An Analysis of Risk Behavior Trends and Mental Health in American Youth Using PROC SURVEYLOGISTIC

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Abstract

The current study looks at recent mental health and risk behavior trends of youth in America. Data used in this analysis was provided by the Center for Disease Control and Prevention and gathered using the Youth Risk Behavior Surveillance System (YRBSS). Interactions between risk behaviors and reported mental states - such as depression, suicidal ideation, and disordered eating – are the main subject of this analysis. This study also outlines demographic differences in risk behaviors and mental health issues as well as correlations between the different mental health issues. A final regression model including the most significant contributing factors to suicidal ideation, depression, and disordered eating is provided and discussed. Results included reporting differences between the years of 1991 and 2011. All results are discussed in relation to current youth health trend issues. Data was analyzed using SAS® 9.3 and JMP® 10.

Introduction

The Youth Risk Behavior Surveillance System (YRBSS) was developed as a tool to help monitor priority risk behaviors that contribute substantially to death, disability, and social issues among American youth and young adults today. The YRBSS has been conducted biennially since 1991 and contains survey data from national, state, and local levels. The national Youth Risk Behavior Survey (YRBS) provides the public with data representative of the United States high school students. On the other hand, the state and local surveys provide data representative of high school students in states and school districts who also receive funding from the CDC through specified cooperative agreements. The YRBSS serves a number of different purposes. The system was originally designed to measure the prevalence of health-risk behaviors among high school students. It was also designed to assess whether these behaviors would increase, decrease, or stay the same over time. An additional purpose for the YRBSS is to have it examine the co-occurrence of different health-risk behaviors. This particular study exams the co-occurrence of suicidal ideation as an indicator of psychological unrest with other health-risk behaviors. The purpose of this study is to serve as an exercise in correlating two different variables across multiple years with large data sets.

Methods

YRBSS provided data sets free to the public online and instructions on how to download the data sets, as well as how to apply the formatting. In order to apply the formatting, the researcher needed only to specify libraries for the data sets and formats:

```
libname mydata 'I:\RRSC_MWSUG_Analytics_2012\MWSUG_2012';   /* Tells SAS where
the data is */
libname library 'I:\RRSC_MWSUG_Analytics_2012\MWSUG_2012';  /* Tells SAS where
the formats are */
```

This enabled SAS to read all the formatting as well as output the variable names, questions, and answers in a very clean manner

Concatenating Data Sets

In order for data from all of the years to be used in this analysis, concatenating the 11 data sets was necessary. The researcher chose which questions would be used in the analysis based on the whether or not the questions in all of the national surveys. All questions asked between the years of 1991 and 2011 were included in the model and separated into categories based on risk behavior type. The questions used were then given new names in order for the appropriate questions to be concatenated together. This was necessary because even though the questions used were present in all the surveys, the order in which the questions appeared in the survey differed between each year.

```
data YRBS1991;
    set mydata.YRBS1991;

    alcohol1=q33;      alcohol2=q32;      alcohol3=q34;
    alcohol4=q35;
    drugs1=q37;        drugs2=q36;        drugs3=q38;        drugs5=q39;
    drugs6=q40;        drugs7=q41;        drugs8=q43;
```

```
         drugs15=q44;      drugs16=q45;     mood2=q19;          mood3=q20;
         mood4=q21;        mood5=q22;       sexuality2=q48;
         sexuality3=q49;   sexuality4=q50;  sexuality5=q51;
         sexuality6=q52;   tobacco1=q23;    tobacco2=q25;
         tobacco3=q24;     tobacco4=q27;    tobacco5=q28;
         tobacco6=q29;     tobacco7=q30;    tobacco11=q26;
         tobacco12=q31;    vehicle1=q9;     vehicle2=q10;
         vehicle3=q6;      vehicle5=q11;    vehicle6=q12;
         vehicle8=q7;      vehicle9=q8;     violence1=q14;
         violence2=q15;    violence10=q16;  violence11=q17;
         violence12=q18;   drop q1-q97;
     run;
```

The coding to concatenate the years together is given below:

```
data YRBS_Total;
set    YRBS1991   YRBS1993   YRBS1995   YRBS1997   YRBS1999   YRBS2001
       YRBS2003   YRBS2005   YRBS2007   YRBS2009   YRBS2011;
run;
```

Proc Surveyfreq

To begin the analysis, the researcher used proc surveyfreq to find the frequency of occurrence for each variable response in the data set. Frequencies for demographics, risk behaviors, and mental health variables are all provided and reviewed. The appropriateness of weighting the variables involved in the model was explored using the results. An example of the code used is provided below:

```
proc surveyfreq data=YRBS_Total;
     tables year*mood1 year*mood2 year*mood3 year*mood4 year*mood5;
run;

proc sgpanel data=YRBS_Total;
      title "Yearly Mood1";
      panelby mood1/ novarname columns=1;
      vbar year;
run;
```

These frequencies showed very little change in each of the responses over the years. Also, when looking at the percentages of each response, the majority of students either denied participating in any unique risky behavior or reported participating in the behavior at a lower rate than other respondents. Given these results, the researcher sought to find out if participation in a particular set of risky behaviors, being that any unique risky behavior is avoided by the majority of the population, would contribute to suicidal ideation. This idea was formulated from the general idea that most risky behaviors are viewed as poor decisions or compensatory behaviors initiated by the environment or other stimuli.

Proc Surveylogistic

The researcher then wanted to test to see if an interaction could be seen between each possible mental illness and certain health-risk behaviors across the years. A logistic analysis was conducted for this purpose. The logistic analysis was written in a manner so that a multiple regression analysis could be performed, given that the particular variables used were categorical. Also, given that the variables used are in a complex survey format, surveylogistic was a necessary procedure to employ for this analysis as it accounts for complex survey designs. The option "decreasing" was used in order to control for the fact that the variable answers were given in an ordinal format defined within the data and set in a decreasing order (least occurrence first, greatest occurrence last). Also, mainly variables that were represented in at least half of the surveys were included in these analyses, as there would not be sufficient enough data otherwise (given the size of this study and the amount of surveys given).

```
proc surveylogistic data=YRBS_Total;
     class mood1 mood2 mood3 mood4 mood5;
     cluster psu;
     strata stratum;
```

```
        model mood2 (decreasing) = mood1 mood3 mood4 mood5 / rsq;
        weight weight;
    run;
```

Determination of Dependent Variables

In the above SAS code, the variable mood2 represents the question "During the past 12 months, did you ever seriously contemplate suicide?" This question was chosen for this study as a representation of suicidal ideation as an indicator of poor mental health. The above model was used to test correlations between suicidal thoughts and independent effects as well as interactions between the following variables: making a plan for suicide, number of times attempted suicide, and if severity of suicidal event lead to treatment by a medical professional. Each of these variables contain the values of each answer for their particular question. The results were outputted as Wald Chi-Square values.

