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The Relationship Between Obesity and Use of Electronics For Individuals Under The Age of 21

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I. Introduction

A. Background Information

For several years, obesity has been a widespread issue in America. Although there are several variables that have been contributing to the prevalence of obesity in America, one that may be becoming growingly more prevalent is the lack of exercise due to the innovations and a greater use of electronics (computer, television, video games, etc.). In fact, a study on child obesity and television viewing revealed that the group of children who watched television for ten days as opposed to those who watched no television for ten days saw a slight increases in their BMIs (Escobar-Chaives and Anderson). Other studies show that interventions with children in video games show a significant reduction in obesity related outcomes (Lu et al.). Furthermore, due to things such as the heavy marketing of junk food and soda to children through commercials on television, those who watch more television might tend to eat more unhealthy food along with those who might drink more soda due to their association with video games such as Mountain Dew, which tends to hold promotions with major video games. Furthermore, the caffeine from soda or addiction to electronics can cause a lack of sleep and negatively impact one's general health condition. This increase in low-nutrition calorie intake in combination with less exercise naturally would lead to individuals having a higher BMI. Indeed, technology has been becoming more and more integral in modern-day American lives from 4K high definition televisions to handheld electronics such as iPads. However, despite the benefits technology provides, there is one common criticism that arises – that people, especially the younger generations, are spending more time on electronics rather than using that time to exercise or even play sports. In terms of public policy, as of now, there is not

much being done about this possible issue. However, some organizations, from non-profit groups to video game software companies themselves, have attempted to try and promote good health through electronics. Some examples of non-profit groups and video game providers attempting to promote health includes having athletes sponsored in health awareness commercials as well as video games companies trying to promote health with new interactive games through accessories such as motion sensing cameras (Example: The Xbox Kinect and Playstation Eye). Therefore, the innovation of such applications of video games and other electronics brings up the underlying question of whether or not these promotions and innovations are offsetting the negative effects of electronics on their effects on obesity. Essentially, this paper's main goal is to analyze and discuss the relationship between people's use of electronics and obesity. Furthermore, due to the growing use of electronics in this current generation as opposed to previous ones, I will specifically be looking at the population of those 21 years old and younger and compare the results with that of the data pertaining to the overall population. In this paper, I will conduct three different types of analyses on both populations in order to gain more information about the populations and to have a better understanding on the relationship between the use of electronics and obesity and how age also plays a part in that relationship.

B. Thesis

The first analysis I will conduct will be to find and analyze the data for the averages and variances for several variables that can be related to electronic use and obesity in order to discuss and have a better overall understanding of the dataset being

used for this research paper. Next, I will look at two specific variables – the number of hours one watched TV or videos in 30 days (PAQ710) and the number of hours used on the computer/video games in 30 days (PAQ715) – in relation to the individuals' general health condition. Lastly, I will perform a couple of linear regression tests in relation to the BMI variable (BMXBMI) in order to test the strength of the relationship between the use of electronics and obesity. For each of these analyses, I will compare the results of the overall population to that of the 21 years old and younger population. After conducting this research and analyzing the results of the research, I expect to see a worse general health value associated with a larger use of electronics as well as a positive relationship between obesity and use of electronics. Furthermore, I expect to see a larger relationship for television viewers as opposed to computer users/video game players due to all of the new healthier innovations for video games such as the motion sensing "Kinect" for the Xbox. Furthermore, I expect to see a larger relationship with electronics for the younger generation rather than the overall population due to the fact that the younger generation has been exposed to a lot more electronics and technological advances in their generation, causing them to perhaps spend more time on electronics in their spare time rather than go and play sports or games outside or even spend time exercising.

II. Analysis of NHANES Dataset

A. Initial Averages and Variances

To begin, the name of the dataset that I will be analyzing is called the National Health and Examination Survey (NHANES). Furthermore, the specific dataset I will use

