2010_SV_112;
            DietarySupplements = S_2010_SV_113;
            Supplem_None = S_2010_SV_114_1;
            Supplem_MultiVit = S_2010_SV_114_2;
            Supplem_BetaCarotene = S_2010_SV_114_3;
            Supplem_FolicAcid = S_2010_SV_114_4;
            Supplem_BVitamins = S_2010_SV_114_5;
            Supplem_VitaminC = S_2010_SV_114_6;
            Supplem_VitaminD = S_2010_SV_114_7;
            Supplem_W1 = S_2010_SV_114_W_1;
            Supplem_W2 = S_2010_SV_114_W_2;
            Supplem_W3 = S_2010_SV_114_W_3;
            Minerals_None = S_2010_SV_115_1;
            Minerals_Multi = S_2010_SV_115_2;
            Minerals_Calcium = S_2010_SV_115_3;
            Minerals_Iron = S_2010_SV_115_4;
            Minerals_Magnesium = S_2010_SV_115_5;
            Minerals_Potassium = S_2010_SV_115_6;
            Minerals_W1 = S_2010_SV_115_W_1;
            Minerals_W2 = S_2010_SV_115_W_2;
            Minerals_W3 = S_2010_SV_115_W_3;
            HerbSupp_None = S_2010_SV_116_1;
            HerbSupp_Echinacea = S_2010_SV_116_2;
            HerbSupp_Ginko = S_2010_SV_116_3;
            HerbSupp_Ginseng = S_2010_SV_116_4;
            HerbSupp_StJohnsWort = S_2010_SV_116_5;
            HerbSupp_Guarana = S_2010_SV_116_6;
            HerbSupp_W1 = S_2010_SV_116_W_1;
            HerbSupp_W2 = S_2010_SV_116_W_2;
            HerbSupp_W3 = S_2010_SV_116_W_3;
            SuppOther_None = S_2010_SV_117_1;
            SuppOther_Creatine = S_2010_SV_117_2;
            SuppOther_Ephedrine = S_2010_SV_117_3;
```

```sas
            SuppOther_DHEA = S_2010_SV_117_4;
            SuppOther_Whey = S_2010_SV_117_5;
            SuppOther_AminoAcid = S_2010_SV_117_6;
            SuppOther_Omega3 = S_2010_SV_117_7;
            SuppOther_Fiber = S_2010_SV_117_8;
            SuppOther_WeightLoss = S_2010_SV_117_9;
            SuppOther_WeightGain = S_2010_SV_117_10;
            SuppOther_W1 = S_2010_SV_117_W_1;
            SuppOther_W2 = S_2010_SV_117_W_2;
            PrescriptionMeds = S_2010_SV_118;
            PrescriptionMeds_W = S_2010_SV_118_W;
            TypicalSunExposure = S_2010_SV_119;
            OutdoorsTimeWeekdays = S_2010_SV_120;
            OutdoorsTimeWeekends = S_2010_SV_121;
            Sun_Face = S_2010_SV_122_1;
            Sun_Neck = S_2010_SV_122_2;
            Sun_Shoulders = S_2010_SV_122_3;
            Sun_Back = S_2010_SV_122_4;
            Sun_UpperArms = S_2010_SV_122_5;
            Sun_LowerArms = S_2010_SV_122_6;
            Sun_Hands = S_2010_SV_122_7;
            Sun_Stomach = S_2010_SV_122_8;
            Sun_UpperThigh = S_2010_SV_122_9;
            Sun_LowerThigh = S_2010_SV_122_10;
            Sun_Feet = S_2010_SV_122_11;
            Sunscreen = S_2010_SV_123;
            TanningBed = S_2010_SV_124;
            TanningBedDays = S_2010_SV_125;
            TanningBedDays_W = S_2010_SV_125_W;
            Flash_DormFlyer = S_2010_SV_126_1;
            Flash_Facebook = S_2010_SV_126_2;
            Flash_Email = S_2010_SV_126_3;
            Flash_WordOfMouth = S_2010_SV_126_4;
            Flash_RA = S_2010_SV_126_5;
            Flash_Commercial = S_2010_SV_126_6;
            Flash_W = S_2010_SV_126_W;
   END;

   ELSE IF Quarter="Fall_2010" THEN DO;
            SurvDate = F_2010_SV_Date;
            BirthMonth = F_2010_SV_BM;
            BirthDay = F_2010_SV_BD;
            BirthYear = F_2010_SV_BY;
            Hispanic = F_2010_SV_5;
            AmIndian = F_2010_SV_6_1;
            Asian = F_2010_SV_6_2;
            Black = F_2010_SV_6_3;
            Hawaiian = F_2010_SV_6_4;
            White = F_2010_SV_6_5;
            ZipCode = F_2010_SV_7;
            *ZipCode = INPUT(ZipCodeC, 5.);
            *ZipCode_W = F_2010_SV_7_W;
            MotherEdu = F_2010_SV_8;
            FatherEdu = F_2010_SV_9;
            MotherInc = F_2010_SV_10;
            FatherInc = F_2010_SV_11;
```

```
        Residence2 = F_2010_SV_12;
        Fund_Grants = F_2010_SV_13_1;
        Fund_Schol = F_2010_SV_13_2;
        Fund_Loans = F_2010_SV_13_3;
        Fund_Self = F_2010_SV_13_4;
        Fund_Family = F_2010_SV_13_5;
        Fund_Other = F_2010_SV_13_W;
        OverallHealth = F_2010_SV_14;
        HeightFt = F_2010_SV_15_FT;
        HeightIn = F_2010_SV_15_IN;
        Weight = F_2010_SV_16;
        WeightDesc = F_2010_SV_17;
        WeightChange = F_2010_SV_18;
        TabaccoCigarettes = F_2010_SV_19;
        TabaccoOtherSmoke = F_2010_SV_20;
        TabaccoSmokeless = F_2010_SV_21;
        Marijuana = F_2010_SV_22;
        Alcohol2 = F_2010_SV_23;
        ABeverages2 = F_2010_SV_24;
        AlchoholNum = F_2010_SV_25;
        SexuallyActive = F_2010_SV_26;
        SafeSex = F_2010_SV_27;
        HormonalCont = F_2010_SV_28;
        Pregnant = F_2010_SV_29;
        SexContIssues = F_2010_SV_30;
        SexContIssuesW = F_2010_SV_30_W;
        DiffFallingAsleep = F_2010_SV_31;
        DiffStayingAsleep = F_2010_SV_32;
        OverallSleepQual = F_2010_SV_33;
        OverallSleepQuan = F_2010_SV_34;
        AvSleepWeekNights = F_2010_SV_35;
        AvSleepWeekendNights = F_2010_SV_36;
        NapWeekdaysYN = F_2010_SV_37;
            IF NapWeekdaysYN>0 THEN DO;
          NapWeekdays=1;
                NapWeekdaysMin=NapWeekdaysYN;
              END;
              ELSE NapWeekdays=0;
        NapWeekendsYN = F_2010_SV_38;
              IF NapWeekendsYN>0 THEN DO;
          NapWeekends=1;
                NapWeekendsMin=NapWeekendsYN;
              END;
              ELSE NapWeekends=0;
        EarlyBirdNightOwl = F_2010_SV_39;
        AvTVMovieWeekday = F_2010_SV_40;
        AvVideoGamesWeekday = F_2010_SV_41;
        AvInternetWeekday = F_2010_SV_42;
        AvTVMovieWeekend = F_2010_SV_43;
        AvVideoGamesWeekend = F_2010_SV_43;
        AvInternetWeekend = F_2010_SV_45;
        TextsPerDay = F_2010_SV_46;
        VigPhysActDays = F_2010_SV_47;
        VigPhysActHrs = F_2010_SV_48_HR;
        VigPhysActMins = F_2010_SV_48_MIN;
        ModPhysActDays = F_2010_SV_49;
```

```
            ModPhysActHrs = F_2010_SV_50_HR;
            ModPhysActMins = F_2010_SV_50_MIN;
            WalkingDays = F_2010_SV_51;
            WalkingHrs = F_2010_SV_52_HR;
            WalkingMins = F_2010_SV_52_MIN;
            SittingHrs = F_2010_SV_53_HR;
            SittingMins = F_2010_SV_53_MIN;
            AthleticsCP = F_2010_SV_54;
            AthleticsHS = F_2010_SV_55;
            StrengthTrain = F_2010_SV_56;
            UpsetUnexpected = F_2010_SV_57;
            UnableControl = F_2010_SV_58;
            NervousStressed = F_2010_SV_59;
            DealtSuccHassles = F_2010_SV_60;
            CopingWithChanges = F_2010_SV_61;
            ConfPersonalProblems = F_2010_SV_62;
            GoingYourWay = F_2010_SV_63;
            CouldNotCope = F_2010_SV_64;
            AbleControlIrr = F_2010_SV_65;
            OnTopOfThings = F_2010_SV_66;
            Angered = F_2010_SV_67;
            ThinkingAbout = F_2010_SV_68;
            AbleControlTime = F_2010_SV_69;
            DiffPilingUp = F_2010_SV_70;
            OnCampusDiningHall = F_2010_SV_71;
            OnCampusRestaurant = F_2010_SV_72;
            OffCampusRestaurant = F_2010_SV_73;
            AlternDiet = F_2010_SV_74;
            CowMilk = F_2010_SV_75;
            Milk_Soy = F_2010_SV_76_1;
            Milk_Rice = F_2010_SV_76_2;
            Milk_Almond = F_2010_SV_76_3;
            Milk_Other = F_2010_SV_76_4;
            Milk_Unknown_1 = F_2010_SV_76_6;
            Milk_Unknown_2 = F_2010_SV_76_7;
            Milk_Unknown_3 = F_2010_SV_76_8;
            Milk_DontDrink = F_2010_SV_76_9;          /**/
            SoftDrinks = F_2010_SV_77;
            CoffeeAdditions= F_2010_SV_78;
            CoffeeSpec = F_2010_SV_79;
            ColdCereal = F_2010_SV_80;
            Milk = F_2010_SV_81;
            BaconSausage = F_2010_SV_82;
            ProcessedMeat = F_2010_SV_83;
            Hamburgers = F_2010_SV_84;
            Pizza = F_2010_SV_85;
            DeliSandwich = F_2010_SV_86;
            FrenchFries = F_2010_SV_87;
            Potatoes = F_2010_SV_88;
            Beans = F_2010_SV_89;
            Seafood = F_2010_SV_90;
            RedMeat = F_2010_SV_91;
            Chicken = F_2010_SV_92;
            PeanutButter = F_2010_SV_93;
            Jelly = F_2010_SV_94;
            MayoSaladDressing = F_2010_SV_95;
```