The other variables chosen for this study as indicators of poor mental health were mood1, weight5, weight6, weight8, weight9, and weight10. Mood1 represented the question "During the past 12 months did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?". Mood1, therefore, was a question related to depression related symptoms as an indicator of poor mental health. All 5 weight variables could be seen as measures of disordered eating as indicators of poor mental health. Weight5 ("During the past 7 days, which one of the following did you do to lose weight or to keep from gaining weight?" [none, dieted, exercised]) and weight6 ("During the past 7 days, which one of the following did you do to lose weight or to keep from gaining weight?" [none, vomit, diet pills]) were included exclusively on the 1991 and 1993 survey administrations. In addition to these two variables we then included weight8 ("During the past 30 days, did you go without eating for 24 hours or more [also called fasting] to lose weight or to keep from gaining weight?"), weight9 ("During the past 30 days, did you take any diet pills, powders, liquids, without a doctor's advice to lose weight or to keep from gaining weight?"), and weight10 ("During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?") were included in the an additional analyses as weight8 was measured between the years1999 and 2011 while both weight9 and weight10 were measured between the years 1995 and 2011.

Demographic Results

Demographic differences in risk behaviors and mental health issues are explored below. The demographic variables explored in this analysis are biological age (regardless of grade) and gender. Demographic variables of race and ethnicity were excluded from this analysis based on the variability of these measures between the surveys. Significant results from this analysis are discussed but will not be included in the final model as the final model is concerned only with the interactions between risk behaviors and mental health issues.

Depression

Mood1 is the dependent variable measured in the analysis of depression as an indicator of mental illness. As a reminder, mood1's phrasing is "During the past 12 months did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?". The demographic variable for age yielded a Wald Chi-Square value of 93.5034 with 6 degrees of freedom and a p-value of <.0001 indicating that the age of the student significantly correlated with depression ratings. To clarify the significance of this correlation, further study of odds ratio values indicated that the likelihood that a student who answered "yes" on this question was a specific age increased by about 30% as the age value increased. In addition to this, younger students (students younger than or equal to the age of 13) were twice as likely than older students to deny feelings of depression. Therefore, there was an even increased likelihood that a student was older if they answered "yes" to this question. The demographic variable for gender yielded a Wald Chi-Square value of 838.1023 with 1 degree of freedom and a p-value of <.0001 indicating that the gender of the student was also significantly correlated with depression ratings. To clarify this second significant correlation, further study of odds ratio values indicated that there was a 53% greater likelihood that a student who answered "yes" was female.

Suicidal Ideation

Mood2 is the dependent variable measured in the analysis of suicidal ideation as an indicator of mental illness. As a reminder, mood2's phrasing is "During the past 12 months, did you ever seriously contemplate suicide?". The demographic variable for age yielded a Wald Chi-Square value of 42.3624 with 6 degrees of freedom and a p-value of <.0001 indicating that the age of the student significantly correlated with suicidal ideation. To clarify the significance of this correlation, further study of odds ratio values indicated that the likelihood that a student who answered "yes" on this question was a specific age increased by about 10% as the age value increased. Therefore, there was a greater likelihood that a student was older if they answered "yes" to this question. The demographic variable for gender yielded a Wald Chi-Square value of 1007.4653 with 1 degree of freedom and a p-value of <.0001 indicating that the gender of the student was also significantly correlated with suicidal ideation. To clarify this second

significant correlation, further study of odds ratio values indicated that there was a 51% greater likelihood that a student who answered "yes" was female.

Diet/Exercise

Weight5 is the dependent variable measured in the analysis of the usage of diet and/or exercise as an indicator of mental illness. As a reminder, weight5's phrasing is "During the past 7 days, which one of the following did you do to lose weight or to keep from gaining weight?" [none, dieted, exercised, both, neither]. The demographic variable for age yielded a Wald Chi-Square value of 4.3627 with 6 degrees of freedom and a p-value of .6277 indicating that the age of the student did not significantly correlate with active participation diet/exercise programs. The demographic variable for gender yielded a Wald Chi-Square value of 474.2632 with 1 degree of freedom and a p-value of <.0001 indicating that the gender of the student was significantly correlated with active participation in diet/exercise programs. To clarify this significant correlation, further study of odds ratio values indicated that male students were three times more likely than females to deny actively participating in diet/exercise programs to lose weight.

Vomit/Diet Pills

Weight6 is the dependent variable measured in the analysis of the usage of vomiting and/or diet pills as an indicator of mental illness. As a reminder, weight6's phrasing is("During the past 7 days, which one of the following did you do to lose weight or to keep from gaining weight?" [none, vomit, diet pills, both, neither]. The demographic variable for age yielded a Wald Chi-Square value of 12.9120 with 6 degrees of freedom and a p-value of .0445 indicating that the age of the student significantly correlated with active use of induced vomiting and/or diet pills. To clarify the significance of this correlation, further study of odds ratio values indicated that the likelihood that a student who answered "yes" on this question was a specific age increased by about 10-20% as the age value increased. Therefore, there was a greater likelihood that a student was older if they answered "yes" to this question. The demographic variable for gender yielded a Wald Chi-Square value of 662.7743 with 1 degree of freedom and a p-value of <.0001 indicating that the gender of the student was also significantly correlated with active use of induced vomiting and/or diet pills. To clarify this second significant correlation, further study of odds ratio values indicated that females were four times more likely than males to admit to actively using induced vomiting and/or diet pills to lose weight.

Fasting

Weight8 is the dependent variable measured in the analysis of the act of fasting as an indicator of mental illness. As a reminder, weight8's phrasing is "During the past 30 days, did you go without eating for 24 hours or more [also called fasting] to lose weight or to keep from gaining weight?" The demographic variable for age yielded a Wald Chi-Square value of 80.1622 with 6 degrees of freedom and a p-value of <.0001 indicating that the age of the student significantly correlated with active fasting rituals. To clarify the significance of this correlation, further study of odds ratio values indicated that the likelihood that a student who answered "yes" on this question was a specific age increased by about 30% as the age value increased. In addition to this, younger students (students younger than or equal to the age of 12) were twice as likely to deny participation in active fasting rituals to lose weight. Therefore, there was a greater likelihood that a student was older if they answered "yes" to this question. The demographic variable for gender yielded a Wald Chi-Square value of 794.1440 with 1 degree of freedom and a p-value of <.0001 indicating that the gender of the student was also significantly correlated with active fasting rituals. To clarify this second significant correlation, further study of odds ratio values indicated that there was a 64% greater likelihood that a student who answered "yes" was female.