was adjusted to only include the answers of those of 21 years of age or younger. This dataset covers data for several variables from the 2009 to 2012. This dataset is the right dataset to use because it is an unbiased data set that contains several variables pertaining to health and obesity, including those pertaining to BMI and electronic use, which would be very useful in analyzing the relationship between the use of electronics and obesity. Furthermore, the version of the NHANES dataset with all of the population's survey answers – meaning data not just limited to individuals of 21 years of age and younger – from years 2011 to 2012 will also be used as a measure of comparison. From these datasets, the variables I found to be the most important in contributing to finding the relationship between use of electronics and obesity include the following: (1) "Hours watch TV or videos for the past 30 days" (PAQ710), (2) "Hours use computer/video games for the past 30 days" (PAQ715), (3) "General health condition" (HUQ010), (4) "Female" (FEMALE), (5) "Age in years at screening" (AGE), and (6) "Body Mass Index (kg/m**2)" (BMXBMI). To simplify and get a better understanding of the data, I calculated the average and variances of each of these six variables. The following table contains the results of the averages and the variances of the variables of the population of those 21 years old and younger:

Variable	Average	Variance
Hours Watching TV/Videos (PAQ710)	2.356	2.606
Hours Using The Computer/Video Games (PAQ715)	2.400	6.060

General Health Condition (HUQ010)	2.156	0.917
Body Mass Index (BMXBMI)	24.153	35.550
Gender (FEMALE)	0.498	0.250
Age In Years (AGE)	16.064	7.747

By analyzing the averages and variances of these variables, I can deduce a lot of valuable information about the use of electronics, health condition, and other variables that could be related to obesity. To begin, the average number of hours watching television or videos per day by the people surveyed was found to be 2.356 hours and the average number of hours people use on the computer/video games per day was found to be 2.400 hours. This shows that on average, the people surveyed spent at least 4.756 hours using electronics a day. Furthermore, the average BMI for those surveyed was found to be 24.153, a BMI that correlates to being at the higher end of being normal weight (25 being overweight). Furthermore, the average for the gender variable was 0.498, meaning that there were slightly more males surveyed than there were females surveyed. Also, the average age of those surveyed was found to be 16.064, so on averaged, those surveyed were in their middle teenage years, which is around the age of a typical high school student. Lastly, the average general health condition was found to be 2.156, which means most people either reported to having very good or good health. Also, by looking at the variance, I am able to conclude that the variable that is the least consistent is BMI, while

the rest of the variables are very consistent with age and hours using the computer/video games are a little more inconsistent than the other remaining variables. Overall, these averages give a better overall picture of the defining characteristics of the population of those 21 years old and younger that were surveyed by the NHANES dataset.

Now, if we look at the same data results from the NHANES dataset including the overall population's answers, we are able to compare the averages of those who are 21 and younger to the overall population.

Variable	Average	Variance
Hours Watching TV/Videos (PAQ710)	2.336	2.72054509
Hours Using The Computer/Video Games (PAQ715)	3.314	10.3721483
General Health Condition (HUQ010)	2.404	1.074933868
Body Mass Index (BMXBMI)	25.1598	56.29723844
Gender (FEMALE)	0.494	0.25046493
Age In Years (AGE)	33.378	573.6183527

When looking at these results, I noticed that the average year of age is about double that of the previous results of individuals 21 years of age and younger. Furthermore, while the overall population group watches on average slightly less hours of television (0.020

hours) than the younger group (21 years of age and younger), the overall group on averages is on the computer/plays video games almost an hour (0.914 hours) more than the younger group, which came as a surprise to me as I expected teenagers to have more free time and thus spend more overall time on electronics, especially on video games and computers. Furthermore, the older group also has a higher BMI (25.1598 as opposed to 24.153), which puts them in the overweight category as opposed to the normal weight category the younger group is in. In terms of gender, the results for both groups were approximately the same with slightly more males than females surveyed. Lastly, the average general health condition for the overall population was found to be 2.404, which means that the average general health of the older population is a bit worse than that of the population of those 21 years old and younger. Overall, these results are definitely interesting and I will revisit them in the conclusion.