```
            Fruit = F_2010_SV_96;
            LettuceSalad = F_2010_SV_97;
            OtherVegies = F_2010_SV_98;
            WhiteBread = F_2010_SV_99;
            WheatWholeGrainBread = F_2010_SV_100;
            Pasta = F_2010_SV_101;
            NutsSeeds = F_2010_SV_102;
            Chips = F_2010_SV_103;
            BakedGoods = F_2010_SV_104;
            FrozenDesserts = F_2010_SV_105;
            FruitJuice100Per = F_2010_SV_106;
            FruitFlavoredDrinks = F_2010_SV_107;
            SoftDrinksRegular = F_2010_SV_108;
            SoftDrinksDietLight = F_2010_SV_109;
            CoffeeOrCoffeeBevs = F_2010_SV_110;
            EnergyDrinks = F_2010_SV_111;
            PlainWater = F_2010_SV_112;
            DietarySupplements = F_2010_SV_113;
            Supplem_None = F_2010_SV_114_A;
            Supplem_MultiVit = F_2010_SV_114_2;
            Supplem_BetaCarotene = F_2010_SV_114_3;
            Supplem_FolicAcid = F_2010_SV_114_4;
            Supplem_BVitamins = F_2010_SV_114_5;
            Supplem_VitaminC = F_2010_SV_114_6;
            Supplem_VitaminD = F_2010_SV_114_7;
            Supplem_Unknown = F_2010_SV_114_8;
            Supplem_W1 = F_2010_SV_114_W;
            /*Supplem_W2 = F_2010_SV_114_W_2;
            Supplem_W3 = F_2010_SV_114_W_3;   No more than one write-in*/
            Minerals_None = F_2010_SV_115_A;
            Minerals_Multi = F_2010_SV_115_2;
            Minerals_Calcium = F_2010_SV_115_3;
            Minerals_Iron = F_2010_SV_115_4;
            Minerals_Magnesium = F_2010_SV_115_5;
            Minerals_Potassium = F_2010_SV_115_6;
            Minerals_Unknown = F_2010_SV_115_7;
            Minerals_W1 = F_2010_SV_115_W;
            /*Minerals_W2 = F_2010_SV_115_W_2;
            Minerals_W3 = F_2010_SV_115_W_3;*/
            HerbSupp_None = F_2010_SV_116_A;
            HerbSupp_Echinacea = F_2010_SV_116_2;
            HerbSupp_Ginko = F_2010_SV_116_3;
            HerbSupp_Ginseng = F_2010_SV_116_4;
            HerbSupp_StJohnsWort = F_2010_SV_116_5;
            HerbSupp_Guarana = F_2010_SV_116_6;
            HerbSupp_Unknown = F_2010_SV_116_7;
            HerbSupp_W1 = F_2010_SV_116_W;
            /*HerbSupp_W2 = F_2010_SV_116_W_2;
            HerbSupp_W3 = F_2010_SV_116_W_3;*/
            SuppOther_None = F_2010_SV_117_A;
            SuppOther_Creatine = F_2010_SV_117_2;
            SuppOther_Ephedrine = F_2010_SV_117_3;
            SuppOther_DHEA = F_2010_SV_117_4;
            SuppOther_Whey = F_2010_SV_117_5;
            SuppOther_AminoAcid = F_2010_SV_117_6;
            SuppOther_Omega3 = F_2010_SV_117_7;
```

```
            SuppOther_Fiber = F_2010_SV_117_8;
            SuppOther_WeightLoss = F_2010_SV_117_9;
            SuppOther_WeightGain = F_2010_SV_117_10;
            SuppOther_Unknown = F_2010_SV_117_11;
            SuppOther_W1 = F_2010_SV_117_W;
            /*SuppOther_W2 = F_2010_SV_117_W_2;*/
            PrescriptionMeds = F_2010_SV_118;
            PrescriptionMeds_W = F_2010_SV_118_W;
            TypicalSunExposure = F_2010_SV_119;
            OutdoorsTimeWeekdays = F_2010_SV_120;
            OutdoorsTimeWeekends = F_2010_SV_121;
            Sun_Face = F_2010_SV_122_1;
            Sun_Neck = F_2010_SV_122_2;
            Sun_Shoulders = F_2010_SV_122_3;
            Sun_Back = F_2010_SV_122_4;
            Sun_UpperArms = F_2010_SV_122_5;
            Sun_LowerArms = F_2010_SV_122_6;
            Sun_Hands = F_2010_SV_122_7;
            Sun_Stomach = F_2010_SV_122_8;
            Sun_UpperThigh = F_2010_SV_122_9;
            Sun_LowerThigh = F_2010_SV_122_10;
            Sun_Feet = F_2010_SV_122_11;
            Sunscreen = F_2010_SV_123;
            TanningBed = F_2010_SV_124;
            TanningBedDays = F_2010_SV_125;
            TanningBedDays_W = F_2010_SV_125_W;
            Flash_DormFlyer = F_2010_SV_126_1;
            Flash_Facebook = F_2010_SV_126_2;
            Flash_Email = F_2010_SV_126_3;
            Flash_WordOfMouth = F_2010_SV_126_4;
            Flash_RA = F_2010_SV_126_5;
            Flash_Commercial = F_2010_SV_126_6;
            Flash_Unknown = F_2010_SV_126_7;
            Flash_W = S_2010_SV_126_W;
    END;

    KEEP /* Keeps Survey Variables to use in further analysis*/
            SurvDate BirthMonth BirthDay BirthYear Hispanic AmIndian Asian
Black Hawaiian White
            ZipCode MotherEdu FatherEdu MotherInc FatherInc Residence2
Fund_Grants
            Fund_Schol Fund_Loans Fund_Self Fund_Family Fund_Other
OverallHealth HeightFt HeightIn
            Weight WeightDesc WeightChange TabaccoCigarettes
TabaccoOtherSmoke TabaccoSmokeless
            Marijuana Alcohol2 ABeverages2 AlchoholNum SexuallyActive SafeSex
HormonalCont Pregnant
            SexContIssues SexContIssuesW DiffFallingAsleep DiffStayingAsleep
OverallSleepQual
         OverallSleepQuan AvSleepWeekNights AvSleepWeekendNights NapWeekdays
NapWeekdaysMin NapWeekends NapWeekendsMin
            EarlyBirdNightOwl AvTVMovieWeekday AvVideoGamesWeekday
AvInternetWeekday AvTVMovieWeekend
            AvVideoGamesWeekend AvInternetWeekend TextsPerDay VigPhysActDays
VigPhysActHrs
            VigPhysActMins ModPhysActDays ModPhysActHrs ModPhysActMins
```

```
WalkingDays WalkingHrs
            WalkingMins SittingHrs SittingMins AthleticsCP AthleticsHS
StrengthTrain UpsetUnexpected
            UnableControl NervousStressed DealtSuccHassles CopingWithChanges
ConfPersonalProblems
            GoingYourWay CouldNotCope AbleControlIrr OnTopOfThings Angered
ThinkingAbout AbleControlTime
            DiffPilingUp OnCampusDiningHall OnCampusRestaurant
OffCampusRestaurant AlternDiet CowMilk
            Milk_Soy Milk_Rice Milk_Almond Milk_Other Milk_DontDrink
SoftDrinks CoffeeAdditions
            CoffeeSpec ColdCereal Milk BaconSausage ProcessedMeat Hamburgers
Pizza DeliSandwich
            FrenchFries Potatoes Beans Seafood RedMeat Chicken PeanutButter
Jelly MayoSaladDressing
            Fruit LettuceSalad OtherVegies WhiteBread WheatWholeGrainBread
Pasta NutsSeeds Chips
            BakedGoods FrozenDesserts FruitJuice100Per FruitFlavoredDrinks
SoftDrinksRegular
            SoftDrinksDietLight CoffeeOrCoffeeBevs EnergyDrinks PlainWater
DietarySupplements
            Supplem_None Supplem_MultiVit Supplem_BetaCarotene
Supplem_FolicAcid Supplem_BVitamins
            Supplem_VitaminC Supplem_VitaminD Supplem_W1 Supplem_W2
Supplem_W3 Minerals_None
            Minerals_Multi Minerals_Calcium Minerals_Iron Minerals_Magnesium
Minerals_Potassium
            Minerals_W1 Minerals_W2 Minerals_W3 HerbSupp_None
HerbSupp_Echinacea HerbSupp_Ginko
            HerbSupp_Ginseng HerbSupp_StJohnsWort HerbSupp_Guarana
HerbSupp_W1 HerbSupp_W2 HerbSupp_W3
            SuppOther_None SuppOther_Creatine SuppOther_Ephedrine
SuppOther_DHEA SuppOther_Whey
            SuppOther_AminoAcid SuppOther_Omega3 SuppOther_Fiber
SuppOther_WeightLoss SuppOther_WeightGain
            SuppOther_W1 SuppOther_W2 SuppOther_W3 PrescriptionMeds
PrescriptionMeds_W TypicalSunExposure
            OutdoorsTimeWeekdays OutdoorsTimeWeekends Sun_Face Sun_Neck
Sun_Shoulders Sun_Back Sun_UpperArms
            Sun_LowerArms Sun_Hands Sun_Stomach Sun_UpperThigh Sun_LowerThigh
Sun_Feet Sunscreen TanningBed
            TanningBedDays TanningBedDays_W Flash_DormFlyer Flash_Facebook
Flash_Email Flash_WordOfMouth
            Flash_RA Flash_Commercial Flash_W

            /*Unknown Survey (Fall 2010) Variables*/
            Milk_Unknown_1 Milk_Unknown_2 Milk_Unknown_3 Supplem_Unknown
Minerals_Unknown HerbSupp_Unknown
            SuppOther_Unknown Flash_Unknown

            /*Physical Assessment Variables*/
            ID Quarter Date Residence Floor Age Gender Exercise Alcohol
ABeverages
            Height Weight Actlvl Waist RHR SBP DBP MBPS MBPD Wrist Side
Resistance
            Reactance Frame BMI Bodyfat;
```

```
RUN;


DATA Datasets.Dropped;  /*Data set with observations/IDs that were dropped*/
    SET Datasets.PhysSurv;
      WHERE SurvDate=.;
RUN;

DATA Datasets.Fixing;    /*Altering problemed variables, adding BPclass, etc.
*/
    SET Datasets.PhysSurv;
    WHERE SurvDate>0;

      length BPclass $ 18;

      IF SBP>=140 OR DBP>=90 THEN BPclass="Hypertensive";
      ELSE IF SBP>=120 OR DBP>=80 THEN BPclass="Pre-Hypertensive";
      ELSE BPclass = "Normal";