Diet Supplements

Weight9 is the dependent variable measured in the analysis of the usage of diet supplements without a doctor's order as an indicator of mental illness. As a reminder, weight9's phrasing is "During the past 30 days, did you take any diet pills, powders, liquids, without a doctor's advice to lose weight or to keep from gaining weight?" The demographic variable for age yielded a Wald Chi-Square value of 104.3435 with 6 degrees of freedom and a p-value of <.0001 indicating that the age of the student significantly correlated with active use of diet supplements without a doctor's order. To clarify the significance of this correlation, further study of odds ratio values indicated that the likelihood that a student who answered "yes" on this question was a specific age increased by about 40% as the age value increased. In addition to this, younger students (students younger than or equal to the age of 13) were twice as likely than older students to deny active use of diet supplements without a doctor's order. Therefore, there was a greater likelihood that a student was older if they answered "yes" to this question. The demographic variable for gender yielded a Wald Chi-Square value of 274.7630 with 1 degree of freedom and a p-value of <.0001 indicating that the gender of the student was also significantly correlated with active use of diet supplements without a doctor's order. To clarify this second significant correlation, further study of odds ratio values indicated that there was a 59% greater likelihood that a student who answered "yes" was female.

Purging

Weight10 is the dependent variable measured in the analysis of the act of purging as an indicator of mental illness. As a reminder, weight10's phrasing is "During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?" The demographic variable for age yielded a Wald Chi-Square value of 71.3192 with 6 degrees of freedom and a p-value of <.0001 indicating that the age of the student significantly correlated with active purging rituals. To clarify the significance of this correlation, further study of odds ratio values indicated that the likelihood that a student who answered "yes" on this question was a specific age increased by about 5-20% as the age value increased. Therefore, there was a greater likelihood that a student was older if they answered "yes" to this question. The demographic variable for gender yielded a Wald Chi-Square value of 332.1479 with 1 degree of freedom and a p-value of <.0001 indicating that the gender of the student was also significantly correlated with active purging rituals. To clarify this second significant correlation, further study of odds ratio values indicated that there was a 68% greater likelihood that a student who answered "yes" was female.

In brief conclusion, the demographic variables of age and gender did significantly correlate with the different measured indicators of mental illness in this study. In addition to this, students who indicated a positive rating on any of the different mental illness measures were more likely to be female and older.

Final Models

Multicollinearity

Given the complexity of the data gathered through each survey and the nature of this study being a secondary analysis, a more compact model for each predictive category was needed. The predictive categories considered are as follows: alcohol use, drug use, sexual activity, tobacco use, vehicle safety, and violent environment. Multicollinearity was then explored by taking the log value of each variable to test the interaction of its original value and log. An example of the code is given below:

```
proc surveylogistic data=YRBS_Total;
        class mood1 mood2 mood3 mood4 mood5;
        cluster psu;
        strata stratum;
        model mood2 (order=decreasing) = mood1 mood3  mood4 mood5
        mood1*lnmood1 mood3*lnmood3
        mood4*lnmood4 mood5*lnmood5 / rsq;
        weight weight;
    run;
```

Variables contributing to multicollinearity were thus deleted from the model. Also, other variables that violated the assumption of linearity of the logit were also excluded from the model. This narrowed each model down to less than 6 variables each. Since no single predictive category could explain over 10% of the variance observed in each mental illness measure, a combination of the different significant variables were included in the final model.

The main interest of the final model results are the presence of significant correlations between the mental health variables and different health-risk behaviors. When viewing the Wald Chi-Square statistics and subsequent p-values, the researcher would like to note that the model parameters were set to 0 since each variable was a linear combination of other variables in the model.

Depression

Mood1 is the dependent variable measured in the analysis of depression as an indicator of mental illness. As a reminder, mood1's phrasing is "During the past 12 months did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?". There were 14 risk-behavior variables that contributed to this final model. The model itself had a Wald Chi-Square value of 5897.2073 with 66 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .1121 while max-rescaled R-square yielded a value of .1590 indicating that our model using strictly risk-behavior variables could explain 15.9% of the variance in the depression measure. The variables and subsequent significance values are given below.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. "During your life, on how many days have you had at least one drink of alcohol?" (alcohol1) yielded a Wald Chi-Square of 28.2944 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having drank alcohol were at least 6% more likely than students who admitted to drinking at least once in their life to deny feelings of depression. "How old were you when

you had your first drink of alcohol other than a few sips?" (alcohol2) yielded a Wald Chi-Square of 20.7619 with 6 degrees of freedom and a p-value of .0020. Further study of odds ratio values indicated that students who admitted to having their first drink of alcohol before the age of 14 were at least 30% less likely than students who admitted to their first drink over the age of 17 and at least 10% less likely than students who admitted to having their frist drink over the age of 15 to deny feelings of depression. "During the past 30 days, on how many days did you have at least one drink of alcohol?" (alcohol3) yielded a Wald Chi-Square of 27.2341 with 6 degrees of freedom and a p-value of .0001. Further study of odds ratio values indicated that students who denied having drank alcohol in the past 30 days were at least 20% more likely than students who admitted to drinking alcohol at least once in the past 30 days to deny feelings of depression. "During the past 30 days, on how many days did you have at least one drink of alcohol on school property?" (alcohol5) yielded a Wald Chi-Square of 20.1523 with 6 degrees of freedom and a p-value of .0026. Further study of odds ratio values indicated that students who denied having drank alcohol on school property in the past 30 days were at least 40% more likely than students who who admitted drinking alcohol on school property during the same time frame to deny feelings of depression. "During your life, how many times have you used any form of cocaine including powder, crack or freebase?" (drugs6) yielded a Wald Chi-Square of 21.5188 with 5 degrees of freedom and a p-value of .0006. Further study of odds ratio values indicated that students who denied ever having used cocaine were at least 35% more likely than students who admitted to using cocaine at least once to deny feelings of depression. "During your life, how many times have you taken a prescription drug (such as OcyContin, Percocet, Vicodin, Adderall, Ritalin, or Xanax) without a doctor's prescription?" (drugs9) yielded a Wald Chi-Square of 58.9930 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having taken a prescription drug without a doctor's order were at least 20% more likely than students who admitted to taking a prescription drug without a doctor's order at least once to deny feelings of depression. "During your life, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?" (drugs10) yielded a Wald Chi-Square of 136.9351 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used inhalants were at least 98% more likely than students who had used inhalants at least once to deny feelings of depression. "Have you ever been physically forced to have sexual intercourse when you did not want to?" (sexuality1) yielded a Wald Chi-Square of 185.9437 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to being forced to have sexual intercourse were at least 60% less likely than students who denied ever being forced to have sexual intercourse to deny feelings of depression. "How old were you when you had sexual intercourse for the first time?" (sexuality3) yielded a Wald Chi-Square of 24.2984 with 7 degrees of freedom and a p-value of .0010. Further study of odds ratio values indicated that students who admitted to having sex before the age of 14 were at least 60% less likely than students who had sex for the first time at age 17 or older or not at all to deny feelings of depression. "Have you ever tried cigarette smoking, even one or two puffs?" (tobacco1) yielded a Wald Chi-Square of 27.8749 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to having smoked a cigarette were at least 25% less likely than students who denied ever having tried a cigarette to deny feelings of depression. "During the past 30 days, did you use chewing tobacco, such as Redman, Levi Garrett, or Beechnut, or snuff, such as Skoal, Skoal Bandits, or Copenhagen?" (tobacco12) yielded a Wald Chi-Square of 58.2942 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied having used chewing tobacco or snuff in the past 30 days were at least 25% more likely than students who admitted to using chewing tobacco or snuff at least once in the past 30 days to deny feelings of depression. "During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to school?" (violence5) yielded a Wald Chi-Square of 155.2797 with 4 degrees of freedom and a p-value of <.0001. "During the past 12 months, how many times were you in a physical fight?" (violence10) yielded a Wald Chi-Square of 40.4417 with 7 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied having been in a physical fight in the past 12 months were at least 24% more likely than students who who had been in a physical fight at least once in the past 12 months to deny feelings of depression. "During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?" (violence14) yielded a Wald Chi-Square of 90.8402 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to being struck by their significant other at least once in the past 12 months were at least 48% less likely than students who had been struck by their significant other at least once during the same time frame to deny feelings of depression.