B. Relationship Between Electronic Use and Health

Now, I will look to analyze the relationship between electronic use and the general health of the 21 and under aged population. I will do this by creating four different groups based on the number of hours spent watching television or videos (0-3 hours or 4+ hours) and the number of hours spent on the computer (0-3 hours or 4+ hours). Furthermore, I will find the average general health that corresponds to each of these four groups respectively. Furthermore, straight from the NHANES Codebook, the values for average general health is as following:

HUQ010 - General health condition

Variable Name: HUQ010
SAS Label: General health condition
English Text: {First/Next} I have some general questions about {your/SP's} health. Would you say {your/SP's} health in general is . . .
Target: Both males and females 0 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
1	Excellent,	2530	2530	
2	Very good,	2551	5081	
3	Good,	3121	8202	
4	Fair, or	1277	9479	
5	Poor?	275	9754	
7	Refused	1	9755	
9	Don't know	1	9756	
.	Missing	0	9756	

Nonetheless, The results of the analysis were the following:

Average Time On Television/Computer	Average General Health
0-3 Hours / 0-3 Hours	2.055
0-3 Hours / 4+ Hours	2.402
4+ Hours / 0-3 Hours	2.154
4+ Hours / 4+ Hours	2.432

By analyzing this table, it is clear that the number of hours spent on electronics correlates to a lower general health due to the higher averages associated with more hours as "2" represents "Very Good" health and "3" represents "Good" health. As expected, when one spends only 0-3 hours on the computer and watching television, the average general health is the best with a value 2.055, an average that translate to "Very Good" health. Also as expected, the highest average general health, with a value of 2.432, is associated with one spending 4+ hours both on the computer and watching television, which represents an average between "Very Good" and "Good" health. Furthermore, the average general health, according to the data, is better when one spends 0-3 hours on the computer and 4+ watching television than those who spend 4+ hours on the computer and 0-3 hours watching television. Therefore, it seems as though spending more time on the computer/playing video games has a bigger negative impact on health than spending more time watching television for those who are 21 years old or younger. Overall, this data shows that spending more time on electronics has a negative impact on an individual's general health, therefore, I definitely expect both spending more time watching television and on the computer/video games to both have a positive relationship with BMI and contribute to obesity in the linear regression analysis.

Now, I will now due to the same test for the overall population and compare this information to the younger population's values for the same set of variables:

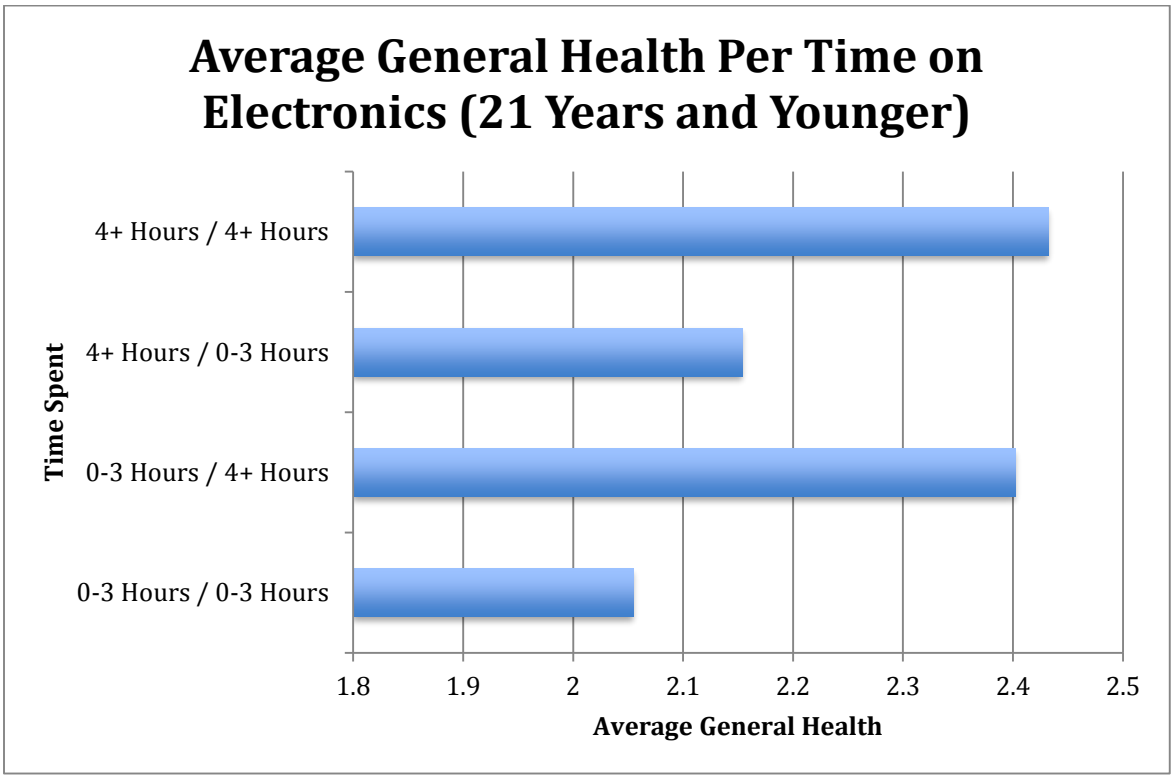
Average Time On Television/Computer	Average General Health