      IF BPclass = "Hypertensive" THEN BPgroup = "Hypertensive/Pre-
Hypertensive";
      ELSE IF BPclass = "Pre-Hypertensive" THEN BPgroup = "Hypertensive/Pre-
Hypertensive";
      ELSE IF BPclass = "Normal" THEN BPgroup = "Normal";

      Birthdate = MDY(BirthMonth,BirthDay,BirthYear);
      DROP BirthMonth BirthDay BirthYear;

      Sex=Gender;
      DROP Gender;

    Height_In = 12*HeightFt + HeightIn;
      DROP HeightFt HeightIn;

      IF quarter = 'Fall_2010' and hispanic = 1 THEN hispanicNew = 0;
      ELSE IF quarter = 'Fall_2010' and hispanic = 2 THEN hispanicNew = 1;
      ELSE hispanicNew = hispanic;
    DROP Hispanic;

      /*Still need to fix nap variables*/

RUN;

/*looks at frequency for both Blood Pressure Class - 3 levels and Blood
Pressure Group - 2 levels*/
proc freq data = datasets.fixing;
      tables BPclass BPgroup;
run;

DATA Datasets.Fixing2;    /*Fixing hispanic, categorizing race, generalizing
vegetarian,creating stress score...*/
   SET Datasets.Fixing;
            *Create new data set with only 3 race categories – Hispanic,
White/Asian, Other;
            race_count = HispanicNew + AmIndian+Asian+Black+Hawaiian+White;
```

```
              *If Hispanic=1, regardless of other race identifiers,
race=Hispanic;
              if HispanicNew = 1 then RaceNum=2;
              else if HispanicNew = 0 then do;
                    *Leave RaceNum empty for the 7 obs with all 0's;
                    if HispanicNew = 0 and
                       AmIndian = 0 and
                       Asian = 0 and
                       Black = 0 and
                       Hawaiian = 0 and
                       White = 0 then RaceNum = .;
                    else if race_count >=3 then RaceNum = 3;
                    else if race_count = 2 then do;
                       if White= 1 and Asian = 1 then RaceNum = 1;
                       else RaceNum = 3;
                    end;
                    else if White = 1 or Asian = 1 then RaceNum = 1;
                    /*All others go to Other*/
                    else RaceNum = 3;
              end;
              drop race_count;

              if AlternDiet>=1 then EatingPref=1;
              else if AlternDiet = . then EatingPref= .;
              else EatingPref=0;

       array ScoreReverse (7)
           DealtSuccHassles
           CopingWithChanges
           ConfPersonalProblems
           GoingYourWay
           AbleControlIrr
           OnTopOfThings
           AbleControlTime;

       /* Array containing new variables for the new
       reversed scores */
       array Reversed (7)
           DSH
           CWC
           CPP
           GYW
           ACI
           OTOT
           ACT;

    do i = 1 to 7; /* converts the given score to a new score based on
wording of the question */
           if ScoreReverse (i) = 4 then Reversed (i) = 0;
           else if ScoreReverse (i) = 3 then Reversed (i) = 1;
           else if ScoreReverse (i) = 2 then Reversed (i) = 2;
           else if ScoreReverse (i) = 1 then Reversed (i) = 3;
           else if ScoreReverse (i) = 0 then Reversed (i) = 4;
    end;
```

```sas
        StressScore = DSH + CWC + CPP + GYW + ACI + OTOT+ ACT
                        + UpsetUnexpected + UnableControl + NervousStressed
                     + CouldNotCope + Angered + ThinkingAbout + DiffPilingUp;
RUN;



DATA Datasets.AddLabels;  /*Adding labels to variables*/
   SET Datasets.Fixing2;

                    *SURVEY DATA LABELS;
         LABEL Survdate = 'Date of Survey'
                    BirthDate= 'Date of Birth'
                    RaceNum = 'Race'
                    HispanicNew = 'Hispanic or Latino'
                    AmIndian = 'American Indian or Alaskan Native'
                    Asian = 'Asian'
                    Black = 'African American'
                    Hawaiian = 'Native Hawaiian or Pacific Islander'
                    White = 'White'
                    ZipCode = 'Home Zip Code'
                    MotherEdu = 'Education of Mother'
                    FatherEdu = 'Education of Father'
                    MotherInc = 'Income of Mother'
                    FatherInc = 'Income of Father'
                    Residence2 = 'Current Cal Poly Residence'
                    Fund_Grants = 'Funding Education with Grants'
                    Fund_Schol = 'Funding Education with Scholarships'
                    Fund_Loans = 'Funding Education with Loans'
                    Fund_Self = 'Self Funded Education'
                    Fund_Family = 'Family Funded Education'
                    Fund_Other = 'Other Funding for Education'
                    OverallHealth = 'Overall Health'
                    Height_In = 'Self-Reported Height in Inches'
                    Weight = 'Current Weight in Pounds'
                    WeightDesc = 'Description of Weight'
                    WeightChange = 'Desired Weight Change'
                    TabaccoCigarettes = 'Smoke Cigarettes'
                    TabaccoOtherSmoke = 'Other Smoking Tabacco'
                    TabaccoSmokeless = 'Smokeless Tabacco'
                    Marijuana = 'Marijuana Use'
                    Alcohol2 = 'Alcohol Consumption'
                    ABeverages2 = 'Five or More Alcoholic Drinks in One
Sitting'
                    AlchoholNum = 'Number of Alcoholic Drinks Consumed'
                    SexuallyActive = 'Sexually Active'
                    SafeSex = 'Practices Safe Sex'
                    HormonalCont = 'Uses Hormonal Contraception'
                    Pregnant = 'Currently Pregnant'
                    SexContIssues = 'Place to Seek Help/Advice Related to Sex
and Contraception'
                    SexContIssuesW = 'Place to Seek Help/Advice Related to Sex
and Contraception-Write In'
                    DiffFallingAsleep = 'Difficulty in Falling Asleep'
                    DiffStayingAsleep = 'Difficulty in Staying Asleep'
                    OverallSleepQual = 'Overall Sleep Quality'
                    OverallSleepQuan = 'Overall Sleep Quantity'
```

```
                    AvSleepWeekNights = 'Average Hours of Sleep on Weeknights'
                    AvSleepWeekendNights = 'Average Hours of Sleep on Weekends'
                    NapWeekdays = 'Naps on Weekdays'
                    NapWeekdaysMin = 'Minutes per Weekday Nap'
                    NapWeekends = 'Naps of Weekends'
                    NapWeekendsMin = 'Minutes per Weekend Nap'
                    EarlyBirdNightOwl = 'Early Bird or Night Owl'
                    AvTVMovieWeekday = 'Average Hours of TV and Movies Per Day
During Weekdays'
                    AvVideoGamesWeekday = 'Average Hours of Video Games Per Day
During Weekdays'
                    AvInternetWeekday = 'Average Hours Spent on Internet Per
Day During Weekdays'
                    AvTVMovieWeekend = 'Average Hours of TV and Movies Per Day
During Weekends'
                    AvVideoGamesWeekend = 'Average Hours of Video Games Per Day
During Weekends'
                    AvInternetWeekend = 'Average Hours Spent on Internet Per
Day During Weekends'
                    TextsPerDay = 'Number of Text Messages Sent Per Day'
                    VigPhysActDays = 'Vigorous Physical Activity in Last 7
Days'
                    VigPhysActHrs = 'Hours Per Day Spent on Vigorous Physical
Activity'
                    VigPhysActMins = 'Minutes Per Day Spent on Vigorous
Physical Activity'
                    ModPhysActDays = 'Moderate Physical Activity in Last 7
Days'
                    ModPhysActHrs = 'Hours Per Day Spent on Moderate Physical
Activity'
                    ModPhysActMins = 'Minutes Per Day Spent on Moderate
Physical Activity'
                    WalkingDays = 'Walked For at Least 10 Minutes in the last 7
Days'
                    WalkingHrs = 'Hours Per Day Spent Walking'
                    WalkingMins = 'Minutes Per Day Spent Walking'
                    SittingHrs = 'Hours Spent Sitting on Weekday'
                    SittingMins = 'Minutes Spent Sitting on Weekday'
                    AthleticsCP = 'Participate in Athletics at Cal Poly'
                    AthleticsHS = 'Participated in Athletics in High School'
                    StrengthTrain = 'Days spent Strength Training in Last 7
Days'
                    UpsetUnexpected = 'Upset Due to Unexpected Events'
                    UnableControl = 'Felt Unable to Control Important Things in
Life'
                    NervousStressed = 'Felt Nervous and Stressed'
                    DealtSuccHassles = 'Dealt Successfully with Irritating Life
Hassles'
                    CopingWithChanges = 'Effectively Coped with Important
Changes in Life'
                    ConfPersonalProblems = 'Felt Confident About Ability to
Handle Personal Problems'
                    GoingYourWay = 'Felt Things Were Going Your Way'
                    CouldNotCope = 'Could Not Cope with Things That Had to Be
Done'
                    AbleControlIrr = 'Able to Control Irritations in Life'
```

```
                    OnTopOfThings = 'Felt on Top of Things'
                    Angered = 'Angered Because of Things that Happened That
Were Outside of Control'
                    ThinkingAbout = 'Thinking About Things that Happened
Outside of Control'
                    AbleControlTime = 'Able to Control the Way You Spend Time'
                    DiffPilingUp = 'Felt Unable to Overcome Piled Up
Difficulties'
                    StressScore = 'Stress Score'
                    OnCampusDiningHall = 'Times Per Week Ate at On Campus
Dining Hall'
                    OnCampusRestaurant = 'Times Per Week Ate at On Campus
Restaurant'
                    OffCampusRestaurant = 'Times Per Week Ate at Off Campus
Restaurant'
                    AlternDiet = 'Type of Vegetarian'
                    EatingPref = 'Vegetarian'
                    CowMilk = 'Type of Cow Milk Consumed'
                    Milk_Soy = 'Consumes Soy Milk'
                    Milk_Rice = 'Consumes Rice Milk'
                    Milk_Almond = 'Consumes Almond Milk'
                    Milk_Other = 'Consumes Other Milk'
                    Milk_DontDrink = 'Does Not Drink Milk'
                    SoftDrinks = 'Type of Soft Drinks Consumed'
                    CoffeeAdditions = 'Additions to Coffee'
                    CoffeeSpec = 'Consumes Specialty Coffee Drinks'
                    ColdCereal = 'Consumption of Cold Cereal'
                    Milk = 'Consumption of Milk'
                    BaconSausage = 'Consumption of Bacon or Sausage'
                    ProcessedMeat = 'Consumption of Processed Meats'
                    Hamburgers = 'Consumption of Hamburgers'
                    Pizza = 'Consumptions of Pizza'
                    DeliSandwich = 'Consumption of Deli Sandwiches'
                    FrenchFries = 'Consumption of French Fries'
                    Potatoes = 'Consumption of Potatoes'
                    Beans = 'Consumption of Cooked or Canned Beans'
                    Seafood = 'Consumption of Fish and Seafood'
                    RedMeat = 'Consumption of Red Meat'
                    Chicken = 'Consumption of Chicken'
                    PeanutButter = 'Consumption of Peanut Butter'
                    Jelly = 'Consumption of Jelly, Jam, Preserves'
                    MayoSaladDressing = 'Consumption of Mayonnaise and Salad
Dressings'
                    Fruit = 'Consumption of Fruit'
                    LettuceSalad = 'Consumption of Lettuce or Green Leafy
Salad'
                    OtherVegies = 'Consumption of Other Vegetables'
                    WhiteBread = 'Consumption of White Bread'
                    WheatWholeGrainBread = 'Consumption of Whole Wheat or Whole
Grain Bread'
                    Pasta = 'Consumption of Pasta'
                    NutsSeeds = 'Consumption of Nuts and Seeds'
                    Chips = 'Consumption of Chips'
                    BakedGoods = 'Consumption of Baked Goods'
                    FrozenDesserts = 'Consumption of Frozen Desserts'
                    FruitJuice100Per = 'Consumption of 100 Percent Fruit Juice'
```

