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# Climate influence on the health of an Appalachian City

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**CLIMATE INFLUENCE ON THE HEALTH  
OF AN APPALACHIAN CITY**

**A Thesis submitted to the Graduate College  
of Marshall University**

**In partial fulfillment of the requirements  
for the degree of Master of Arts**

**in**

**Sociology**

**by**

**Ryan Wade Becka**

**Approved by**

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**Marshall University**

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Thank you

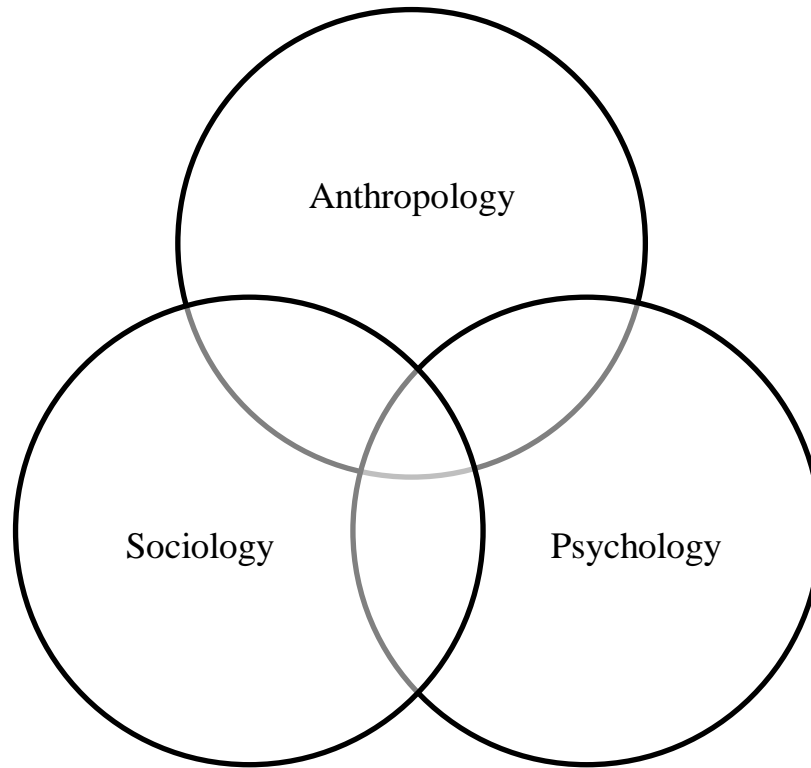
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## **Abstract**

In 2008 the Center for Disease Control (CDC) found Huntington, West Virginia, to be the unhealthiest city in America. A Gallup Poll conducted in 2010 found the Huntington-Ashland metropolitan area number one of 188 metro areas where depression diagnoses are most common. Manifestations of poor health in Huntington may be related to Seasonal Affective Disorder (SAD), a type of depression that occurs mainly in winter months. Symptoms of SAD are reported as a lack of energy, sleeping more, and consuming high amounts of carbohydrates and starchy foods. I theorize that these maladaptive behaviors may be a reaction to climate conditions present in the Huntington region which are present all year around. To test the likelihood of this theory, an online survey was distributed to a convenience sample of undergraduate and graduate students enrolled in social science courses at Marshall University, Huntington, West Virginia. The data was collected in four waves of the study corresponding to the seasons. Quantitative data on types of foods eaten, activity level, and feelings of lethargy were analyzed using the statistics which were collected from each season. The purpose of the research presented here is to examine if a relationship exists among lifestyle factors, seasonal variations in weather, and self-reported health that could be responsible for Huntington's health issues. The results of the survey suggest that there is validity to the thesis that one of the factors leading to the unhealthy behaviors exhibited by the population of Huntington, West Virginia, could be due to previously unrecognized effects of year-around seasonal affective disorder caused by climate conditions.

## *Culture in Process*



This picture is reconstructed from a Cultural Anthropology textbook which shows how each discipline holds some interconnections with each other. I use it because the topic I defend looks at these disciplines holistically because they all work together to develop a culture. A culture isn't produced just by what it is consuming or how the society works as a machine. Scholars so desperately want to divide disciplines when it is so clear that they work together as one organism.