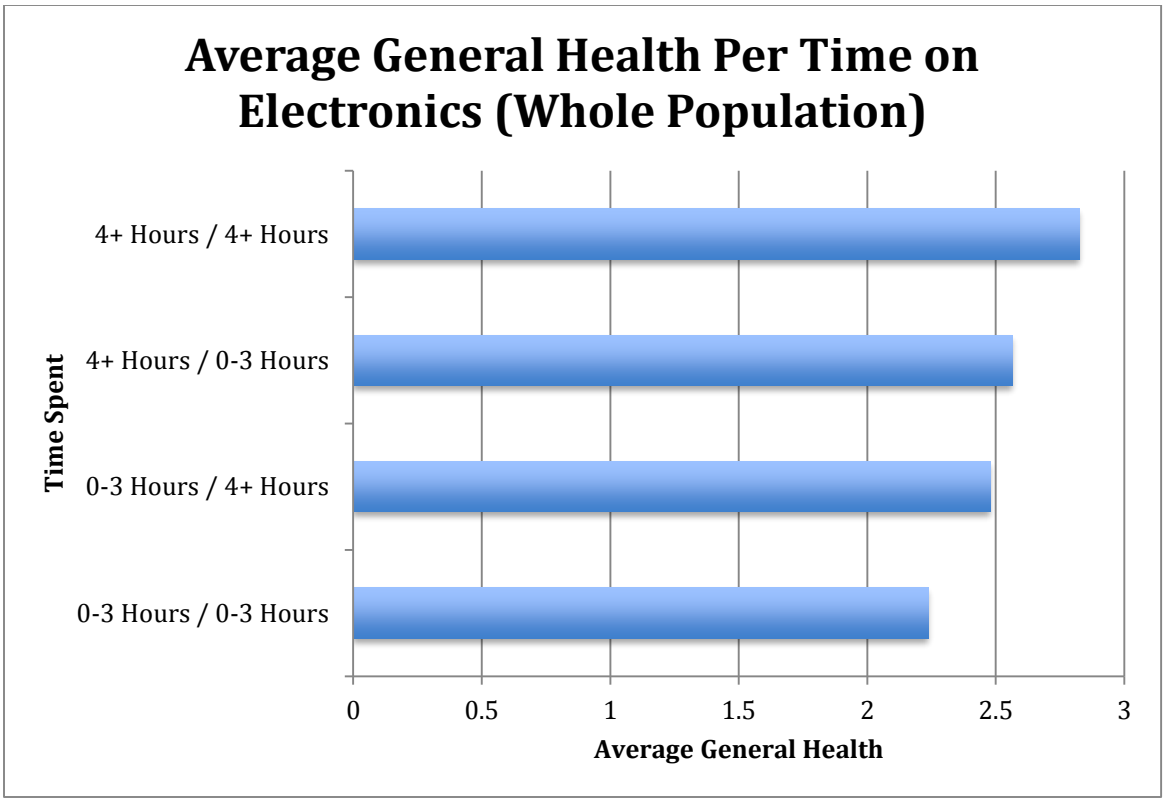
0-3 Hours / 0-3 Hours	2.237
0-3 Hours / 4+ Hours	2.481
4+ Hours / 0-3 Hours	2.564
4+ Hours / 4+ Hours	2.825

Now, by looking at the table of the data from the overall population, it is also clear even more so than it was for those 21 years old and younger that that the number of hours spent on electronics correlates to a lower general health due to the higher averages associated with more hours. Just as it was for the data for those 21 years and younger, those who spend only 0-3 hours on the computer and watching television have the best general health of the four categories with a value 2.237. Furthermore, as it was in the 21 years and younger data, the category with individuals watching 4+ hours of television and on the computer for 4+ hours had the highest average for general health with a value of 2.825. However, unlike for the data of those who are 21 years old and younger, according to the data, the average general health of the population is better when one spends 0-3 hours watching television and 4+ hours on the computer rather than vice versa. So for the overall population, it seems to be the opposite of those 21 years and younger in the fact that it seems that spending more time watching television has a bigger impact on health than spending more time using the computer. Overall, however, the data for the overall population, just like that of the younger population, shows that spending more time on

electronics does indeed have a negative impact on the overall population's general health. So just as I predicted for those 21 years old and younger, I expect both variables – spending time on the computer and watching television – to have a positive relationship with one's BMI in the linear regression analysis.