```
                   FruitFlavoredDrinks = 'Consumption of Fruit Flavored
Drinks'
                   SoftDrinksRegular = 'Consumption of Soft Drinks'
                   SoftDrinksDietLight = 'Consumption of Diet and Light Soft
Drinks'
                   CoffeeOrCoffeeBevs = 'Consumption of Coffee or Specialty
Coffee Beverages'
                   EnergyDrinks = 'Consumption of Energy Drinks'
                   PlainWater = 'Consumption of Plain Water'
                   DietarySupplements = 'Took Dietary Supplements in Last 30
Days'
                   Supplem_None = 'Did Not Take Dietary Supplements in Last 30
Days'
                   Supplem_MultiVit = 'Took a Multivitamin Supplement'
                   Supplem_BetaCarotene = 'Took a Beta-Carotene Supplement'
                   Supplem_FolicAcid = 'Took a Folic Acid Supplement'
                   Supplem_BVitamins = 'Took a B Vitamin Supplement'
                   Supplem_VitaminC = 'Took a Vitamin C Supplement'
                   Supplem_VitaminD = 'Took a Vitamin D Supplement'
                   Supplem_W1 = 'Supplement Write in 1'
                   Supplem_W2 = 'Supplement Write in 2'
                   Supplem_W3 = 'Supplement Write in 3'
                   Minerals_None = 'Did Not Take a Mineral Supplement'
                   Minerals_Multi = 'Took a Multi Mineral Supplement'
                   Minerals_Calcium = 'Took a Calcium Mineral Supplement'
                   Minerals_Iron = 'Took an Iron Mineral Supplement'
                   Minerals_Magnesium = 'Took a Magnesium Mineral Supplement'
                   Minerals_Potassium = 'Took a Potassium Mineral Supplement'
                   Minerals_W1 = 'Mineral Supplement Write in 1'
                   Minerals_W2 = 'Mineral Supplement Write in 2'
                   Minerals_W3 = 'Mineral Supplement Write in 3'
                   HerbSupp_None = 'Did Not Take an Herbal Supplement'
                   HerbSupp_Echinacea = 'Took an Echinacea Herbal Supplement'
                   HerbSupp_Ginko = 'Took a Ginko Herbal Supplement'
                   HerbSupp_Ginseng = 'Took a Ginseng Herbal Supplement'
                   HerbSupp_StJohnsWort = 'Took a St. Johns Wort Supplement'
                   HerbSupp_Guarana = 'Took a Guarana Herbal Supplement'
                   HerbSupp_W1 = 'Herbal Supplement Write in 1'
                   HerbSupp_W2 = 'Herbal Supplement Write in 2'
                   HerbSupp_W3= 'Herbal Supplement Write in 3'
                   SuppOther_None = 'Did Not Take Other Supplements'
                   SuppOther_Creatine = 'Took a Creatine Supplement'
                   SuppOther_Ephedrine = 'Took an Ephedrine Supplement'
                   SuppOther_DHEA = 'Took a DHEA Supplement'
                   SuppOther_Whey = 'Took a Whey Supplement'
                   SuppOther_AminoAcid = 'Took an Amino Acid Supplement'
                   SuppOther_Omega3 = 'Took an Omega-3 Supplement'
                   SuppOther_Fiber = 'Took a Fiber Supplement'
                   SuppOther_WeightLoss = 'Took a Weight Loss Supplement'
                   SuppOther_WeightGain = 'Took a Weight Gain Supplement'
                   SuppOther_W1 = 'Other Supplements Write in 1'
                   SuppOther_W2 = 'Other Supplements Write in 2'
                   SuppOther_W3 = 'Other Supplements Write in 3'
                   PrescriptionMeds = 'Takes Prescription Medication'
                   PrescriptionMeds_W = 'Prescription Medication Write In'
                   TypicalSunExposure = 'Typical Sun Exposure'
```

```
                        OutdoorsTimeWeekdays = 'Time Spent Outdoors on Weekdays'
                        OutdoorsTimeWeekends = 'Time Spent Outdoors on Weekends'
                        Sun_Face = 'Had Sun Exposure on Face'
                        Sun_Neck = 'Had Sun Exposure on Neck'
                        Sun_Shoulders = 'Had Sun Exposure on Shoulders'
                        Sun_Back = 'Had Sun Exposure on Back'
                        Sun_UpperArms = 'Had Sun Exposure on Upper Arms'
                        Sun_LowerArms = 'Had Sun Exposure on Lower Arms'
                        Sun_Hands = 'Had Sun Exposure on Hands'
                        Sun_Stomach = 'Had Sun Exposure on Stomach'
                        Sun_UpperThigh = 'Had Sun Exposure on Upper Thighs'
                        Sun_LowerThigh = 'Had Sun Expsure on Lower Thighs'
                        Sun_Feet = 'Had Sun Exposure on Feet'
                        Sunscreen = 'Use of Sunscreen'
                        TanningBed = 'Use of Tanning Beds'
                        TanningBedDays = 'Number of Days in Last Month Tanning Bed
Was Used'
                        TanningBedDays_W = 'Tanning Bed Days Write In'
                        Flash_DormFlyer = 'Heard About FLASH Through Dorm Flyer'
                        Flash_Facebook = 'Heard About FLASH Through Facebook'
                        Flash_Email = 'Heard About FLASH Through Email'
                        Flash_WordOfMouth = 'Heard About FLASH Through Word of
Wouth'
                        Flash_RA = 'Heard About FLASH Through Resident Advisor'
                        Flash_Commercial = 'Heard About FLASH Through FLASH
Commercial'
                        Flash_W = 'Heard About FlASH Write In';

                        *PHYSICAL ASSESSMENT LABELS;
      LABEL  Quarter = 'Quarter Physical Assessment Was Taken'
                Date = 'Date of Physical Assessment'
                Residence = 'Current Cal Poly Residence Hall'
                Floor = 'Floor Of Current Cal Poly Residence Hall'
                Age = 'Age of Participent'
                Gender = 'Gender of Participent'
                Exercise = 'Strenous Exercise in Last 8 Hours'
                Alcohol = 'Consumed Alcohol In Last 10 Hours'
                ABeverages = 'Consumed 5+ Alcoholic Beverages'
                Height = 'Average Height of Participent'
                Weight = 'Average Weight of Participent'
                Actlvl = 'Activity Level of Participent'
                Waist = 'Average Waist Measurement'
                RHR = 'Average Resting Heart Rate'
                SBP = 'Average Systolic Blood Pressure'
                DBP = 'Average Diastolic Blood Pressure'
                MBPS = 'Average Manual Blood Pressure Systolic'
                MBPD = 'Average Manual Blood Pressure Diastolic'
                Wrist = 'Wrist Circumference of Participent'
                Side = 'Side of Body of Wrist Measurement of Participent'
                Resistance = 'Resistance of Participent'
                Reactance = 'Reactance of Participent'
                Frame = 'Type of Body Frame of Participent'
                BMI = 'Body Mass Index of Participent'
                Bodyfat = 'Percentage of Body Fat of Participent';

RUN;
```

```sas
options fmtsearch=(Datasets);

PROC FORMAT library = Datasets;
      value TimeScale
            0 = 'Never'
            1 = '1-3x last month'
            2 = '1-2x/wk'
            3 = '3-4x/wk'
            4 = '5-6x/wk'
            5 = '1x/day'
            6 = '2x/day'
            7 = '3x/day'
            8 = '4+ x/day'
            . = "Non-response";

      value Gender
            0 = 'Male'
            1 = 'Female'
           99 = 'N/A';

      value YesNo
            1 = 'Yes'
            0 = 'No'
            2 = "Don't know"
            99 = 'N/A';

      value No
           0 = 'No';

      value Education
            1 = 'Not a HS Graduate'
            2 = 'HS Graduate'
            3 = 'Some college'
            4 = 'College graduate'
            5 = 'Completed Graduate school'
           99 = 'N/A';

      value Income
            1 = 'No Income'
            2 = 'Less than $10000'
            3 = '$10 to $24999'
            4 = '$25 to $49999'
           5 = '$50 to $74,999'
           6 = '$75 to $100000'
           7 = 'More than $100,000'
           99 = 'N/A';

      /*value CurrentResidence
            1 = 'Yosemite'
           2 = 'Sierra Madre'
           3 = 'Santa Lucia/North Mountain'
           4 = 'Trinity'
           5 = 'Tenaya'
           6 = 'Fremont'
           7 = 'Muir'
```