## **Introduction**

Huntington, West Virginia, has become known as the unhealthiest city in the nation (CDC, 2008). The CDC said that the majority of the people within the metropolitan area are obese and have high tooth decay. The Associated Press reported in its article on MSNBC that over 30% of the population was obese and over 50% of the population suffers from dental issues (Associated Press, 2008). A Gallup Poll survey done in 2010 and released in 2011 found that one-third of the population of the Huntington-Ashland metropolitan area reported being diagnosed as having depression. The cause for these issues is believed to be from cultural and economic influences. For instance, people eat what their grandparents have eaten in the past and those foods were meant to sustain a population in farming and manufacturing economies and involve a larger amount of food and more fattening foods. Also, foods that can be unhealthy and contain more fat and carbohydrates such as bread, noodles, and fatty meats are less expensive to purchase by those who are living in a region that is not prospering economically. According to the U. S. Census for 2006-2010, the percent of persons below poverty level for the Huntington area is 29.4%; the median household income for the Huntington area is \$27,858; the individual median income is \$19,648. These are all below the state of West Virginia averages and the U. S. averages.

This study is important to society in that data will be examined that may help a region such as Huntington, West Virginia, pull out of an unhealthy life cycle and maintain sustainability on its own. Historically the region has been brought up to the American mainstream standard of living via outside influences, such as President Roosevelt's New Deal, T.V.A. (Tennessee Valley Authority), C.C.C. (Civilian Conservation Corps), Rural Electrification, and President Lyndon Johnson's War on Poverty. These helped the region economically and socially and raised the

standard of living for the time, but the region was subsequently forgotten and could not sustain progress on its own. These historic programs helped the region a great deal. But, metaphorically, they only gave the people fish to eat; they did not teach the people how to fish on their own. It is important to have a region of people being able to sustain an independent, happy, fulfilling lifeway. This study could prove valuable by providing further understanding as to why such unhealthy habits are occurring. Currently this region could be considered to be a social anchor in the way that aid is being sent to the region to maintain the standard of living instead of raising the standard of living. As previously stated the U. S. Census Bureau for 2010 shows the percentage of people living below the poverty level for Huntington, West Virginia, as 29.4%, much higher than the state of West Virginia's level of 17.4%. Income levels for individuals and households are also below the State of West Virginia average. In view of these figures, the area is likely receiving funds from state and Federal agencies in the form of welfare, food stamps, housing assistance, and other social programs. The social inequalities that absorb the money out of the national economy could be used for sustainability on a national level instead of just keeping this region afloat. Once the region's people are in high spirits who knows what they themselves could bring to the national table of interest.

In general sociologists suggest that shifting economies, such as outsourcing, change the degree of habits in a culture. Subcultural regions within the United States show different habits and patterns. Those that show drastic differences are in more volatile climate areas. The ecological setting within which a culture exists affects its ultimate lifeway. Overall anthropologists have uncovered accounts of how the Indians of the Northwest Coast were prospering while the Indians of the Great Basin were living on the edge of a razor (A. T. Boldurian, personal communication, 2006). Some psychologists tend to argue that SAD



(seasonal affective disorder) is a form of depression that is brought on by the different seasons and that its effects on persons can affect how they adapt to their daily lives.

The trend is that certain areas have been better off health wise, materially, socially, economically, politically, and spiritually throughout history. The ecology of these favorable areas have seasons that are defined distinctively which allow the culture to properly schedule the resources, efficiently using the carrying capacity, and allow the culture to fully understand and utilize the cultural ecology.

Throughout the past, some cultures have shown to be more innovative than others. In general, sociologists state that cultures adapt due to the economics of the culture. Archaeologists overall suggest tools that were made in order to make life more efficient for the culture created new developments in the culture. What is questioned in this thesis is an additional possibility. The climate a culture endures influences its lifeway causing conditions, such as the health issues confronting Huntington, West Virginia.

It is my contention that here in the U.S. a trend of climate influencing culture has been appearing since the early arrivals roughly 13,000 years ago. Contemporary doctrine says that the first people who migrated to America did so 13,000 years ago, crossing Beringia. They moved down the Rocky Mountains and stopped at the Four Corners of America: Arizona, Colorado, New Mexico, and Utah (Garbarino and Sasso, 1994). The spot was great. The resources were plentiful and the efficiency of the culture could transform from any other past lifeway. The Clovis people made tools that were top grade and they had a lifeway that seemed to be perfect for their situation. The Clovis culture, of the southwest region, only lasted roughly 800 years. The ecology was perfect for them and they took it to the point of diminishing return (Garbarino and Sasso, 1994).