Suicidal Ideation

Mood2 is the dependent variable measured in the analysis of suicidal ideation as an indicator of mental illness. As a reminder, mood2's phrasing is "During the past 12 months, did you ever seriously contemplate suicide?". There were 17 risk-behavior variables that contributed to this final model. The model itself had a Wald Chi-Square value of 27872.7710 with 83 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .0940 while max-rescaled R-square yielded a value of .1620 indicating that our model using strictly risk-behavior variables could explain 16.2% of the variance in the suicidal ideation measure. The variables and subsequent significance values are given below.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. "During your life, on how many days have you had at least one drink of alcohol?" (alcohol1) yielded a Wald Chi-Square of 30.9483 with 6 degrees of freedom and a p-value of <.0001. Further study of

odds ratio values indicated that students who denied ever having drank alcohol were at least 10% more likely than students who were heavy drinkers to deny feelings of suicidal ideation. "How old were you when you had your first drink of alcohol other than a few sips?" (alcohol2) yielded a Wald Chi-Square of 19.0516 with 6 degrees of freedom and a p-value of .0041 Further study of odds ratio values indicated that students who admitted to having their first drink of alcohol before the age of 14 were almost 35% less likely than students who had their first drink at an older age to deny feelings of suicidal ideation. "During the past 30 days, on how many days did you have at least one drink of alcohol on school property?" (alcohol5) yielded a Wald Chi-Square of 28.2749 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied having drank alcohol on school property in the last month were at least 13% more likely than students who admitted to drinking alcohol on school property in the last month to deny feelings of suicidal ideation. "During the past 30 days, how did you usually get the alcohol you drank?" (alcohol6) yielded a Wald Chi-Square of 27.9336 with 7 degrees of freedom and a p-value of .0002. Further study of odds ratio values indicated that students who obtained the alcohol they drank by purchasing it themselves were at least 20% more likely than students who either stole or were given alcohol to deny feelings of suicidal ideation. "During your life, how many times have you used marijuana?" (drugs1) yielded a Wald Chi-Square of 16.6515 with 6 degrees of freedom and a p-value of .0107. Further study of odds ratio values indicated that students who denied ever having smoked marijuana were at least 20% more likely than students who had smoked marijuana more than ten times in their life to deny feelings of suicidal ideation. "During your life, how many times have you used any form of cocaine including powder, crack or freebase?" (drugs6) yielded a Wald Chi-Square of 17.9760 with 5 degrees of freedom and a p-value of .0030. Further study of odds ratio values indicated that students who denied ever having used cocaine were at least 55% more likely than students who had used cocaine more than once to deny feelings of suicidal ideation. "During your life, how many times have you taken a prescription drug (such as OcyContin, Percocet, Vicodin, Adderall, Ritalin, or Xanax) without a doctor's prescription?" (drugs9) yielded a Wald Chi-Square of 39.8003 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having taken a prescription drug without a doctor's prescription were at between 50-65% more likely than students who admitted to taking a prescription drug without a doctor's prescription at least once to deny feelings of suicidal ideation. "During your life, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?" (drugs10) yielded a Wald Chi-Square of 88.3955 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used inhalants were at almost 3 times more likely than students who were heavy users of inhalants and almost 2 times more likely than students who admitted using inhalants at least once to deny feelings of suicidal ideation. "During your life, how many times have you used a needle to inject any illegal drugs into your body?" (drugs16) yielded a Wald Chi-Square of 7.1715 with 2 degrees of freedom and a p-value of .0277. Further study of odds ratio values indicated that students who denied ever having used a needle to inject a drug were at least 67% more likely than students who had admitted to using a needle to inject a drug at least once to deny feelings of suicidal ideation. "Have you ever been physically forced to have sexual intercourse when you did not want to?" (sexuality1) yielded a Wald Chi-Square of 140.8521 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever been forced to participate in sexual intercourse were at least 60% more likely than students who had admitted to being forced to participate in sexual intercourse against their will to deny feelings of suicidal ideation. "During your life, how many people have you had sexual intercourse?" (sexuality4) yielded a Wald Chi-Square of 16.9139 with 6 degrees of freedom and a p-value of .0096. Further study of odds ratio values indicated that students who denied ever having had sex were at least 15% more likely than students who had admitted to having sex with 3 or more people to deny feelings of suicidal ideation. "During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?" (tobacco6) yielded a Wald Chi-Square of 32.6303 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having smoked cigarettes were at almost 3 times more likely than students who were heavy smokes and at least 60% more likely than students who admitted to smoking at least 1 cigarette in the past 30 days to deny feelings of suicidal ideation. "During the past 30 days, did you use chewing tobacco, such as Redman, Levi Garrett, or Beechnut, or snuff, such as Skoal, Skoal Bandits, or Copenhagen?" (tobacco12) yielded a Wald Chi-Square of 23.6533 with 6 degrees of freedom and a p-value of .0006. Further study of odds ratio values indicated that students who denied ever having used chewing tobacco or snuff were at least 20% more likely than students who were heavy users to deny feelings of suicidal ideation. "During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol?" (vehicle6) yielded a Wald Chi-Square of 14.4707 with 4 degrees of freedom and a p-value of .0059. Further study of odds ratio values indicated that students who denied driving a vehicle while intoxicated in the past 30 days were at least 36% more likely than students who admitted to driving a vehicle while intoxicated six or more times in the last 30 days to deny feelings of suicidal ideation. "During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to school?" (violence5) yielded a Wald Chi-Square of 53.6795 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever missing school because they felt unsafe were at least 46% more likely than students who missed 6 or more days of school due to feeling unsafe to deny feelings of suicidal ideation. "During the past 12 months, how many times were you in a physical fight?" (violence10) yielded a Wald Chi-Square of 42.0455 with 7 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied having gotten in a physical fight the last 12 months were at least 42% more likely than students who admitted to getting into a physical fight during the same time frame to deny feelings of suicidal ideation. "During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?" (violence14) yielded a Wald Chi-Square of 32.2283 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to being

struck by their significant other within the past 12 months were at least 39% less likely than students who denied being struck by their significant other within the same time frame to deny feelings of suicidal ideation.