```
        8 = 'Sequoia'
        9 = 'Cerro Vista Apts'
        10 = "Parent's Home"
        11 = 'Poly canyon'
        12 = 'Stenner Glen'
        13 = 'Fraternity/sorority'
        14 = 'Other off campus housing'
        99 = 'N/A';*/

    value GoodScale
        1 = 'Very bad'
        2 = 'Bad'
        3 = 'Good'
        4 = 'Very Good'
        5 = 'Excellent';

    value Weight
        1 = 'Very underweight'
        2 = 'Slightly underweight'
        3 = 'About the right weight'
        4 = 'Slightly overweight'
        5 = 'Very overweight';

    value TryWeight
        1 = 'I am not trying to do anything'
        2 = 'Stay the same weight'
        3 = 'Lose weight'
        4 = 'Gain weight';

    value Use
        0 = 'Have never used'
        5 = 'Current User'
        103 = 'Current and Past Users'
        99 = 'Have used, but not in the last 30 days';

    value DrinkFive
        0 = 'Did not drink'
        99 = 'I drank, but never more than 5 or more drinks';

    value DrinkNum
        0 = 'Did not drink'
        99 = 'So many that I can not remember';

    value SafeSex
        0 = 'No sex'
        1 = 'Never'
        2 = 'Rarely'
        3 = 'Sometimes'
        4 = 'Fairly often'
        5 = 'Very often'
        6 = 'Always';

    value OftenScale
        0 = 'Never'
        1 = 'Almost never'
        2 = 'Sometimes'
```

```
           3 = 'Fairly often'
           4 = 'Very often';

     value Often
         1 = 'Never'
           2 = 'Almost never'
           3 = 'Sometimes'
           4 = 'Fairly often'
           5 = 'Very often';

     value AvgScale
           1 = 'Very bad'
           2 = 'Bad'
           3 = 'Average'
           4 = 'Good'
           5 = 'Excellent';

     value Sleep
           13 = '13 or more hours';

     value Bird
           1 = 'Early Bird'
           2 = 'Night Owl';

     value TV
           99 = 'I did not watch any'
           77 = 'Less than one hour'
           13 = '13 hours or more';

     value Game
           99 = 'I did not spend any time gaming'
           77 = 'Less than one hour'
           13 = '13 hours or more';

     value Int
           99 = 'I did not spend any time on the internet'
           77 = 'Less than one hour'
           13 = '13 hours or more';

     value Text
           1 = '0-9'
           2 = '10-19'
           3 = '20-29'
           4 = '30-49'
           5 = '50-74'
           6 = '75-99'
           7 = '100-149'
           8 = '150-199'
           9 = '200-499'
           10 = '500 or more';

     value EatPref
           0 = 'Non vegetarian'
           1 = 'Vegan'
           2 = 'Lacto vegetarian'
           3 = 'Pesca vegetarian'
```

```
        4 = 'Lacto-ovo-vegetarian'
        5 = 'Pollo vegetarian'
        6 = 'Semi/Flexi vegetarian';

value Milk
        1 = 'Whole'
        2 = '2%'
        3 = '1%'
        4 = 'Non-fat/skim'
        9 = "N/A don't drink";

value OtherMilk
        1 = 'Soy milk'
        2 = 'Rice milk'
        3 = 'Almond milk'
        4 = 'Other'
        9 = "Don't drink";

value SoftDrinks
        1 = 'Regular'
        2 = 'Diet, light, zero calorie'
        9 = 'Do not drink';

value Coffee
        1 = 'Black'
        2 = 'Sugar, no cream'
        3 = 'Cream only (no sugar, no artificial sweetener)'
        4 = 'Sugar and cream'
        5 = 'Artificial sweetener, no cream'
        6 = 'Artificial sweetener and cream'
        9 = "Don't drink";

value Vitamins
        1 = 'Multi vitamin'
        2 = 'Beta Carotene'
        3 = 'Folic Acid'
        4 = 'B vitamins'
        5 = 'Vitamin C'
        6 = 'Vitamin D'
        99 = 'None';

value Minerals
        1 = 'Multi mineral'
        2 = 'Calcium'
        3 = 'Iron'
        4 = 'Magnesium'
        5 = 'Potassium'
        99 = 'None';

value Herbs
        1 = 'Enchinacea'
        2 = 'Ginkgo'
        3 = 'Ginseng'
        4 = "St. John's wort"
        5 = 'Guarana'
        99 = 'None';
```

```
value Supplements
      1 = 'Creatine'
      2 = 'Ephedrine'
      3 = 'DHEA'
      4 = 'Whey'
      5 = 'Amino Acids'
      6 = 'Omega-3'
      7 = 'Fiber'
      8 = 'Weight-loss'
      9 = 'Weight-gain'
      99 = 'None';

value LowHigh
      1 = 'Low'
      2 = 'High';

value Minutes
      1 = 'Less than 30 mins'
      2 = '30-59 mins'
      3 = '60-90 mins'
      4 = 'More than 90 mins';

value SunExp
      1 = 'Face'
      2 = 'Neck'
      3 = 'Shoulders'
      4 = 'Back'
      5 = 'Upper arms'
      6 = 'Lower arms'
      7 = 'Hands'
      8 = 'Stomach'
      9 = 'Upper thighs'
      10 = 'Lower legs'
      11 = 'Feet';

value Sunscreen
      1 = 'Rarely'
      2 = 'Whenever I go outdoors for extended periods'
      3 = 'Whenever I go outdoors'
      4 = 'Always';

value Tanning
      0 = 'Almost never'
      1 = 'Yes'
      99 = 'No, never';

value Flash
      1 = 'Dorm flyer'
      2 = 'Facebook'
      3 = 'Email'
      4 = 'Word of mouth'
      5 = 'Resident advisor'
      6 = 'FLASH commercial';

value Level
```

```
            1 = "Very light"
            2 = "Light"
            3 = "Moderate"
            4 = "Heavy"
            5 = "Exceptional";

        value Frame
            1 = "Small"
            2 = "Medium"
            3 = "Large";

        value RaceNum
            1 = "White/Asian"
            2 = "Hispanic"
            3 = "Other";

RUN;


DATA Datasets.FREQvars;
    RETAIN
            /*Physical Assessment Variables*/
            ID Quarter Age Sex Exercise Alcohol ABeverages Actlvl Frame
BPgroup BMI BPclass

            /*Survey Variables*/
            RaceNum HispanicNew AmIndian Asian Black Hawaiian White
            MotherEdu FatherEdu MotherInc FatherInc Residence2
            Fund_Grants Fund_Schol Fund_Loans Fund_Self Fund_Family
Fund_Other
            OverallHealth WeightDesc WeightChange
            TabaccoCigarettes TabaccoOtherSmoke TabaccoSmokeless Marijuana
Alcohol2 ABeverages2 AlchoholNum
            SexuallyActive SafeSex HormonalCont Pregnant SexContIssues
SexContIssuesW
            DiffFallingAsleep DiffStayingAsleep OverallSleepQual
OverallSleepQuan /*AvSleepWeekNights AvSleepWeekendNights*/
            NapWeekdays /*NapWeekdaysMin*/ NapWeekends /*NapWeekendsMin*/
EarlyBirdNightOwl
            /*AvTVMovieWeekday*/ AvVideoGamesWeekday /*AvInternetWeekday
AvTVMovieWeekend*/
            AvVideoGamesWeekend /*AvInternetWeekend*/ TextsPerDay
VigPhysActDays /*VigPhysActHrs
            VigPhysActMins*/ ModPhysActDays /*ModPhysActHrs ModPhysActMins*/
WalkingDays /*WalkingHrs
            WalkingMins SittingHrs SittingMins*/ AthleticsCP AthleticsHS
StrengthTrain UpsetUnexpected
            UnableControl NervousStressed DealtSuccHassles CopingWithChanges
ConfPersonalProblems
            GoingYourWay CouldNotCope AbleControlIrr OnTopOfThings Angered
ThinkingAbout AbleControlTime
            DiffPilingUp StressScore OnCampusDiningHall OnCampusRestaurant
OffCampusRestaurant AlternDiet
            EatingPref CowMilk Milk_Soy Milk_Rice Milk_Almond Milk_Other
Milk_DontDrink SoftDrinks CoffeeAdditions
            CoffeeSpec ColdCereal Milk BaconSausage ProcessedMeat Hamburgers
```

```
Pizza DeliSandwich
          FrenchFries Potatoes Beans Seafood RedMeat Chicken PeanutButter
Jelly MayoSaladDressing
          Fruit LettuceSalad OtherVegies WhiteBread WheatWholeGrainBread
Pasta NutsSeeds Chips
          BakedGoods FrozenDesserts FruitJuice100Per FruitFlavoredDrinks
SoftDrinksRegular
          SoftDrinksDietLight CoffeeOrCoffeeBevs EnergyDrinks PlainWater
DietarySupplements
          Supplem_None Supplem_MultiVit Supplem_BetaCarotene
Supplem_FolicAcid Supplem_BVitamins
          Supplem_VitaminC Supplem_VitaminD Minerals_None
          Minerals_Multi Minerals_Calcium Minerals_Iron Minerals_Magnesium
Minerals_Potassium
          HerbSupp_None HerbSupp_Echinacea HerbSupp_Ginko
          HerbSupp_Ginseng HerbSupp_StJohnsWort HerbSupp_Guarana
          SuppOther_None SuppOther_Creatine SuppOther_Ephedrine
SuppOther_DHEA SuppOther_Whey
          SuppOther_AminoAcid SuppOther_Omega3 SuppOther_Fiber
SuppOther_WeightLoss SuppOther_WeightGain
          PrescriptionMeds TypicalSunExposure
          OutdoorsTimeWeekdays OutdoorsTimeWeekends Sun_Face Sun_Neck
Sun_Shoulders Sun_Back Sun_UpperArms
          Sun_LowerArms Sun_Hands Sun_Stomach Sun_UpperThigh Sun_LowerThigh
Sun_Feet Sunscreen TanningBed
          TanningBedDays TanningBedDays_W Flash_DormFlyer Flash_Facebook
Flash_Email Flash_WordOfMouth
          Flash_RA Flash_Commercial;

     SET Datasets.AddLabels;

 FORMAT RaceNum RaceNum. HispanicNew YesNo. AmIndian YesNo. Asian YesNo.
Black YesNo. Hawaiian YesNo. White YesNo.
          MotherEdu Education. FatherEdu Education. MotherInc Income.
FatherInc Income. /*Residence2*/
          Fund_Grants YesNo. Fund_Schol YesNo. Fund_Loans YesNo. Fund_Self
YesNo. Fund_Family YesNo. /*Fund_Other YesNo.*/
          OverallHealth GoodScale. WeightDesc Weight. WeightChange
TryWeight.
          TabaccoCigarettes Use. TabaccoOtherSmoke Use. TabaccoSmokeless
Use. Marijuana Use.
          Alcohol2 Use. ABeverages2 DrinkFive. AlchoholNum DrinkNum.
          SexuallyActive YesNo. SafeSex SafeSex. HormonalCont YesNo.
Pregnant YesNo. SexContIssues YesNo.
          DiffFallingAsleep Often. DiffStayingAsleep Often.
OverallSleepQual AvgScale. OverallSleepQuan AvgScale.
          NapWeekdays YesNo. NapWeekends YesNo. EarlyBirdNightOwl Bird.
          AvTVMovieWeekday TV. AvVideoGamesWeekday Game. AvInternetWeekday
Int. AvTVMovieWeekend TV.
          AvVideoGamesWeekend Game. AvInternetWeekend Int. TextsPerDay
Text.
          AthleticsCP YesNo. AthleticsHS YesNo.
          UpsetUnexpected OftenScale. UnableControl OftenScale.
NervousStressed OftenScale. DealtSuccHassles OftenScale.
          CopingWithChanges OftenScale. ConfPersonalProblems OftenScale.
GoingYourWay OftenScale.
```