Many of the early farming methods in America were developed in the southwest. The prehistoric desert farmers of the region developed many of the traditions that are used today, such as resource scheduling, and larger nuclear families for farm help. The early farmers of the Four Corners area of America, the point where the four states of Arizona, Colorado, New Mexico, and Utah meet, came up with some of the methods of agriculture which people still practice today. Not only did they develop efficient farming methods, but new things arose, such as competition, larger families, and staying in one area instead of moving around. The environment of the area was favorable to allow the culture to evolve to this next level. Agriculture changed lifeways and allowed cultures to transform in the southwest.

Both prehistoric Paleo-Indians and historic Indians developed many methods of producing that we were able to mimic. People adopted these methods and made improvements as were needed. The Eastern Woodland tribes held a subsistence lifeway. They were relatively basic in their hunting, gathering skills, and subsistence agriculture. The climate in the eastern woodlands was much like the climate of the southwest for the first Americans of 13,000 years ago. They had plentiful natural resources such as wood, game, and wild plant foods. They utilized the rivers, coasts, and lakes (Garbarino and Sasso, 1994). For example, looking at the Hopi of the southwest around 1350-1625 A.D. pottery was prepared much more thoroughly (Arizona State Museum, 2000-2007), than the Fort Ancient of Appalachia 1000 to 1650 A.D. suggesting that less energy was put into the production of the pottery (Ohio History Central, 1999-2011). Contemporary doctrine suggests that Paleo-Indians of the eastern woodlands were populated sometime after the first arrival into the Americas, and they may not have been as efficient as some of the cultures in the west who had paved the way for most of the cultural methods that are still followed today.

The above information on indigenous cultures would suggest that climatic influences have been affecting the eastern woodlands populations since prehistoric and historic times. Climate conditions that changed at the end of the last ice age are the same climate conditions that prevail currently in the region. We have recorded climate conditions that cover a more recent time period but inferences about the past can be drawn from cultural and social markers. This study was conducted to see if the health issues seen in Huntington today have any connections with the region experiencing a high percentage of people with SAD (seasonal affective disorder) and its symptoms occurring all year round due to climate conditions that the region endures.

Exactly what is seasonal affective disorder? Seasonal affective disorder is a form of depression that reoccurs around the same time each year. According to the Mayo Clinic symptoms start in the late fall/early winter and last until early spring. There are some rare cases that occur during the summer months (Mayo Clinic Staff, 2009). The Mayo Clinic says that there are two forms of depression, winter onset and summer onset depression (Mayo Clinic, Staff 2009). This study looks mainly at the winter onset depression symptoms to evaluate if these symptoms can be connected to the health issues in Huntington, West Virginia. Since climate data garnered from the National Oceanic and Atmospheric Administration shows the climate of Huntington, West Virginia, to remain constant the year around for number of overcast days and rainfall amounts, the effects of seasonal affective disorder may plague the population of the region throughout the entire year.

## Literature Review

Listening to lectures in multiple classes and discussions of Appalachia you get the sense that the people within Appalachia, at least within the 19<sup>th</sup> and 20<sup>th</sup> century, suffer from ups and downs just as everywhere else. Two particular books that come to mind when thinking of this topic are *Appalachia: A History* by John Alexander Williams (2002) and *High Mountain Rising: Appalachia in Time and Place* edited by Richard A. Straw and H. Tyler Blethen (2004). In reading these two books one learns of the hard times that the region went through and in particular how the region began to pull back together. The Civil War reconstruction, and later the New Deal implemented by President Roosevelt developing the T.V.A. (Tennessee Valley Authority), C.C.C. (Civilian Conservation Corps), and Rural Electrification, and President Johnson's War on Poverty started programs which helped put much of Appalachia back to work and back on the map. A pattern that can be observed from this is that people within Appalachia are in need of outside influences to do these types of things, or so it would appear.

Once the CDC (Center for Disease Control) reported that Huntington, West Virginia, was the unhealthiest city in the nation I wondered what causes these results. I argue that within the region a high number of cases is occurring year round of people with symptoms related to SAD. Some will argue that other areas of the country have people suffering from SAD and are not as unhealthy as those in Huntington, West Virginia. What these other areas do not have is a stereotype that is fueling an already suffering population. The population has been suffering from SAD-like symptoms which can cause health issues that have been overlooked because of a simpler answer, the stereotype. For most of Appalachia's history, the people are presented as poor, lazy, and uneducated. This stereotype over time can influence just what it says by the

population believing it, causing it to feed the depression of the region even more, thus becoming a self-fulfilling prophecy.