Diet/Exercise

Weight5 is the dependent variable measured in the analysis of the usage of diet and/or exercise as an indicator of mental illness. As a reminder, weight5's phrasing is "During the past 7 days, which one of the following did you do to lose weight or to keep from gaining weight?" [none, dieted, exercised, both, neither]. There were 10 risk-behavior variables that contributed to this final model. The model itself had a Wald Chi-Square value of 4341.1806 with 49 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .0428 while max-rescaled R-square yielded a value of .0457 indicating that our model using strictly risk-behavior variables could explain 4.57% of the variance in the diet/exercise measure. The variables and subsequent significance values are given below.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. "During your life, on how many days have you had at least one drink of alcohol?" (alcohol1) yielded a Wald Chi-Square of 104.2865 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having drank alcohol were at least 40% less likely than students who were heavy drinkers to admit to usage of a diet/exercise regimen to lose weight. "During your life, how many times have you used marijuana?" (drugs1) yielded a Wald Chi-Square of 53.8275 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having smoked marijuana were at least 12% more likely than students who admitted to smoking marijuana at least once to admit to usage of a diet/exercise regimen to lose weight. "During your life, how many times have you used any form of cocaine including powder, crack or freebase?" (drugs6) yielded a Wald Chi-Square of 20.2924 with 5 degrees of freedom and a p-value of .0011. Further study of odds ratio values indicated that students who denied ever having used cocaine were at least 30% less likely than students who admitted to trying cocaine at least once to admit to usage of a diet/exercise regimen to lose weight. "During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?" (tobacco6) yielded a Wald Chi-Square of 40.9233 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having smoked a cigarette were at least 50% less likely than students who has had smoked a cigarette at least once in the past 30 days to admit to usage of a diet/exercise regimen to lose weight. "During the past 30 days, did you use chewing tobacco, such as Redman, Levi Garrett, or Beechnut, or snuff, such as Skoal, Skoal Bandits, or Copenhagen?" (tobacco12) yielded a Wald Chi-Square of 104.4513 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used chewing tobacco or snuff were at least 70% more likely than students who admitted to having used chewing tobacco or snuff at least once in the past 30 days to admit to usage of a diet/exercise regimen to lose weight. "How often do you wear a seat belt when riding in car driven by someone else" (vehicle3) yielded a Wald Chi-Square of 45.0011 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used a seatbelt while riding in a car were at least 40% less likely than students who stated that they always wore a seatbelt while riding in a car to admit to usage of a diet/exercise regimen to lose weight. "During the past 30 days, how many times did you ride in a car or other vehicle driven by someone who had been drinking alcohol?" (vehicle5) yielded a Wald Chi-Square of 32.6352 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever ridden in a car with an intoxicated driver were at least 25% less likely than students who who admitted to riding in a car with an intoxicated driver at least once within the past 30 days to admit to usage of a diet/exercise regimen to lose weight. "During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol?" (vehicle6) yielded a Wald Chi-Square of 13.1426 with 4 degrees of freedom and a p-value of .0106. Further study of odds ratio values indicated that students who denied ever having driven a vehicle while intoxicated were at least 31% more likely than students who admitted to driving a car while intoxicated at least once within the past 30 days to admit to usage of a diet/exercise regimen to lose weight. "During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club?" (violence1) yielded a Wald Chi-Square of 41.3184 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied having carried a weapon in the past 30 days were at least 45% more likely than students who admitted to carrying a weapon at least once in the past 30 days to admit to usage of a diet/exercise regimen to lose weight.

Vomit/Diet Pills

Weight6 is the dependent variable measured in the analysis of the usage of vomiting and/or diet pills as an indicator of mental illness. As a reminder, weight6's phrasing is("During the past 7 days, which one of the following did you do to lose weight or to keep from gaining weight?" [none, vomit, diet pills, both, neither]. There were 9 risk-behavior variables that contributed to this final model. The model itself had a Wald Chi-Square value of 3966.7243 with 46 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .0441 while max-rescaled R-square yielded a value of .0536 indicating that our model using strictly risk-behavior variables could explain 5.36% of the variance in the vomit/diet pills measure. The variables and subsequent significance values are given below.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. "During your life, on how many days have you had at least one drink of alcohol?" (alcohol1) yielded a Wald Chi-Square of 70.3891 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having drank alcohol were at least 40% less likely than students who were heavy drinkers to admit to usage vomiting/diet pills to lose weight. "During your life, how many times have you used marijuana?" (drugs1) yielded a Wald Chi-Square of 46.4417 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used marijuana were at least 30% more likely than students who admitted to having tried marijuana at least once to admit to usage vomiting/diet pills to lose weight. "How old were you when you had sexual intercourse for the first time?" (sexuality3) yielded a Wald Chi-Square of 19.2508 with 7 degrees of freedom and a p-value of .0074. Further study of odds ratio values indicated that students who denied ever having had sex were 30% more likely than students who had sex for the first time at an older age to admit to usage of vomiting/diet pills to lose weight. Also, students who admitted to having sex for the first time after the age of 15 were at least 25% more likely than students who admitted to having sex for the first time before the age of 14 to admit to usage vomiting/diet pills to lose weight. "During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?" (tobacco6) yielded a Wald Chi-Square of 64.9788 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who either denied having smoked a cigarette or admitted to smoking only one or two cigarettes per day in the past 30 days were at least 10% less likely than students who admitted to smoking more than 2 cigarettes per day during the same time frame to admit to usage vomiting/diet pills to lose weight. "During the past 30 days, did you use chewing tobacco, such as Redman, Levi Garrett, or Beechnut, or snuff, such as Skoal, Skoal Bandits, or Copenhagen?" (tobacco12) yielded a Wald Chi-Square of 116.0374 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used chewing tobacco were at least 95% more likely than students who admitted to using chewing tobacco or snuff at least once in the past 30 days to admit to usage vomiting/diet pills to lose weight. "How often do you wear a seat belt when riding in a car driven by someone else?" (vehicle3) yielded a Wald Chi-Square of 38.2818 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used a seatbelt while riding in a vehicle were at least 35% less likely than students who stated they always used a seatbelt while riding in a vehicle to admit to usage vomiting/diet pills to lose weight. "During the past 30 days, how many time did you ride in a car or other vehicle driven by someone who has been drinking alcohol?" (violence5) yielded a Wald Chi-Square of 28.9582 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied riding in a vehicle with an intoxicated driver during the past 30 days were at least 10% more likely than students who admitted to riding in a vehicle with an intoxicated driver at least once during the same time frame to admit to usage vomiting/diet pills to lose weight. "During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club?" (violence1) yielded a Wald Chi-Square of 81.8001 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied having carried a weapon in the last 30 days were at least 60% more likely than students who admitted to having carried a weapon in the last 30 days to admit to usage vomiting/diet pills to lose weight.