Lastly for the data analysis for the relationship between electronic use and health, I translated the data from both the tables into bar graphs in order to get a better understanding of the data through visuals and to compare the two different populations more easily. The results were the following:





Looking at these results, it is clear to see one simple trend: the overall population in every category has a worse general health average than the population of those 21 years old and younger. Furthermore, these differences are very clear when looking at the "0-3 hours watching television/0-3 hours on the computer" category and in the "4+ hours watching television/0-3 hours on the computer" category. These findings for the first of these two categories, 0-3 hours for both variables, suggests that adults who spend minimal time on both electronic variables have a lower general health condition than those 21 years and younger. The fact that the general health averaged jumped up so much from the younger population to the overall populations suggests that variables other than electronics were playing a big role in people having a lower general health as they got older. On the other hand, because the 21 years old and younger generation started off with such worse

general average than other categories, it is suggested that electronics do play a role in making one's general health worse. Also, despite the large increase in numerical value, the category with 0-3 hours for both variables had the lowest numerical value for the four categories for the overall population, which supports the claim that electronics do have a negative affect on health. Furthermore, due to the higher decrease in general health - higher increase in the numerical value - from the younger population to the older population, watching more television seems to have a larger impact as one grows older while playing on the computer seems to have more of an immediate impact as the numerical value for the category for those who are on the computer for 4+ hours and are on the television for only 0-3 hours began higher than it's counterpart. This could be because video games are something that has been more innovative and have become more popular with the younger generation than the older generation; therefore, it makes sense the "computer" category would have a more immediate effect on the younger population. A possible underlying factor for these results may include the fact that age has a huge impact on health as the average age difference between the two populations, according to the part A, was found to be about 17 years, which is larger than the average age of 16 for the population of those 21 year old and younger. In order to get a better understanding of these results, they will be revisited in the conclusion after also factoring in the results from the linear regression analysis.

C. Linear Regression and Dummy Variables

For my last method of analysis, I created two dummy variables called "Computer" and "Television" which equals 1 if respondent spends 4+ hours on either of

the activities and 0 for every other case. After this, I ran a linear regression test with BMI on the Y-axis and the "Computers" as well as the "Television" Variable on the X-axis. By running a linear regression test, I am able to get more statistics and information about the relationship between computer use and the amount of time spent watching television with one's BMI. I will first do this for the overall population. The results for the overall population were the following:

Linear Regression

Regression Statistics

R	0.14081
R-square	0.01983
Adjusted R-square	0.01588
S	7.44333
N	500

BMXBMI = 24.81384 + 2.53969 * Television - 0.59289 * Computer

ANOVA

	d.f.	*SS*	*MS*	*F*	*p-level*
Regression	2.	556.98579	278.49289	5.02667	0.0069
Residual	497.	27,535.33619	55.40309		
Total	499.	28,092.32198			

	Coefficient	*Standard Error*	*LCL*	*UCL*	*t Stat*	*p-level*	*H0 (5%)*
Intercept	24.81384	0.44477	23.93997	25.68771	55.78981	0.	*rejected*
Television	2.53969	0.80723	0.95367	4.1257	3.14616	0.00175	*rejected*
Computer	-0.59289	0.69481	-1.95803	0.77224	-0.85331	0.3939	*accepted*

T (5%) 1.96475

LCL - Lower value of a reliable interval (LCL)

UCL - Upper value of a reliable interval (UCL)

When looking at these results, it looks as though both the "Television" and "Computer" dummy variable coefficients have a relationship with BMI. However, surprisingly, they both seem to have opposite effects on BMI. "Television" has a coefficient of 2.53969, meaning that if an individual switches from "0-3 hours" to "4+ hours," the individual's BMI goes up by 2.53969, showing a strong positive relationship with the number of hours used to watch TV and weight gain or obesity. On the other hand, "Computer" has a coefficient -0.59289, which means, surprisingly, that the "Computer" variable has a negative relationship with BMI. This coefficient means that if an individual goes from "0-3 hours" to "4+ hours," on the computer, the individual's BMI down by -0.59289. To me, this was very surprising, as I would have thought that those who would spend a lot of time on the computer would most definitely see a positive relationship, especially since this statistic includes video games.