As previously mentioned, the CDC said that Huntington, West Virginia, was the unhealthiest city in America in 2008 (msnbc.com, 2008). Some literature and media such as a book written by Jack Weller, *Yesterday's People*, and the ARC (Appalachian Regional Commission) Report give reasons why some of the problems could be contributing to the contemporary health issues. The media has described Appalachia as this backwards region in which people do not want to change. Weller suggests that the mountain people are standoffish to the ways of the "others" (outsiders) (Weller, 1965). Weller, who came to the area as a minister and found himself an outsider, had his attempts to help the mountain people rebuffed, and asked himself these questions:

"Why isn't he like us? Why doesn't he respond as we do, think as we do, live as we do? What are his goals and hopes? Why, when he moves to the city and is exposed to all the opportunities of city life, does he still cling to his mountain ways? ....Why doesn't the mountain man care how his house looks to others?.....Doesn't the mountaineer care for his children?.....Are these people really so lazy?.....Have they no get up and go? And the central question of all is: Why are these folk living as they do, so contented that they do not seem even to want the help offered to them?" (Weller, 1965 p2).

Weller's quest to answer these questions and understand the mind of the Appalachian resulted in his 1965 book which delved deeply into aspects of the Appalachian problem.

The ARC Report of 1964 also points out the problems but in a gentler way. The ARC Report (1964) presented the facts of the condition of the Appalachian region, which it described as an area lagging behind the rest of the nation. The report summarized:

"This then, is Appalachia: a nonurban land with a population over 50 percent rural but less than 10% farm; deeply unemployed; all too frequently deprived of the facilities and services of a modern society; dependent on local jurisdictions with an inadequate tax base and too often reliant upon the marginal comforts of a welfare economy." (ARC Report, 1964 p16)

Media portrayal of the region has routinely been negative, portraying people as the reason for their situation, such as being the unhealthiest people, because of their backward ways. Nothing has yet been examined to see if there is a deeper reason for these problems rather than simply the negative stereotype that is depicted. This study was aimed to fill that gap.

A stereotype impacts people by the following three steps: first to show effects stereotypes can have on people, second to show how powerful the media is in influencing people, and third to show that the people of the region have a hidden issue that is being covered up by a stereotype. That stereotype is that Appalachians are unhealthy because they are a poor, lazy, and uneducated population.

When stereotyping people, such as Appalachians, it is done with the intent to belittle by distinguishing and labeling the differences, associating these differences with negative attributes, dividing the "US" and "THEM" and labeling the person with a status loss or discrimination. To be able to do these things the "stigmatizer" depends on social, economic, and political power which much of Appalachia/Huntington lacks due to the characteristics describing Appalachians.

For example, describing Appalachians as poor, lazy, and uneducated separates them from others creating the barrier stereotype to help the outsiders place themselves above in society.

In 1986 Stafford and Scott described stigma as a characteristic of people that is contrary to a norm of a social unit. Link and Phelan (2001) assert that there are 5 assumptions that need to be noted. They are: 1. that the disability is located solely in biology, 2. that the problems of the disabled are due to disability produced impairment, 3. that the disabled person is a victim, 4. that the disability is central to the disabled person's self-concept, self-definition, social comparison and reference groups, and 5. that having a disability is synonymous with needing help and social support.

Over time the symptoms that are associated with SAD may have contributed to develop the Appalachian character in which the “outsider” was able to use his or her power to label the traits into a stereotype. This came full circle to the Appalachians in strengthening the traits which have developed the Appalachian character, because these traits contribute to the people becoming passive victims. (Weller, 1965). Passive victims are the people whom the stereotype creates and the people end up portraying the undesirable attributes (Link and Phelan, 2001).

The consequences of stereotypes have been looked at in many facets. There are four points in which stereotypes have been looked at: first, stereotypes have an elusive nature in that they are difficult to identify and even harder to control; second, people use stereotypes to explain or justify inequalities; third, a stereotype can influence the behaviors of both the agent and target; fourth, stereotypes are responsive to human intent so they can be held in check with personal motivation and social norms created (Operario and Fiske, 2001). The area which is to be looked at for this research is the third point of stereotyping, where the stereotype influences the behaviors of both the agent and the target.

According to Operario and Fiske (2001), the agent (outsiders) suggests that the target (Appalachians) are inferior so the outsiders act as if they are better than the Appalachians to keep the outsiders feeling better about themselves. Appalachians, the targets, believe over time that they are inferior and subconsciously role play the part as inferior. Operario and Fiske call this a stereotype threat. The target acts out the way that “outsiders” perceive “them” (Appalachians) to be. For example, a teacher has two students with the same level of intelligence and the teacher tells Student A. how good he/she is progressing and Student B. how bad he/she is progressing, Student A. excels, and Student B. lags behind.