Fasting

Weight8 is the dependent variable measured in the analysis of the act of fasting as an indicator of mental illness. As a reminder, weight8's phrasing is "During the past 30 days, did you go without eating for 24 hours or more [also called fasting] to lose weight or to keep from gaining weight?" There were 12 risk-behavior variables that contributed to this final model. The model itself had a Wald Chi-Square value of 2689.4420 with 59 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .0622 while max-rescaled R-square yielded a value of .1228 indicating that our model using strictly risk-behavior variables could explain 12.28% of the variance in the fasting measure. The variables and subsequent significance values are given below.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. "How old were you when you had your first drink of alcohol other than a few sips?" (alcohol2) yielded a Wald Chi-Square of 54.9907 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having drank alcohol were at least 42% more likely than students who had their first drink of alcohol before the age of 17 to deny fasting to lose weight. "During the past 30 days, on how many days did you have at least one drink of alcohol on school property?" (alcohol5) yielded a Wald Chi-Square of 17.2694 with 6 degrees of freedom and a p-value of .0083. Further study of odds ratio values indicated that students who denied ever having drank alcohol on school property during the last 30 days were at least 20% more likely than students who admitted to drinking alcohol at least once on school property during the same time frame to deny fasting to lose weight. "During your life, how many times have you used marijuana?" (drugs1) yielded a Wald Chi-Square of 66.7637 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having smoked marijuana were at least 50% less likely than students who admitted to heavy marijuana use to deny fasting to lose weight. "During your life, how many times have you taken a prescription drug (such as OcyContin, Percocet, Vicodin, Adderall, Ritalin, or Xanax) without a doctor's prescription?" (drugs9) yielded a Wald Chi-Square of 33.5975 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having taken a prescription drug without doctor's prescription were at least 55% more likely than students who admitted to taking a prescription drug without a doctor's

order at least once to deny fasting to lose weight. "During your life, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?" (drugs10) yielded a Wald Chi-Square of 55.6985 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever used inhalants were at least 2 times more likely than students who admitted to using inhalants at least once to deny fasting to lose weight. "Have you ever been physically forced to have sexual intercourse when you did not want to?" (sexuality1) yielded a Wald Chi-Square of 54.7845 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to having been forced to have sexual intercourse were at least 53% less likely than students who denied ever having been forced to have sexual intercourse to deny fasting to lose weight. "During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?" (tobacco6) yielded a Wald Chi-Square of 25.8382 with 6 degrees of freedom and a p-value of .0002. Further study of odds ratio values indicated that students who denied having smoked a cigarette in the past 30 days were at least 44% more likely than students who smoked at least one cigarette in the past 30 days to deny fasting to lose weight. "During the past 30 days, did you use chewing tobacco, such as Redman, Levi Garrett, or Beechnut, or snuff, such as Skoal, Skoal Bandits, or Copenhagen?" (tobacco12) yielded a Wald Chi-Square of 23.8747 with 6 degrees of freedom and a p-value of .0006. Further study of odds ratio values indicated that students who denied having used chewing tobacco or snuff during the past 30 days were at least 11% more likely than students who admitted to using chewing tobacco or snuff at least once in the same time frame to deny fasting to lose weight. "During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to school?" (violence5) yielded a Wald Chi-Square of 43.5821 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied skipping school due to feeling unsafe were at least 60% more likely than students who admitted to skipping school at least once in the past 30 days due to feelings of being unsafe to deny fasting to lose weight. "During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?" (violence14) yielded a Wald Chi-Square of 17.1101 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to having been struck by a significant other within the past year were at least 30% less likely than students who denied being struck by a significant other within the same time frame to deny fasting to lose weight.

Diet Supplements

Weight9 is the dependent variable measured in the analysis of the usage of diet supplements without a doctor's order as an indicator of mental illness. As a reminder, weight9's phrasing is "During the past 30 days, did you take any diet pills, powders, liquids, without a doctor's advice to lose weight or to keep from gaining weight?" There were 9 risk-behavior variables that contributed to this final model. The model itself had a Wald Chi-Square value of 1482.1553 with 34 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .0465 while max-rescaled R-square yielded a value of .1400 indicating that our model using strictly risk-behavior variables could explain 14% of the variance in the diet supplements measure. The variables and subsequent significance values are given below.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. "During your life, on how many days have you had at least one drink of alcohol?" (alcohol1) yielded a Wald Chi-Square of 120.6145 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having drank alcohol were at least 4 times more likely than students who were heavy drinkers to deny using diet supplements without a doctor's order to lose weight. "During your life, how many times have you used marijuana?" (drugs1) yielded a Wald Chi-Square of 21.8474 with 6 degrees of freedom and a p-value of .0013. Further study of odds ratio values indicated that students who denied ever having used marijuana were at least 45% less likely than students who were heavy marijuana users to deny using diet supplements without a doctor's order to lose weight. "During your life, how many times have you taken a prescription drug (such as OcyContin, Percocet, Vicodin, Adderall, Ritalin, or Xanax) without a doctor's prescription?" (drugs9) yielded a Wald Chi-Square of 61.6297 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used a prescription drug without a doctor's order were at least 84% more likely than students who were admitted to using a prescription without a doctor's order at least once to deny using diet supplements without a doctor's order to lose weight. "During your life, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?" (drugs10) yielded a Wald Chi-Square of 36.0245 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used inhalants were at least 13% more likely than students who admitted to using inhalants at least once to deny using diet supplements without a doctor's order to lose weight. "During your life, how many times have you used a needle to inject any illegal drugs into your body?" (drugs16) yielded a Wald Chi-Square of 22.1687 with 2 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used a needle to inject an illegal drug were at least 80% more likely than students who admitted to using a needle to inject an illegal drug to deny using diet supplements without a doctor's order to lose weight. "Have you ever been physically forced to have sexual intercourse when you did not want to?" (sexuality1) yielded a Wald Chi-Square of 60.9655 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to having been forced to have sexual intercourse at least once were at least 47% less likely than students who denied ever having been forced to have sexual intercourse to deny using diet supplements without a doctor's order to lose weight. "How often do you wear a

seat belt when riding in a car driven by someone else?" (vehicle3) yielded a Wald Chi-Square of 28.0253 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied wearing a seatbelt or stated that they wear a seatbelt rarely were at least 40% less likely than students who stated they always wore a seatbelt when riding in a vehicle to deny using diet supplements without a doctor's order to lose weight. "During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to school?" (violence5) yielded a Wald Chi-Square of 28.8855 with 4 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied having skipped school within the past 30 days because of feelings of being unsafe were at least 50% more likely than students who admitted to missing school at least once due to unsafe feelings to deny using diet supplements without a doctor's order to lose weight. "During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?" (violence14) yielded a Wald Chi-Square of 14.4546 with 1 degrees of freedom and a p-value of .0001. Further study of odds ratio values indicated that students who admitted to being struck by a significant other within the past 12 months were at least 28% less likely than students who denied being struck by a significant other in the past year to deny using diet supplements without a doctor's order to lose weight.