Despite finding this relationship, however, I will now also conduct a linear regression with multiple other variables to get a better understanding of the causations of obesity, or a higher BMI. The results of this data analysis were the following:

Linear Regression

Regression Statistics

R	0.54359
R-square	0.29549
Adjusted R-square	0.28836
S	6.32957
N	500

BMXBMI = 17.55769 + 0.53191 * Television - 1.06678 * Computer + 0.09742 * FEMALE + 0.14409 * AGE + 1.25895 * HUQ010

ANOVA

	d.f.	*SS*	*MS*	*F*	*p-level*
Regression	5.	8,300.96983	1,660.19397	41.4391	0.

Residual	494.	19,791.35215	40.06347				
Total	499.	28,092.32198					

	Coefficient	*Standard Error*	*LCL*	*UCL*	*t Stat*	*p-level*	*H0 (5%)*
Intercept	17.55769	0.7993	15.98725	19.12813	21.96647	0.	*rejected*
Television	0.53191	0.70267	-0.84867	1.91249	0.75699	0.44942	*accepted*
Computer	-1.06678	0.59662	-2.23901	0.10546	-1.78802	0.07439	*accepted*
FEMALE	0.09742	0.56985	-1.02221	1.21706	0.17096	0.86432	*accepted*
AGE	0.14409	0.01257	0.11939	0.16878	11.46415	0.	*rejected*
General Health	1.25895	0.28992	0.68932	1.82858	4.34236	0.00002	*rejected*
T (5%)	1.96478						

LCL - Lower value of a reliable interval (LCL)

UCL - Upper value of a reliable interval (UCL)

When look at these results, there is a lot of valuable information that I can gather from it. First of all, out of all the variables, one's general health, as one might expect, has the largest positive relationship with BMI. Out of all the other factors, the "Television" variable still has the largest positive impact, with a value of 0.53191 higher BMI for every switch from "0-3 hours" to "4+ hours". Furthermore, the Female variable has a 0.09742 value, showing that females on average have a slightly higher BMI of 0.09742 than men. This is surprising to me because in general, the male population plays more video games, so I would have suspected that males have a higher BMI then females. But again, there are many variables that contribute to BMI, so the statistic isn't necessarily a strong one in supporting my theory. Furthermore, the coefficient for "AGE" was found to be 0.14409, meaning that as one grows older, their BMI goes up by 0.14409 per year. This makes sense because as one grows older, their metabolism starts to slow down and their body's physical limits also start to decrease, allowing for less physical exercise. The most surprising statistic to me in this linear regression was the fact that the computer efficient became even more negative, with a value of -1.08678. Overall, the linear

regressions suggest that spending time watching television contributes to increasing obesity while spending time on the computer and video games, surprisingly, do not.

Now, I will be running the same two linear regression tests using the data of those who are 21 years old or younger. For the first test, I will again be looking at the relationship between computer use and the amount of time spent watching television with one's BMI. The results for this test were the following:

Linear Regression

Regression Statistics

R	0.11594
R-square	0.01344
Adjusted R-square	0.00947
S	5.93408
N	500

BMXBMI = 23.66656 + 0.74726 * Television + 1.34837 * Computer

ANOVA

	d.f.	*SS*	*MS*	*F*	*p-level*
Regression	2.	238.45686	119.22843	3.38589	0.03463
Residual	497.	17,501.02736	35.21333		
Total	499.	17,739.48422			

	Coefficient	*Standard Error*	*LCL*	*UCL*	*t Stat*	*p-level*	*H0 (5%)*
Intercept	23.66656	0.32688	23.02432	24.30881	72.40071	0.	*rejected*
Television	0.74726	0.6646	-0.55851	2.05304	1.12438	0.2614	*accepted*
Computer	1.34837	0.62015	0.12992	2.56681	2.17425	0.03016	*rejected*

T (5%) 1.96475

LCL - Lower value of a reliable interval (LCL)