```sas
                CouldNotCope OftenScale. AbleControlIrr OftenScale. OnTopOfThings
OftenScale. Angered OftenScale.
                ThinkingAbout OftenScale. AbleControlTime OftenScale.
DiffPilingUp OftenScale. AlternDiet EatPref. EatingPref YesNo.
        CowMilk Milk. Milk_Soy YesNo. Milk_Rice YesNo. Milk_Almond YesNo.
Milk_Other YesNo. Milk_DontDrink YesNo.
                SoftDrinks SoftDrinks. CoffeeAdditions Coffee. CoffeeSpec YesNo.
ColdCereal TimeScale.
                Milk TimeScale. BaconSausage TimeScale. ProcessedMeat TimeScale.
Hamburgers TimeScale. Pizza
                DeliSandwich TimeScale. FrenchFries TimeScale. Potatoes
TimeScale. Beans TimeScale. Seafood TimeScale.
                RedMeat TimeScale. Chicken TimeScale. PeanutButter TimeScale.
Jelly TimeScale. MayoSaladDressing TimeScale.
                Fruit TimeScale. LettuceSalad TimeScale. OtherVegies TimeScale.
WhiteBread TimeScale.
                WheatWholeGrainBread TimeScale. Pasta TimeScale. NutsSeeds
TimeScale. Chips TimeScale.
                BakedGoods TimeScale. FrozenDesserts TimeScale. FruitJuice100Per
TimeScale. FruitFlavoredDrinks TimeScale.
                SoftDrinksRegular TimeScale. SoftDrinksDietLight TimeScale.
CoffeeOrCoffeeBevs TimeScale.
                EnergyDrinks TimeScale. PlainWater TimeScale. DietarySupplements
YesNo.
                Supplem_None YesNo. Supplem_MultiVit YesNo. Supplem_BetaCarotene
YesNo. Supplem_FolicAcid YesNo.
                Supplem_BVitamins YesNo. Supplem_VitaminC YesNo. Supplem_VitaminD
YesNo. Minerals_None YesNo.
                Minerals_Multi YesNo. Minerals_Calcium YesNo. Minerals_Iron
YesNo. Minerals_Magnesium YesNo.
                Minerals_Potassium YesNo. HerbSupp_None YesNo. HerbSupp_Echinacea
YesNo. HerbSupp_Ginko YesNo.
                HerbSupp_Ginseng YesNo. HerbSupp_StJohnsWort YesNo.
HerbSupp_Guarana YesNo.
                SuppOther_None YesNo. SuppOther_Creatine YesNo.
SuppOther_Ephedrine YesNo. SuppOther_DHEA YesNo.
                SuppOther_Whey YesNo. SuppOther_AminoAcid YesNo. SuppOther_Omega3
YesNo. SuppOther_Fiber YesNo.
                SuppOther_WeightLoss YesNo. SuppOther_WeightGain YesNo.
     PrescriptionMeds YesNo.
                TypicalSunExposure LowHigh.   OutdoorsTimeWeekdays Minutes.
OutdoorsTimeWeekends Minutes.
                Sun_Face YesNo. Sun_Neck YesNo. Sun_Shoulders YesNo. Sun_Back
YesNo. Sun_UpperArms YesNo.
                Sun_LowerArms YesNo. Sun_Hands YesNo. Sun_Stomach YesNo.
Sun_UpperThigh YesNo. Sun_LowerThigh YesNo.
                Sun_Feet YesNo. Sunscreen Sunscreen. TanningBed Tanning.

                /*Physical Assessment Variables*/
                ID Sex Gender. Exercise YesNo. Alcohol YesNo. /*ABeverages
YesNo.*/ Actlvl Level. Frame Frame.;

                KEEP
                /*Physical Assessment Variables*/
                ID Quarter Age Sex Exercise Alcohol ABeverages Actlvl Frame
BPgroup BPclass BMI
```

```
            /*Survey Variables*/
            RaceNum HispanicNew AmIndian Asian Black Hawaiian White
            MotherEdu FatherEdu MotherInc FatherInc Residence2
            Fund_Grants Fund_Schol Fund_Loans Fund_Self Fund_Family
Fund_Other
            OverallHealth WeightDesc WeightChange
            TabaccoCigarettes TabaccoOtherSmoke TabaccoSmokeless Marijuana
Alcohol2 ABeverages2 AlchoholNum
            SexuallyActive SafeSex HormonalCont Pregnant SexContIssues
SexContIssuesW
            DiffFallingAsleep DiffStayingAsleep OverallSleepQual
OverallSleepQuan /*AvSleepWeekNights AvSleepWeekendNights*/
            NapWeekdays /*NapWeekdaysMin*/ NapWeekends /*NapWeekendsMin*/
EarlyBirdNightOwl
            /*AvTVMovieWeekday*/ AvVideoGamesWeekday /*AvInternetWeekday
AvTVMovieWeekend*/
            AvVideoGamesWeekend /*AvInternetWeekend*/ TextsPerDay
VigPhysActDays VigPhysActHrs
            VigPhysActMins ModPhysActDays ModPhysActHrs ModPhysActMins
WalkingDays /*WalkingHrs
            WalkingMins SittingHrs SittingMins*/ AthleticsCP AthleticsHS
StrengthTrain UpsetUnexpected
            UnableControl NervousStressed DealtSuccHassles CopingWithChanges
ConfPersonalProblems
            GoingYourWay CouldNotCope AbleControlIrr OnTopOfThings Angered
ThinkingAbout AbleControlTime
            DiffPilingUp StressScore OnCampusDiningHall OnCampusRestaurant
OffCampusRestaurant AlternDiet
            EatingPref CowMilk Milk_Soy Milk_Rice Milk_Almond Milk_Other
Milk_DontDrink SoftDrinks CoffeeAdditions
            CoffeeSpec ColdCereal Milk BaconSausage ProcessedMeat Hamburgers
Pizza DeliSandwich
            FrenchFries Potatoes Beans Seafood RedMeat Chicken PeanutButter
Jelly MayoSaladDressing
            Fruit LettuceSalad OtherVegies WhiteBread WheatWholeGrainBread
Pasta NutsSeeds Chips
            BakedGoods FrozenDesserts FruitJuice100Per FruitFlavoredDrinks
SoftDrinksRegular
            SoftDrinksDietLight CoffeeOrCoffeeBevs EnergyDrinks PlainWater
DietarySupplements
            Supplem_None Supplem_MultiVit Supplem_BetaCarotene
Supplem_FolicAcid Supplem_BVitamins
            Supplem_VitaminC Supplem_VitaminD Minerals_None
            Minerals_Multi Minerals_Calcium Minerals_Iron Minerals_Magnesium
Minerals_Potassium
            HerbSupp_None HerbSupp_Echinacea HerbSupp_Ginko
            HerbSupp_Ginseng HerbSupp_StJohnsWort HerbSupp_Guarana
            SuppOther_None SuppOther_Creatine SuppOther_Ephedrine
SuppOther_DHEA SuppOther_Whey
            SuppOther_AminoAcid SuppOther_Omega3 SuppOther_Fiber
SuppOther_WeightLoss SuppOther_WeightGain
            PrescriptionMeds TypicalSunExposure
            OutdoorsTimeWeekdays OutdoorsTimeWeekends Sun_Face Sun_Neck
Sun_Shoulders Sun_Back Sun_UpperArms
            Sun_LowerArms Sun_Hands Sun_Stomach Sun_UpperThigh Sun_LowerThigh
```

```sas
Sun_Feet Sunscreen TanningBed
             TanningBedDays TanningBedDays_W Flash_DormFlyer Flash_Facebook
Flash_Email Flash_WordOfMouth
             Flash_RA Flash_Commercial;

RUN;


/*Quantitative Variables:
PHYSICAL: Height Weight Waist RHR SBP DBP Wrist Resistance Reactance BMI
Bodyfat
SURVEY: HeightFt HeightIn Weight */

DATA Datasets.QUANvars;
   SET Datasets.AddLabels;
   KEEP Height Weight Waist RHR SBP DBP Wrist Resistance Reactance BMI
Bodyfat;
RUN;

/*Runs frequencies on important variables and cross tabs of variables*/

PROC FREQ data=datasets.freqvars;
   TABLES racenum;
RUN;

PROC FREQ data=datasets.freqvars;
   TABLES racenum*quarter;
RUN;

PROC FREQ data=datasets.freqvars;
     TABLES BPgroup*racenum;
RUN;

PROC FREQ data=datasets.freqvars;
     TABLES BPgroup*sex;
RUN;

PROC MEANS data = datasets.freqvars;
   var BMI;
run;


/*this portion of the code was to determine what the best possible model for
the logistic regression would be*/

OPTIONS NODATE;

ODS GRAPHICS ON;

PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
     class racenum sex;
     model BPgroup = racenum sex BMI racenum*sex racenum*BMI sex*BMI
racenum*sex*BMI;
     oddsratio racenum;
     oddsratio sex;
     oddsratio BMI;
RUN;
```

```
PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI racenum*sex racenum*BMI sex*BMI;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
RUN;

PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI racenum*BMI sex*BMI;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
RUN;


PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI sex*BMI;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
RUN;

PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
RUN;

PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI racenum*sex sex*BMI;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
RUN;

PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI racenum*sex racenum*BMI;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
RUN;

PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI sex*racenum;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
```

```
RUN;

PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI BMI*racenum;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
RUN;

PROC LOGISTIC data = datasets.freqvars plots(only)=(oddsratio(range=clip));
      class racenum sex;
      model BPgroup = racenum sex BMI;
      oddsratio racenum;
      oddsratio sex;
      oddsratio BMI;
RUN;

/*Creates barchart*/

proc gchart data = datasets.freqvars;
vbar BMI / group = racenum ;
run;
quit;

ODS GRAPHICS OFF;

/*Prepares a final dataset for the majority of the analyses*/

DATA Datasets.Analysis;
      SET datasets.freqvars;

      LENGTH BMICat $ 16;