Purging

Weight10 is the dependent variable measured in the analysis of the act of purging as an indicator of mental illness. As a reminder, weight10's phrasing is "During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?" There were 9 risk-behavior variables that contributed to this final model. The model itself had a Wald Chi-Square value of 2931.5367 with 33 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .0435 while max-rescaled R-square yielded a value of .1567 indicating that our model using strictly risk-behavior variables could explain 15.67% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. "During the past 30 days, on how many days did you have at least one drink of alcohol?" (alcohol3) yielded a Wald Chi-Square of 44.8484 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied having drank alcohol in the past 30 days were at least 70% more likely than students who admitted to drinking alcohol at least once in the past 30 days to deny purging to lose weight. "During your life, how many times have you used marijuana?" (drugs1) yielded a Wald Chi-Square of 33.1981 with 6 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used marijuana were at least 60% more likely than students who were heavy marijuana users to deny purging to lose weight. "During your life, how many times have you taken a prescription drug (such as OxyContin, Percocet, Vicodin, Aderall, Ritalin, or Xanax) without a doctor's prescription?" (drugs9) yielded a Wald Chi-Square of 17.2439 with 5 degrees of freedom and a p-value of .0041. Further study of odds ratio values indicated that students who denied ever using a prescription drug without a doctor's order were at least 65% more likely than students who admitted to using a prescription drug without a doctor's order at least once to deny purging to lose weight. "During your life, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?" (drugs10) yielded a Wald Chi-Square of 78.2589 with 5 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who denied ever having used inhalants were at least 99% more likely than students who admitted to trying inhalants even once to deny purging to lose weight. "During your life, how many times have you used a needle to inject any illegal drug into your body?" (drugs16) yielded a Wald Chi-Square 12.2529 with 2 degrees of freedom and a p-value of .0022. Further study of odds ratio values indicated that students who denied ever having injected an illegal drug into their body using a needle were at least 80% more likely than students who admitted to using a needle to inject an illegal drug into hteir body at least once to deny purging to lose weight. "Have you ever been physically forced to have sexual intercourse when you did not want to?" (sexuality1) yielded a Wald Chi-Square of 79.9008 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to having been forced to have sexual intercourse were at least 42% less likely than students who denied ever being forced to have sexual intercourse to deny purging to lose weight. "Have you ever tried cigarette smoking, even one or two puffs?" (tobacco1) yielded a Wald Chi-Square of 16.5610 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to having tried cigarette smoking at least once were at least 39% less likely than students who denied ever trying cigarette smoking to deny purging to lose weight. "During the past 12 months, did your boyfriend or girlfriend ever hit, slap or physically hurt you on purpose?" (violence14) yielded a Wald Chi-Square of 21.32 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to being struck by a significant other within the past year were at least 48% less likely than students who denied being struck by a significant other the past year to deny purging to lose weight.

Interactions Between Dependent Variables

Depression

Mood1 is the dependent variable measured in the analysis of depression as an indicator of mental illness. As a reminder, mood1's phrasing is "During the past 12 months did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?". There were 4 mental health variables available for interactions that contributed to this model. The model itself had a Wald Chi-Square value of 6922.5251 with 4 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .1664 while max-rescaled R-square yielded a value of .2394 indicating that our model using strictly mental health variable interactions could explain 23.94% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. The suicidal ideation variable (mood2) yielded a Wald Chi-Square of 6029.2642 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently having suicidal thoughts were at least 88% less likely than students who denied having recent suicidal thoughts to deny feeling depressed. The fasting variable (weight8) yielded a Wald Chi-Square of 556.3394 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently fasting to lose weight were at least 59% less likely than students who denied having recently fasted to lose weight to deny feeling depressed. The diet supplement variable (weight9) yielded a Wald Chi-Square of 40.6960 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently using diet supplements without a doctor's order to lose weight were at least 27% less likely than students who denied having recently used diet supplements without a doctor's order to deny feeling depressed. The purging variable (weight10) was also provided which yielded a Wald Chi-Square of 39.7976 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently participating in purging behaviors to lose weight were at least 56% less likely than students who denied having recent purged to lose weight to deny feeling depressed.

Suicidal Ideation

Mood2 is the dependent variable measured in the analysis of suicidal ideation as an indicator of mental illness. As a reminder, mood2's phrasing is "During the past 12 months, did you ever seriously contemplate suicide?". There were 8 mental health variables available for interactions that contributed to two different models. The first model included variables mood1, weight8, weight9, and weight10 had a Wald Chi-Square value of 7439.0426 with 4 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our first model. R-square yielded a value of .1634 while max-rescaled R-square yielded a value of .2756 indicating that our first model using strictly mental health variable interactions could explain 27.56% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. The depression variable (mood1) yielded a Wald Chi-Square of 6045.0643 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently feeling depressed were at least 88% less likely than students who denied having recent feelings of depression to deny having suicidal thoughts. The fasting variable (weight8) yielded a Wald Chi-Square of 351.5621 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently fasting to lose weight were at least 51% less likely than students who denied having recently fasted to lose weight to deny having suicidal thoughts. The diet supplement variable (weight9) yielded a Wald Chi-Square of 42.0410 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recent usage of diet supplements without a doctor's order to lose weight were at least 31% less likely than students who denied having recently used diet supplements without a doctor's order to deny having suicidal thoughts. The purging variable (weight10) was also provided which yielded a Wald Chi-Square of 129.2916 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently having suicidal thoughts were at least 88% less likely than students who denied having recent suicidal thoughts to deny having suicidal thoughts.

The second model included variables weight5, weight6, and the interaction between weight5 and weight6 (weight5*weight6) had a Wald Chi-Square value of 873.0383 with 24 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our first model. R-square yielded a value of .0373 while max-rescaled R-square yielded a value of .0544 indicating that our first model using strictly mental health variable interactions could explain 5.44% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. The diet/exercise variable (weight5) yielded a Wald Chi-Square of 12.5422 with 4 degrees of freedom and a p-value of .0137. The vomit/diet pills variable (weight6) yielded a Wald Chi-Square of 94.0744 with 4 degrees of freedom and a p-value of <.0001. An interaction between diet/exercise and vomit/diet pills variables (weight5*weight6) yielded a Wald Chi-Square of 24.4214 with 16 degrees of freedom and a p-value of .0807, therefore indicating that an interaction between the diet/exercise and vomit/diet pills variables did not significantly contribute to depression.