UCL - Upper value of a reliable interval (UCL)

Unlike the overall population results, these results for the population of those 21 and younger match my expectations in terms of the effects of electronics on BMI. According to the data, both the "Television" and "Computer" dummy variable coefficients have a positive relationship with BMI. "Television" has a coefficient of 0.74726, meaning that if an individual switches from "0-3 hours" to "4+ hours," the individual's BMI goes up by 0.72726, showing a decent positive relationship with the number of hours used to watch TV and weight gain or obesity. However, unlike what I hypothesized in my thesis, "Computer" has a coefficient 1.34837, which means that spending more time on the computer has a larger positive relationship with BMI than spending time watching television as when an individual goes from "0-3 hours" to "4+ hours" on the computer, the individual's BMI goes up by 1.34837. Overall, through this test however, filtering the population to a younger population has helped support the first part of my thesis that both more use of computers and televisions have a positive relationship with one's BMI.

Next, as I did with the overall population, I will conduct a linear regression with multiple other variables – this time I will also include the variables (1) Money spent on eating out and (2) Money spent on carryout/delivered foods - in order to get a better understanding of how each variable affects obesity by looking on the relationships of these variables with BMI. The results of this data analysis were the following:

Linear Regression

Regression Statistics

R	0.36355
R-square	0.13217
Adjusted R-square	0.11982
S	5.59378

N	500

BMXBMI = 14.69039 + 0.43313 * Television + 0.31686 * Computer + 0.03315 * FEMALE + 0.33573 * AGE + 3.58721E-7 * CBD120 + 0.00173 * CBD130 + 1.77709 * HUQ010

ANOVA

	d.f.	*SS*	*MS*	*F*	*p-level*
Regression	7.	2,344.62343	334.9462	10.70445	1.41342E-12
Residual	492.	15,394.86079	31.29037		
Total	499.	17,739.48422			

	Coefficient	*Standard Error*	*LCL*	*UCL*	*t Stat*	*p-level*	*H0 (5%)*
Intercept	14.69039	1.56807	11.60945	17.77134	9.36845	0.	*rejected*
Television	0.43313	0.62963	-0.80395	1.67022	0.68792	0.49183	*accepted*
Computer	0.31686	0.6023	-0.86654	1.50025	0.52608	0.59907	*accepted*
FEMALE	0.03315	0.50466	-0.95841	1.0247	0.06568	0.94766	*accepted*
AGE	0.33573	0.09452	0.15002	0.52144	3.55197	0.00042	*rejected*
Money Spent on Eating Out	3.58721E-7	0.00133	-0.00261	0.00261	0.00027	0.99978	*accepted*
Money Spent on Carryout/Delivery Foods	0.00173	0.00375	-0.00563	0.00909	0.46167	0.64452	*accepted*
General Health	1.77709	0.27112	1.2444	2.30979	6.55461	1.41121E-10	*rejected*

T (5%)	1.9648

LCL - Lower value of a reliable interval (LCL)

UCL - Upper value of a reliable interval (UCL)

Looking at these results, the first thing that caught my eye was that "Television" and "Computer", after General Health, both had the highest positive relationships with BMI as I would have expected them to be. However, unlike the previous test, "Television" has a larger positive coefficient and relationship with BMI than "Computer," just as I had predicted it to be in my hypothesis. The next thing I noticed was that the two new variables that were added into the test, money spent on eating out and money spent on carryout/delivery foods, have virtually little to no impact on BMI in relation to the other variables tested as both of these variables have coefficients of less than 0.005. Furthermore, the FEMALE variable's coefficient was found to be .033, meaning females

on average have a very slightly higher BMI than males for the younger population. Lastly, age has the next highest coefficient after the electronics. Because this population is of those 21 years and younger – natural biological effects, as one grows older such as a slower metabolism is not accounted for in this population. However, this is probably because this is a population in which the individual's bodies are still growing – so naturally, they will weigh more. Overall, this linear regression data was very useful as it helps support my theory that electronics – computers, video games, and television – have a positive relationship with BMI, especially with the younger generation that is growing up alongside electronic innovations and technology itself.