As far back as the Revolutionary War people living in Appalachia have been stereotyped as living differently. The British soldiers thought that people in the Appalachians Mountains were barbaric (Williams, 2002). During the Civil War Appalachians were standoffish; they did not want to be bothered with the war. They were too poor to own slaves so they did not have any interest in fighting in the war. Once they were drafted they would end up escaping and going back to their mountain farms (McKinney, 2004).

During the Great Depression Eleanor Roosevelt visited Appalachia and reported back to President Franklin D. Roosevelt on the substandard living conditions. She described that while the time was the 1930's the region was like it was the 1870's (Salstrom, 2004). The region was corrupted politically during The Civil War Reconstruction and was never pulled back together (McKinney, 2004).

Once WWII gave the region progress with its labor force though the TVA (Tennessee Valley Authority), REA (Rural Electrification Administration), and the CCC (Civil Conservation Corps) via absentee influence the region progressed. When the war was over things began to



decline once again and John F. Kennedy visited West Virginia and saw similar things that Eleanor Roosevelt saw thirty years prior and wanted to start the War on Poverty (Eller, 2008).

Once media (television) took hold of poverty in Appalachia when President Lyndon B. Johnson launched the War on Poverty cameras have not stopped flocking to the region to view how the poor hillbillies are living. An episode on CBS in the 1960's with Dan Rather, *Forty-Eight Hours*, went to Floyd County, Kentucky to show the images of what looked like a third world country. These images showed run down houses, broken down cars, trash all over the place, malnourished children, among other things. After that the media has solely focused on an image of the poor, lazy, and uneducated hillbilly in films and TV shows, such as *Silence of the Lambs*, *Deliverance*, *Wrong Turn*, *The Beverly Hillbillies* (even though that took place in the Ozark Mountains it was still thought to be Appalachia), *The Andy Griffith Show* and *Wild and Wonderful Whites of West Virginia*. All promote the stereotype projecting negative thoughts and beliefs onto middle class America regarding their perception of Appalachian people (Hsiung, 2004).

In the Appalachian context in which people may be suffering from SAD, outsiders could develop a stereotype in which Appalachians are lazy, poor, and uneducated. Again, this comes full circle. A study conducted by Dr. Michael Inzlicht (2010) explored what happens to people after they are stereotyped. Inzlicht found that stereotyped people tend to be more aggressive, exhibit a lack of self-control, make trouble rather than make good rational decisions, and overindulge on unhealthy foods.

In 2008 Huntington, West Virginia, in the heart of Appalachia, was brought back into the media spotlight once again with the CDC's report of Huntington being the unhealthiest city in the country. The media not only told the story of how the region was eating and living an

unhealthy lifestyle, but it brought back the image of how the region was somewhere else, as if it was another America. The negative stereotypes began to resurface, that the region was poor and had lazy and uneducated people.

I am proposing that the region's unhealthy lifestyle can be a result of a much deeper issue than just the stereotype of the region. The possibility that the climate is causing symptoms of SAD year round could be the reason for the problem. Living in the region, I know that I have recognized a change in my personal lifeway. The climate does get to me. When it's rainy or cloudy out I do not feel as energetic and I tend to drink more soda, eat more junk foods, and play more video games. I do not feel that the stereotype has affected me, but I am not native to Huntington or West Virginia, but for some who have heard that they are hillbilly and what a hillbilly is over time that is how they are going to identify themselves, that is what is expected of them. They are identified as a coal miner, as poor, as lazy, as uneducated. What would be the push to move forward if Hollywood and the national media only reinforce these stereotypes?

Many of the same symptoms that are attributed to SAD are some of the Appalachian traits which Jack Weller describes in his book *Yesterday's People* (1965). These symptoms include: depression, hopelessness, anxiety, lack of energy, oversleeping, lack of interest in activities which were once enjoyed, change in appetite with craving for high carbohydrate-filled foods, weight gain, substance abuse, and difficulty concentrating and processing information (Mayo Clinic Staff, 2009). For example, Weller found that Appalachians were not socially outgoing. One of the symptoms of SAD is social withdrawal according to the staff at the Mayo clinic.