      IF  BMI< 25 then BMICat = "Normal";
      ELSE IF BMI >= 25 then BMICat = "OverWeight/Obese";

ARRAY Grains_old (5) ColdCereal DeliSandwich WhiteBread WheatWholeGrainBread
Pasta;
ARRAY Vegetables_old (5) DeliSandwich Potatoes Beans LettuceSalad
OtherVegies;
ARRAY Fruits_old (2) Fruit FruitJuice100Per;
ARRAY Dairy_old (1) Milk;
ARRAY Protein_old (7) DeliSandwich Beans Seafood RedMeat Chicken PeanutButter
NutsSeeds;
ARRAY Oils_old (2) PeanutButter MayoSaladDressing;
ARRAY EmptyCals_old (12) BaconSausage ProcessedMeat Hamburgers Pizza
FrenchFries Jelly Chips BakedGoods FrozenDesserts
      FruitFlavoredDrinks SoftDrinksRegular EnergyDrinks;

/*Arrays for groupings after frequency conversions*/
ARRAY Grains_new (5);
ARRAY Vegetables_new (5);
ARRAY Fruits_new (2);
ARRAY Dairy_new (1);
ARRAY Protein_new (7);
```

```
ARRAY Oils_new (2);
ARRAY EmptyCals_new (12);

*array of adjustedfood frequencies FALL 09;
do i = 1 to 5;
if Grains_old (i) = 0 then Grains_new (i) = 0;
else if Grains_old (i) = 1 then Grains_new (i) = 2;
else if Grains_old (i) = 2 then Grains_new (i) = 1.5*4;
else if Grains_old (i) = 3 then Grains_new (i) = 3.5*4;
else if Grains_old (i) = 4 then Grains_new (i) = 5.5*4;
else if Grains_old (i) = 5 then Grains_new (i) =1*30;
else if Grains_old (i) = 6 then Grains_new (i) = 2*30;
else if Grains_old (i) = 7 then Grains_new (i) = 3*30;
else if Grains_old (i) = 8 then Grains_new (i) = 4*30;
end;

do i = 1 to 5;
if Vegetables_old (i) = 0 then Vegetables_new (i) = 0;
else if Vegetables_old (i) = 1 then Vegetables_new (i) = 2;
else if Vegetables_old (i) = 2 then Vegetables_new (i) = 1.5*4;
else if Vegetables_old (i) = 3 then Vegetables_new (i) = 3.5*4;
else if Vegetables_old (i) = 4 then Vegetables_new (i) = 5.5*4;
else if Vegetables_old (i) = 5 then Vegetables_new (i) =1*30;
else if Vegetables_old (i) = 6 then Vegetables_new (i) = 2*30;
else if Vegetables_old (i) = 7 then Vegetables_new (i) = 3*30;
else if Vegetables_old (i) = 8 then Vegetables_new (i) = 4*30;
end;

do i = 1 to 2;
if Fruits_old (i) = 0 then Fruits_new (i) = 0;
else if Fruits_old (i) = 1 then Fruits_new (i) = 2;
else if Fruits_old (i) = 2 then Fruits_new (i) = 1.5*4;
else if Fruits_old (i) = 3 then Fruits_new (i) = 3.5*4;
else if Fruits_old (i) = 4 then Fruits_new (i) = 5.5*4;
else if Fruits_old (i) = 5 then Fruits_new (i) =1*30;
else if Fruits_old (i) = 6 then Fruits_new (i) = 2*30;
else if Fruits_old (i) = 7 then Fruits_new (i) = 3*30;
else if Fruits_old (i) = 8 then Fruits_new (i) = 4*30;
end;

i = 1;
if Dairy_old (i) = 0 then Dairy_new (i) = 0;
else if Dairy_old (i) = 1 then Dairy_new (i) = 2;
else if Dairy_old (i) = 2 then Dairy_new (i) = 1.5*4;
else if Dairy_old (i) = 3 then Dairy_new (i) = 3.5*4;
else if Dairy_old (i) = 4 then Dairy_new (i) = 5.5*4;
else if Dairy_old (i) = 5 then Dairy_new (i) =1*30;
else if Dairy_old (i) = 6 then Dairy_new (i) = 2*30;
else if Dairy_old (i) = 7 then Dairy_new (i) = 3*30;
else if Dairy_old (i) = 8 then Dairy_new (i) = 4*30;

do i = 1 to 7;
if Protein_old (i) = 0 then Protein_new (i) = 0;
else if Protein_old (i) = 1 then Protein_new (i) = 2;
else if Protein_old (i) = 2 then Protein_new (i) = 1.5*4;
else if Protein_old (i) = 3 then Protein_new (i) = 3.5*4;
```

```sas
else if Protein_old (i) = 4 then Protein_new (i) = 5.5*4;
else if Protein_old (i) = 5 then Protein_new (i) =1*30;
else if Protein_old (i) = 6 then Protein_new (i) = 2*30;
else if Protein_old (i) = 7 then Protein_new (i) = 3*30;
else if Protein_old (i) = 8 then Protein_new (i) = 4*30;
end;

do i = 1 to 2;
if Oils_old (i) = 0 then Oils_new (i) = 0;
else if Oils_old (i) = 1 then Oils_new (i) = 2;
else if Oils_old (i) = 2 then Oils_new (i) = 1.5*4;
else if Oils_old (i) = 3 then Oils_new (i) = 3.5*4;
else if Oils_old (i) = 4 then Oils_new (i) = 5.5*4;
else if Oils_old (i) = 5 then Oils_new (i) =1*30;
else if Oils_old (i) = 6 then Oils_new (i) = 2*30;
else if Oils_old (i) = 7 then Oils_new (i) = 3*30;
else if Oils_old (i) = 8 then Oils_new (i) = 4*30;
end;

do i = 1 to 12;
if EmptyCals_old (i) = 0 then EmptyCals_new (i) = 0;
else if EmptyCals_old (i) = 1 then EmptyCals_new (i) = 2;
else if EmptyCals_old (i) = 2 then EmptyCals_new (i) = 1.5*4;
else if EmptyCals_old (i) = 3 then EmptyCals_new (i) = 3.5*4;
else if EmptyCals_old (i) = 4 then EmptyCals_new (i) = 5.5*4;
else if EmptyCals_old (i) = 5 then EmptyCals_new (i) =1*30;
else if EmptyCals_old (i) = 6 then EmptyCals_new (i) = 2*30;
else if EmptyCals_old (i) = 7 then EmptyCals_new (i) = 3*30;
else if EmptyCals_old (i) = 8 then EmptyCals_new (i) = 4*30;
end;

*calculate average frequency for each food under category FALL 09;
Grains = (sum(of Grains_new:))/5;
Vegetables = (sum(of Vegetables_new:))/5;
Fruits = (sum(of Fruits_new:))/2;
Dairy = (sum(of Dairy_new:))/1;
Protein = (sum(of Protein_new:))/7;
Oils = (sum(of Oils_new:))/2;
EmptyCals = (sum(of EmptyCals_new:))/12;

/*Collapses variables on top of themselves in order to use PROC CATMOD*/

if BMICat = "Normal" and BPGroup = "Hypertensive/Pre-Hypertensive" then BmiBP
= "Normal/Hyper";
else if BMICat = "Normal" and BPGroup = "Normal" then BmiBP =
"Normal/Normal";
else if BMICat = "OverWeight/Obese" and BPGroup = "Hypertensive/Pre-
Hypertensive" then BmiBP = "Obese/Hyper";
else if BMICat = "OverWeight/Obese" and BPGroup = "Normal" then BmiBP =
"Obese/Normal";

if Actlvl = 3.5 then Actlvl = 4;
if Actlvl = 5 then Actlvl = 4;

if OverallHealth = 1 then OverallHealth = 2;
if OverallHealth = 4 then OverallHealth = 3;
```

```sas
if OverallHealth = 5 then OverallHealth = 3;

if OverallSleepQual = 1 then OverallSleepQual = 2;
if OverallSleepQual = 5 then OverallSleepQual = 4;
if OverallSleepQual = 4 then OverallSleepQual = 3;

if OverallSleepQuan = 1 then OverallSleepQuan = 2;
if OverallSleepQuan = 5 then OverallSleepQuan = 4;
if OverallSleepQuan = 4 then OverallSleepQuan = 3;

if WeightDesc = 1 then WeightDesc = 2;
if WeightDesc = 5 then WeightDesc = 4;

if AvVideoGamesWeekday = 99 then AvVideoGamesWeekday = 0;
if AvVideoGamesWeekday = 77 then AvVideoGamesWeekday = 1;
if AvVideoGamesWeekday = 13 then AvVideoGamesWeekday = 13;

if AvVideoGamesWeekend = 99 then AvVideoGamesWeekend = 0;
if AvVideoGamesWeekend = 77 then AvVideoGamesWeekend = 1;
if AvVideoGamesWeekend = 13 then AvVideoGamesWeekend = 13;

AverageVideoGamesWeekly = (5*AvVideoGamesWeekday + 2*AvVideoGamesWeekend)/7;

if AverageVideoGamesWeekly <= 2 then FrequentGamer = "Yes";
else if AverageVideoGamesWeekly > 2 then FrequentGamer = "No";

if Actlvl = 1 then Actlvl = 2;
if Actlvl = 4 then Actlvl = 3;

if Marijuana ^= 99 and Marijuana ^= 0 then Marijuana = 5;
if Marijuana = 99 then Marijuana = 103;
if Marijuana = 5 then Marijuana = 103;

if TabaccoCigarettes ^= 99 and TabaccoCigarettes ^= 0 then TabaccoCigarettes
= 5;
if TabaccoCigarettes = 99 then TabaccoCigarettes = 103;
if TabaccoCigarettes = 5 then TabaccoCigarettes = 103;

if Alcohol2 ^=99 and Alcohol2 ^= 0 then Alcohol2 = 5;
if Alcohol2 = 99 then Alcohol2 = 103;
if Alcohol2 = 5 then Alcohol2 = 103;

if WeightChange = 1 then WeightChange = 2;


/*IDType = put(ID, 4.);*/
/*drop ID;*/
/*rename IDType = ID;*/

F09_IPAQ=put(F09_IPAQ,1.);  *make sure numeric;
S10_IPAQ=put(S10_IPAQ,1.);

/*Create IPAQ groupings based on article from FLASH binder*/
F09_IPAQ = 1;
if VigPhysActDays in (5,6,7) & (VigPhysActHrs>=0.5 | ModPhysActHrs>=1) then
F09_IPAQ = 3;
```

```sas
else if VigPhysActHrs>=0.5 | ModPhysActHrs>=0.5 then F09_IPAQ = 2;