III. Conclusion

Overall, after conducting a few tests between multiple variables and analyzing the results, I was able to get a better understanding of the relationships of electronics pertaining to obesity and was able to find variable information pertaining to the answer to my research study. From the linear regression test, it was found that while although for the overall population, watching television has a positive relationship with BMI, the results suggested that the use of computers/video games don't for the overall population, but does for the group 21 years old and younger. Furthermore, Part A also showed that the overall population spent more time on electronics than the younger population. This could be due to the fact that some people who are older use computers for a lot of practical uses such as looking at e-mail, paying bills, looking up exercise workouts, etc. as opposed to watching television which is mostly done for entertainment purposes. Furthermore, there are a lot of variables that go into each statistic, so a more effective variable for this particular study could have been "computer use for entertainment

purposes." Furthermore, the linear regression test was very helpful as it also showed us that for the population of those 21 years and younger, both computers/video games and watching televisions have a positive relationship with BMI. This was interesting because while the older population didn't exactly fit my thesis, the younger population did in the sense that electronics have a positive relationship with BMI. The reason for this can perhaps be explained by the same reason I gave to explain why the older population had a negative relationship for computers/video games and BMI. The younger generation does not need computers to do many of the practical things the older generation does such as paying bills and looking at important e-mails. The younger generation has fewer responsibilities, so I think it would be fair to assume that the younger generation uses computers/video games a lot more for entertainment purposes.

Furthermore, watching more television had a larger impact towards a lower general health condition than spending more time on the computer or playing video games. Also, new innovations coming out for video games, such as body motion sensing controls, have helped incorporate exercising into video games and could be contributing to these results. Additionally, another interesting thought to ponder is whether BMI was the best variable to use as a benchmark for one's health or not for the linear regression test. Furthermore, it is important to remember that although my tests have given me these results, there are a lot of variables that go into each statistic (age, gender, etc.), the results are not fully conclusive, and that more accurate results can be achieved with further tests. Other variables that would have been interesting to look at as well if they were included in the survey are quality of sleep and average quality of food eaten on average daily. Moreover, while gender didn't seem to have much of an impact on BMI, age had the next

highest relationship to BMI after electronics. Because I assumed that might have been the case, I decided to test age as a variable in this study – as I compared the two populations for every test - to see how age also affected the relationship between electronics and BMI.

Moreover, in Part B, the results showed that the overall population had worse general health than the younger population in all four categories. There are various possible reasons why this could have happened. The first possible reason is that many other variables played a part in worse general health such as age itself, with the body's metabolism decreasing, more smoking, or larger alcohol consumption. Furthermore, many of the effects from electronics on BMI might not be immediate and the individual's bodies could wear in the future from the lack of exercise due to electronics or other similar cases. Furthermore, it was evident from the results in Part B and Part C that both electronics definitely have an affect on one's general health and BMI. However, the results from Part B suggest that computers have more of a negative effect on the younger generation's general health, while the results from the first linear regression with just the "computer" and "television" for the younger population and from the results in Part C shows that "computers" have a larger positive effect on BMI. Therefore, these results fail to support my claim that television would have a larger affect on BMI. This is probably because the new innovations I discussed in the introduction for video games are very new and might not have been as popular at the time of the surveys (2009-2012) for the younger generation as they are now. Overall, although Part B showed that the overall population had a worse general health than the younger one– which is probably due to a variety of other variables that also affect general health – the linear regressions from Part

C supports my claim that the younger generation is affected by electronics more in the linear regressions with multiple variables as it showed a larger positive relationship for both “computers” and “television” the it did for the overall population.

Lastly, in terms of solutions, as of right now there are not really any public policies or programs related to electronics and health. Furthermore, there are not any policies that I can foresee being implemented in the near future just because it would not be plausible to put any restriction on the amount of hours spent on electronics or any similar policy. What I would suggest, however, is to create a small budget to use towards health advocacy commercials on television, video games, or websites. By doing so, the government can try to encourage and market people to get more active which would lower the average BMI. Moreover, I like the approach that some non-profit groups and celebrities are taking in trying to alleviate this issue in creating commercials to advocate exercising and good health. Overall, I believe that although steps are being taken to help alleviate the issues, it is also ultimately up to the parents or caretakers of minors to help guide them to have a healthier lifestyle. These problems will most probably not be solved in the near future, but at least electronic manufactures, celebrities, and non-profit groups are taking a step in the right direction in trying to help solve the issue.

IV. Works Cited

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