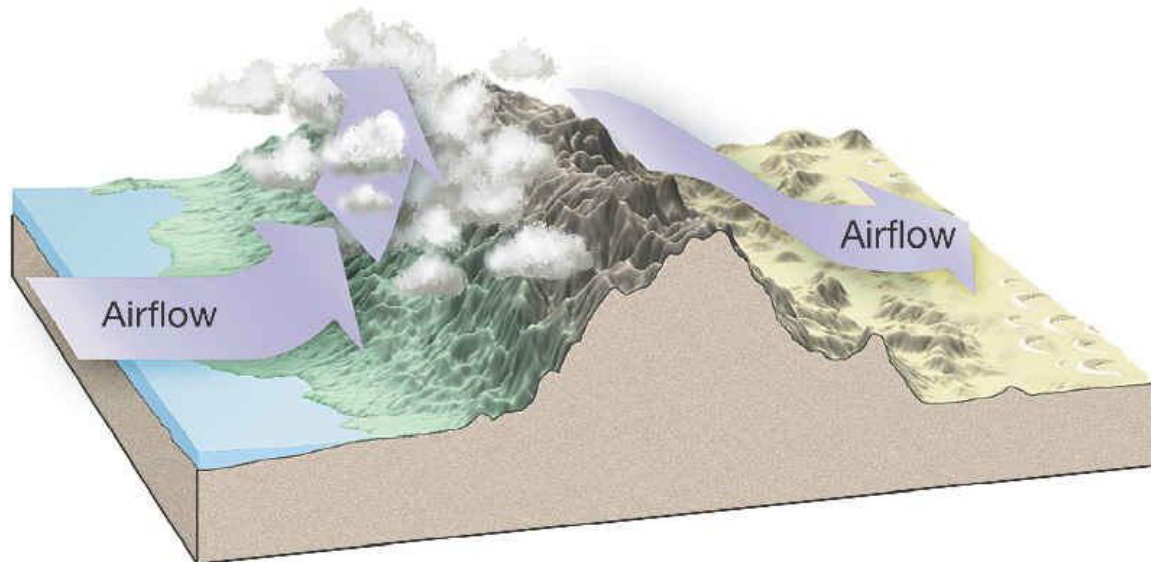
The symptoms are recurring with the seasons. They come and go at the same time frame each year. They come about during late fall and go away when days begin to get sunnier (Mayo Clinic Staff, 2009).

Three things happen in the fall and winter when this depression recurs: your circadian rhythm (biological clock), your melatonin levels, and your serotonin levels become unbalanced. First the circadian rhythm gets off balance and causes you to have an erratic sleep pattern. Second, the melatonin level which plays a role in the sleep patterns and mood is off balance, and third, the serotonin, which is a brain chemical that affects mood levels, is unbalanced. All three of these are affected by a lack of sunlight during the winter months.

Huntington may have undocumented cases of seasonal affective disorder or SAD. Gallup polled residents of the Huntington, tri-state, regional area in 2010 and found that 32.1% of persons said they had been diagnosed with depression. This finding places the region as the number one depressed area of the 188 metropolitan areas surveyed. A large number of these depressions may be undiagnosed seasonal affective disorder.

I argue that, because of the unusual weather patterns that the region experiences, the city lives with a weather system that supports all of the symptoms of SAD year round, not just during the winter months. SAD has been described by the Mayo Clinic Staff as the “Winter Blues” because of the lack of sunlight due to the shorter days during the winter months. What can be recognized in Huntington is that there is an unusual number of cloudy and partly cloudy days, and a high amount of precipitation due to orographic uplift. Webster's dictionary defines orographic uplift as the lifting of air. Webster's also defines orographic effect as the effect on the passing flow of air over mountains, which may cause the lifting or diverting of air, creation of

clouds, and increases in leeward precipitation caused by its passage up and over mountains or other sloping terrain.



Orographic uplift

[www.geography.hunter.cuny.edu](http://www.geography.hunter.cuny.edu)

According to NOAA (National Oceanic and Atmospheric Administration), which keeps records of these factors over an extended period of time, Huntington receives an average of only 63 days of sun per year. That leaves 304 days of year to be cloudy, nearly 80% of the year. Again, according to the Mayo Clinic Staff, a main cause of SAD is a lack of sunlight and if Huntington is only getting adequate sunlight 20% of the year, then the symptoms will stay consistent throughout the year, not only occurring during the winter months. This is root of the problem that this thesis is seeking to obtain preliminary information about by asking the types of questions the survey addressed. The survey questions were designed to see if behaviors of the participants fell under seasonal affective disorder symptoms and were present throughout all four seasons of the year.