Diet/Exercise

Weight5 is the dependent variable measured in the analysis of the usage of diet and/or exercise as an indicator of mental illness. As a reminder, weight5's phrasing is "During the past 7 days, which one of the following did you do to lose weight or to keep from gaining weight?" [none, dieted, exercised, both, neither]. There were 3 mental health variables available for interactions that contributed to this model. The model itself had a Wald Chi-Square value of 7337.1979 with 9 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .5091 while max-rescaled R-square yielded a value of .5478 indicating that our model using strictly mental health variable interactions could explain 54.78% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. The suicidal ideation variable (mood2) yielded a Wald Chi-Square of 6.9012 with 1 degrees of freedom and a p-value of .0086. The vomit/diet pills variable (weight6) yielded a Wald Chi-Square of 5044.1705 with 4 degrees of freedom and a p-value of <.0001. An interaction between the suicidal ideation and vomit/diet pills variables (mood2*weight6) was also provided which yielded a Wald Chi-Square of 23.6010 with 4 degrees of freedom and a p-value of <.0001.

Vomit/Diet Pills

Weight6 is the dependent variable measured in the analysis of the usage of vomiting and/or diet pills as an indicator of mental illness. As a reminder, weight6's phrasing is "During the past 7 days, which one of the following did you do to lose weight or to keep from gaining weight?" [none, vomit, diet pills, both, neither]. There were 3 mental health variables available for interactions that contributed to this model. The model itself had a Wald Chi-Square value of 2766.9975 with 9 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .5634 while max-rescaled R-square yielded a value of .6935 indicating that our model using strictly mental health variable interactions could explain 69.35% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. The suicidal ideation variable (mood2) yielded a Wald Chi-Square of 0.1098 with 1 degrees of freedom and a p-value of .7403, therefore indicating a lack of significance between suicidal ideation and the use of vomiting or diet pills to lose weight. The diet/exercise variable (weight5) yielded a Wald Chi-Square of 1882.9269 with 4 degrees of freedom and a p-value of <.0001. An interaction between the suicidal ideation and diet/exercise variables (mood2*weight5) was also provided which yielded a Wald Chi-Square of 21.3683 with 4 degrees of freedom and a p-value of .0003.

Fasting

Weight8 is the dependent variable measured in the analysis of the act of fasting as an indicator of mental illness. As a reminder, weight8's phrasing is "During the past 30 days, did you go without eating for 24 hours or more [also called fasting] to lose weight or to keep from gaining weight?" There were 5 mental health variables available for interactions that contributed to this model. The model itself had a Wald Chi-Square value of 5049.4507 with 5 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .1219 while max-rescaled R-square yielded a value of .2327 indicating that our model using strictly mental health variable interactions could explain 23.27% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. The depression variable (mood1) yielded a Wald Chi-Square of 566.7193 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently feeling depressed were at least 59% less likely than students who denied having recent feelings of depression to deny fasting to lose weight. The suicidal ideation variable (mood2) yielded a Wald Chi-Square of 347.0723 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently having suicidal thoughts were at least 51% less likely than students who denied having recent suicidal thoughts to deny fasting to lose weight. The diet supplements variable (weight9) yielded a Wald Chi-Square of 580.3570 with 1 degrees of freedom and a p-value of <.0001. The purging variable (weight10) yielded a Wald Chi-Square of 875.4609 with 1 degrees of freedom and a p-value of <.0001.An interaction between the diet supplements and purging variables (wieght9*weight10) was also provided which yielded a Wald Chi-Square of 52.4530 with 1 degrees of freedom and a p-value of <.0001.

Diet Supplements

Weight9 is the dependent variable measured in the analysis of the usage of diet supplements without a doctor's order as an indicator of mental illness. As a reminder, weight9's phrasing is "During the past 30 days, did you take any diet pills, powders, liquids, without a doctor's advice to lose weight or to keep from gaining weight?" There were 5 mental health variables available for interactions that contributed to this model. The model itself had a Wald Chi-Square

value of 4655.4046 with 5 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .0828 while max-rescaled R-square yielded a value of .2132 indicating that our model using strictly mental health variable interactions could explain 21.32% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. The depression variable (mood1) yielded a Wald Chi-Square of 46.9350 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently having depressive feelings were at least 28% less likely than students who denied having recent depressive feelings to deny using diet supplements without a doctor's order to lose weight. The suicidal ideation variable (mood2) yielded a Wald Chi-Square of 39.5902 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently having suicidal thoughts were at least 30% less likely than students who denied having recent suicidal thoughts to deny using diet supplements without a doctor's order to lose weight. The fasting variable (weight8) yielded a Wald Chi-Square of 582.8962 with 1 degrees of freedom and a p-value of <.0001. The purging variable (weight10) yielded a Wald Chi-Square of 1270.6276 with 1 degrees of freedom and a p-value of <.0001. An interaction between the fasting and purging variables (wieght8*weight10) was also provided which yielded a Wald Chi-Square of 83.0809 with 1 degrees of freedom and a p-value of <.0001.

Purging

Weight10 is the dependent variable measured in the analysis of the act of purging as an indicator of mental illness. As a reminder, weight10's phrasing is "During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?" There were 5 mental health variables available for interactions that contributed to this model. The model itself had a Wald Chi-Square value of 3952.5299 with 5 degrees of freedom and a p-value of <.0001. R-square and max-rescaled R-square values were also considered to test the validity of our model. R-square yielded a value of .0962 while max-rescaled R-square yielded a value of .3085 indicating that our model using strictly mental health variable interactions could explain 30.85% of the variance in the purging measure.

The variables, subsequent significance values, and odds ratio interpretations are provided to more thoroughly explain the make-up of this model. The depression variable (mood1) yielded a Wald Chi-Square of 47.9707 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently having recent depressive feelings were at least 32% less likely than students who denied having recent depressive feelings to deny purging to lose weight. The suicidal ideation variable (mood2) yielded a Wald Chi-Square of 131.1646 with 1 degrees of freedom and a p-value of <.0001. Further study of odds ratio values indicated that students who admitted to recently having suicidal thoughts were at least 49% less likely than students who denied having recent suicidal thoughts to deny purging to lose weight. The fasting variable (weight8) yielded a Wald Chi-Square of 880.2331 with 1 degrees of freedom and a p-value of <.0001. The diet supplements variable (weight9) yielded a Wald Chi-Square of 1274.8012 with 1 degrees of freedom and a p-value of <.0001. An interaction between the fasting and diet supplements variables (wieght8*weight9) was also provided which yielded a Wald Chi-Square of 66.3382 with 1 degrees of freedom and a p-value of <.0001.

Conclusion

This study was intended as an exercise on the use of logistic regression in a large survey sample of social science data, however, the significant results of the study warrant some discussion. In conclusion, this study supports the idea that youth participation in risky behaviors is correlated significantly with various possible mental illness indicators. This study also found that overall, students who were female and nearing adulthood were at a greater risk for displaying mental illness characteristics than other students. The results of this study should encourage further research into the contributing factors of mental illness and youth participation in risky behaviors. If we can further strengthen our understanding of the connection between these two entities, proper preventative programs and therapies can be developed to assist students with various mental and physical health problems as they arise.

The limitations of this study stem from the fact that it is a secondary analysis based on a nationally distributed sample. The researcher could not be sure how the data was randomized and therefore, weights recalculated by the Center for Disease Control and Prevention were used in the analysis.

Acknowledgments

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