S10_IPAQ = 1;
if VigPhysActDays in (5,6,7) & (VigPhysActHrs>=0.5 | ModPhysActHrs>=1) then
S10_IPAQ = 3;
else if VigPhysActHrs>=0.5 | ModPhysActHrs>=0.5 then S10_IPAQ = 2;

/*Categorize change in IPAQ*/
length IPAQchange $8.;
if F09_IPAQ ^= . & S10_IPAQ ^= . then do;
  IPAQchange = 2;
  if F09_IPAQ < S10_IPAQ then IPAQchange = 3;
  else if F09_IPAQ > S10_IPAQ then IPAQchange = 1;
end;

drop i Grains_new: Vegetables_new: Fruits_new: Dairy_new: Protein_new:
Oils_new: EmptyCals_new:;

run;

/*Creates appropriate graphical summaries for the main variables in my senior
project*/

ods graphics on;

data datasets.gender;
      set datasets.analysis;

      if Sex = 0 then Male = 1;
      else Female = 1;
run;


proc freq data = datasets.gender;
      tables Sex / nocum plots=freqplot (scale = percent);
      tables RaceNum /  nocum plots=freqplot (scale = percent);
      tables RaceNum*Sex /  nocum plots=freqplot (scale = percent twoway =
stacked);
      tables RaceNum*Female RaceNum*Male /  nocum plots=freqplot (scale =
percent twoway = stacked);
      tables BPgroup /  nocum plots=freqplot (scale = percent);
      tables BMIcat /  nocum plots=freqplot (scale = percent);
      tables BMIcat*Female BMIcat*Male /  nocum plots=freqplot (scale =
percent twoway = stacked);
      tables BMIcat*Sex /  nocum plots=freqplot (scale = percent twoway =
stacked);
      tables BPgroup*Sex/  nocum plots=freqplot (scale = percent twoway =
stacked);
      tables BPgroup*Female BPgroup*Male/  nocum plots=freqplot (scale =
percent twoway = stacked);
      tables RaceNum*Sex /  nocum plots=freqplot (scale = percent twoway =
stacked);
run;

ods graphics off;
```

```sas
proc freq data = Datasets.Analysis;
      tables BMIcat*BPgroup;
      exact chisq;
run;

/* Calculates frequencies and such for variables to be used in analysis*/

proc freq data = datasets.analysis;
      tables Actlvl;
run;

proc freq data = datasets.analysis;
      tables FrequentGamer;
run;

proc freq data = datasets.analysis;
      tables racenum*sex;
run;

proc sort data = datasets.analysis;
      by sex;
run;

proc means data = datasets.analysis;
      by sex;
      var BMI Age;
run;

***Creating larger fake dataset;
Data datasets.analysis2;
      set datasets.analysis;
run;

Data datasets.analysis3;
      set datasets.analysis;
run;

Data datasets.mega;
      set datasets.analysis datasets.analysis2 datasets.analysis3;

      if Actlvl = 3.5 then Actlvl = 4;
      if Actlvl = 5 then Actlvl = 4;

run;


*********************************************;
****** Deciding which predictors to use *****;
****    for discrete multivariate analysis ***;
*********************************************;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex EatingPref / clparm covb corrb itprint freq
cov design;
QUIT;
```

```
PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = RaceNum / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex|OverallHealth / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = OverallSleepQual / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = OverallSleepQuan / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = WeightDesc / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = WeightChange / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = AlternDiet / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = FrequentGamer / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Marijuana / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = TabaccoCigarettes / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Alcohol2 / clparm freq cov design;
```

```
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Frame / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = EarlyBirdNightOwl / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Actlvl / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex TabaccoCigarettes Marijuana / clparm freq
cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat = BPGroup / clparm freq cov design;
QUIT;


*************************************************;
**** COMPLICATED MODEL TO FIGURE OUT DFs ********;
**** Plus additional models ran to find model ***:
*************************************************;


PROC CATMOD data = Datasets.mega;
      response logits;
      model BMICat*BPclass = Actlvl / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex EatingPref Frame WeightChange WeightDesc
EarlyBirdNightOwl FrequentGamer  / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex EatingPref Frame WeightChange WeightDesc
EarlyBirdNightOwl  / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
```

```sas
        model BMICat*BPGroup = Sex EatingPref Frame WeightChange WeightDesc /
clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex|EatingPref / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex EatingPref / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex Frame / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex|WeightChange / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex WeightChange / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex|WeightDesc / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex WeightDesc / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex|EarlyBirdNightOwl / clparm freq cov design;
QUIT;


PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex EatingPref Actlvl  / clparm freq cov design;
QUIT;


proc freq data = Datasets.Analysis;
      tables BmiBP;
run;



options nodate;
PROC CATMOD data=Datasets.Analysis;
```

```sas
      response logit;
      model BMICat = Sex / clparm freq;
QUIT;


data subset;
      set Datasets.Analysis (firstobs = 1 obs = 50);
run;

PROC CATMOD data=subset;
      response logit;
      model BMICat = Sex / clparm freq;
QUIT;

proc sort data=subset;
      by BMICat Sex;
run;

proc freq data=subset;
      by BMICat Sex;
      tables BMICat*Sex;
run;

PROC CATMOD data=subset;
      response logits;
      model BMICat = WeightChange / clparm freq;
QUIT;


proc freq data = datasets.analysis;
      tables BPGroup BMICat;
run;

*****New Analyses understanding what is going on now;

PROC CATMOD data = Datasets.Analysis;
      response logit;
      model BMICat = Sex / clparm freq;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logit;
      model BPGroup = Sex / clparm freq;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logit;
      model BmiBP = Sex / clparm freq;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex / noint clparm freq cov design;
QUIT;

** Verifying CATMOD;
```

```
PROC LOGISTIC data = Datasets.Analysis;
      class Sex (ref = "Male");
      model BMICat = Sex / link = glogit;
quit;

PROC LOGISTIC data = Datasets.Analysis;
      class Sex (ref = "Male");
      model BPGroup = Sex / link = glogit;
quit;

PROC LOGISTIC data = Datasets.Analysis;
      class Sex (ref = "Male");
      model BmiBP = Sex / link = glogit;
quit;

****Using RaceNum a the predictor instead of sex;

PROC CATMOD data = Datasets.Analysis;
      response logit;
      model BMICat = RaceNum / clparm freq;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logit;
      model BPGroup = RaceNum / clparm freq;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logit;
      model BmiBP = RaceNum / clparm freq;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = RaceNum / clparm freq cov design;
QUIT;

PROC CATMOD data=Datasets.Analysis;
      response marginals;
      model BMICat*BPGroup = Sex / clparm freq;
QUIT;

PROC CATMOD data=Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex RaceNum;
QUIT;

PROC CATMOD data=Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Frame;
QUIT;



*******************************************;
```

```sas
************** Final Models ****************;
********************************************;


*** Univariate Versions of my final model;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat = Sex Actlvl EatingPref / clparm freq cov design wls;
QUIT;



PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BPGroup = Sex Actlvl EatingPref / clparm freq cov design wls;
QUIT;

*** Final models used;

ods html file = "example.html";

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat = Sex / clparm freq cov design;
QUIT;

PROC CATMOD data = Datasets.Analysis;
      response logits;
      model BMICat*BPGroup = Sex Actlvl EatingPref / clparm freq cov design
addcell=1;
QUIT;

ods html close;




********************************************;
************ Cluster Analysis **************;
********************************************;



********subsetting data to cluster? ;

data Datasets.subset;
      set Datasets.Analysis;

length SexMF $ 6;
length MarijuanaUse $ 20;
length CigaretteUse $ 20;
length AlcoholUse $ 20;
length EatingPreference $ 13;
length ActivityLevel $ 8;
length SleepQuantity $ 7;
length SleepQuality $ 7;
length OverallHealth2 $ 4;
length Race $ 11;
length SleepPattern $ 10;
```

```
SexMF = put(Sex, 1.);
if SexMF = "0" then SexMF = "Male";
else SexMF = "Female";

EatingPreference = put(EatingPref, 1.);
if EatingPreference = "1" then EatingPreference = "Vegetarian";
else EatingPreference = "NonVegetarian";


ActivityLevel = put(Actlvl, 1.);
if ActivityLevel = "2" then ActivityLevel = "Light";
else ActivityLevel = "Moderate";

CigaretteUse = put(TabaccoCigarettes, 3.);
if CigaretteUse = "103" then CigaretteUse = "Current or Past User";
else CigaretteUse = "Never Used";

MarijuanaUse = put(Marijuana, 3.);
if MarijuanaUse = "103" then MarijuanaUse = "Current or Past User";
else MarijuanaUse = "Never Used";

AlcoholUse = put(Alcohol2, 3.);
if AlcoholUse = "103" then AlcoholUse = "Current or Past User";
else AlcoholUse = "Never Used";

SleepPattern = put(EarlyBirdNightOwl, 1.);
if SleepPattern = "1" then SleepPattern = "Early Bird";
else SleepPattern = "Night Owl";

SleepQuantity = put(OverallSleepQuan, 1.);
if SleepQuantity = "2" then SleepQuantity = "Bad";
else SleepQuantity = "Average";

SleepQuality = put(OverallSleepQual, 1.);
if SleepQuality = "2" then SleepQuality = "Bad";
else SleepQuality = "Average";

OverallHealth2 = put(OverallHealth, 1.);
if OverallHealth2 = "2" then OverallHealth2 = "Bad";
else OverallHealth2 = "Good";

Race = put(RaceNum, 1.);
drop RaceNum;
if Race = "1" then Race = "White/Asian";
else if Race = "2" then Race = "Hispanic";
else if Race = "3" then Race = "Other";

keep ID SexMF EatingPreference ActivityLevel CigaretteUse MarijuanaUse
AlcoholUse SleepPattern SleepQuantity
            SleepQuality OverallHealth2 Race;

run;

data trans;
      set Datasets.Transpose;
```

```sas
run;


****Performs cluster analysis on dataset: clusters variables by similarities
to each other;

proc distance data=trans method=djaccard absent=0 out=djacc;
      var anominal(Row_1 - Row_681);
      id Label;
   run;

ods graphics on;

   proc cluster data=djacc method=centroid
                pseudo outtree=tree;
      id label;
      var SexMF -- SleepPattern;
   run;

ods html file = "example6.html" style = default;


   proc tree data=tree horizontal n=5 out=out;
      id label;
   run;

ods html close;

   proc sort;
      by label;
   run;

   data datasets.clus;
      merge subset out;
      by label;
   run;

   proc sort;
      by cluster;
   run;

   proc tree data=datasets.clus n=9 out=out;
      id label;
   run;
```