Another contributing factor is the amount of rain that comes along with this high amount of cloudy days. According to NOAA, Huntington, West Virginia, receives an average of 42.31 inches of precipitation annually. It could be argued that other areas get that much rain, if not more, annually, such as Seattle, Washington. According to NOAA Seattle gets 37.07 inches of rain annually, slightly less than Huntington. The difference is the amount of rain that falls each month. In Seattle, the rain amounts fluctuate from season to season, along with the sunny and cloudy days. No month in Seattle has the same number of sunny or cloudy days and the levels of precipitation fluctuate each month. In Huntington each month the sunny and cloudy days are balanced, along with an average of 3.5 inches of precipitation each month. I argue that these numbers, which convey the number of sunny and cloudy and rainy days, caused by orographic uplift and its effect, contribute to the health issues in Huntington, West Virginia, in that they are causing unrecognized seasonal affective disorder.

According to Michael E. Ritter (2006) from the University of Wisconsin, Stevens Point Geology Department, orographic uplift is where clouds hit the side of a mountain and create a shadow and drops precipitation where the cloud stands. The mountains themselves also cause a shadowing effect. At the bottom of the mountain, where houses are built, the sun does not reach these houses until later in the day and it leaves earlier causing less daylight in the hollows. For instance, instead of the sunlight shining at 7 a.m. and lasting until 8 p.m., it only shines from 10 a.m. until 4 or 5 p.m. All of these factors have the potential to contribute to consistent year round SAD symptoms instead of just during the winter months.

In looking at other areas of the country in the past for comparison, the Indians of the Northwest Coast had a culture that thrived. They had an egalitarian system that had the most up-to-date culture. Their people had an ecosystem that favored them. They had plentiful food

sources and fitting weather to do the things they needed to do. They were able to keep a full stock of food and used the time left over on the social, political, material and religion of the culture (Garbarino and Sasso, 1994).

The Indians of the Southwest and the Great Basin were truly remarkable in molding their contemporary lifeway. They grasped the basics of what would later be termed cultural ecology. They had an ecosystem that was less favorable, but they had to focus on how to adapt to it rather than to use it. The land was dry with a low percentage of rainfall per year and they had an understanding of the climatic equilibrium (Garbarino and Sasso, 1994).

Much of the Eastern Woodland Indians' ecosystem, which historically includes the steel belt and the coal mines of Appalachia, falls under an interesting climate; the climate is not terrible but not perfect. The amount of rainfall and cloudy days documented shows a higher number of each than would be expected. Just as animals do, when it rains or the sun isn't shining, humans tend to hide out in their homes and vegetate. People watch movies, eat junk food, drink soda, and are not very active. Again looking at the climate statistics, the average number of sunny days per summer in the Huntington-Ashland metropolitan area is 63. The average annual number for partly cloudy days for Huntington is 99; the average annual number of cloudy days for the city is 203. Average annual precipitation recorded over a thirty year period for Huntington is 42.31 inches (NOAA, 2008).

Jared Diamond (2005) discussed in a chapter titled "*The Ancient Ones: The Anasazi and Their Neighbors*" in his book *Collapse* the rise and fall of the Native Americans in the Southwest. Unlike Appalachia, the southwest ran out of natural resources. The weather patterns are nothing like the weather patterns in Appalachia. The area was not favorable to begin with and the people had to adapt methods such as irrigation and alluvial groundwater tables to support

crops. The region exploded and some of the most magnificent Native American constructions were left behind. The people inhabiting places such as Chaco Canyon consisted of elite and peasants. Archaeological evidence shows that the area must have run out of resources and due to its power outside resources were brought in. Diamond explains this outside support by comparing the power of Chaco Canyon to Rome and London which do not serve as anything but political and religious centers (Diamond, 2005, pp.136-156).

Diamond also discusses the issues of a more modern region in Montana. Missoula, Montana, just as other places has its social issues. Like West Virginia and Appalachian communities, Missoula, Montana suffers from similar socially affected problems, such as outsiders developing the region for personal use, and corporate mining affecting the water supplies. Diamond says “Thus, seemingly pristine Montana actually suffers from serious environmental problems involving toxic wastes, forest, soils, water, climate change, biodiversity losses and introduced pests. All of these problems translate into economic problems” (Diamond, 2005, p. 56). As with West Virginia, Montana’s natural resources made the state’s wealth. Several areas lend themselves to a comparison: both have mines, copper in Montana and coal in West Virginia, both have had large timber production in the past, and both have had poor dam construction. Diamond discusses issues with a dam just north of Missoula that is poorly constructed due to lack of government regulations, which could lead to water contamination if the dam fails. West Virginia too has had water issues due to poor coal mine regulations (Diamond, 2005, pp. 25-76).

Diamond discusses that the Bitter Root Valley, the valley in which Missoula rests, is a poor region in the United States (Diamond, 2005). According to the latest U.S. Census Bureau, Missoula’s population is 66,788 with a median income of \$36,547, similar to the Ohio Valley,

where Huntington exist, with 49,138 people and a median income of \$27,858, which is also considered a poor region in the United States. Both suffer from absentee owners extracting the natural resources, with wealth leaving to corporate coffers located elsewhere and then the owners leaving once those resources are gone. Now both regions are considered to be struggling economically.

Thus in trying to understand Huntington, West Virginia's health issues, it is important to look at another city of similar size and experiencing similar economic and social issues for comparisons. With so many similarities between the two metropolitan regions, two things stand out that are not similar: 1. the weather patterns and 2. the state of health of the citizens.

Missoula's weather patterns based on clear, partly cloudy, and cloudy days are not the same as Huntington. Throughout the winter months the numbers come close, but the growing seasons are not. The number of sunny days in Missoula is 75, partly cloudy is 83, and cloudy days is 208. A much bigger fact that the two regions differ in is the amount of rainfall which contributes largely to cloudy days. Missoula is on the rain shadow or leeward side of the Bitterroot Mountain range.

According to NOAA (National Oceanic Atmospheric Administration) Missoula accumulates an average of 13.82 inches of precipitation and Huntington accumulates an average of 42.31 inches of precipitation (NOAA, 2008). The CDC has reported the Huntington-Ashland metropolitan area as being the unhealthiest in America. Missoula has not been surveyed but the city of Kalispell, Montana, in the county directly to the north was and was shown to be in the middle of the pack in the healthiest and unhealthiest city survey (DeNoon, 2008). Huntington then would seem to be troubled by not only a lower number of sunny days but also a higher amount of rainfall than Missoula.



In 2008, when the CDC published the study which stated the Huntington-Ashland metropolitan area to be the unhealthiest city in America, a report published by msnbc.com from the Associated Press followed up on the CDC report and showed that nearly half of the adults in the Huntington-Ashland metropolitan area are obese. The city leads in a half-dozen illnesses too, such as heart disease and diabetes and the highest percentage, around 50%, of the elderly people who have lost teeth or all of their teeth (Associated Press, 2008). These reports suggested that the region developed these health issues simply based on its culture and economics. According to the CDC report 24.3 % of people age 18 or older are in either fair or poor health, 35.8% suffer limited activities due to physical, mental or emotional problems, 31.4% say they do not have the opportunity for leisure/physical activity time, 12.7% are told they have diabetes, 45.5% of citizens age 20 or older are told they are obese, 21.6% are told they have coronary heart disease, and 48.1% age 65 and older have all of their natural teeth extracted (Associated Press, 2008).

As indicated in the MSNBC report much of the issue is attributed on economic trouble in Huntington. Pizza and hotdog restaurants are very common, the unemployment rate is high and the jobs that are within the region are low paying service industry jobs. Families with low income may be more attracted to the cheaper fast food restaurants which provide enough food for a family of four for around ten dollars (Associated Press, 2008).

It was reported by the Associated Press (2008) that there may be a lack of concern for exercise and not many places within Huntington to support exercise. People have only a few places to exercise: the YMCA, the Marshall University recreation facility, and the surrounding neighborhood parks. Another concern for a lack of exercise is the deteriorating sidewalks and the lack of walkways along rural roads. Also blamed may be a lack of motivation and cultural attitude toward exercise. Exercise is believed to be for the well-to-do. The well-to-do have the

money to pay for the shoes and clothing to exercise in, the gym membership cost, and simply the time to actually go exercise.

Dr. Thomas Dannals, a Huntington family physician, said there is a connection between education and lack of exercise. Dannals said “The uneducated don’t know the value of it. They don’t have the drive for it. There’s a reason you’re successful, you’ve got drive. The same is true for exercise” (Associated Press, 2008). According to the Associated Press (2008) article on MSNBC, the cultural belief behind the diet in Huntington, West Virginia stems back generations. Dr. Harry Tweel, Director of the Cabell-Huntington Health Department, said people in Huntington are reluctant to change their diet because it is the diet that they grew up on. Many of the people have an attitude of “You’re not going to tell me what I can eat.” The cultural attitude is ‘My parents ate that and my grandparents ate that’. According to a report done by CRAI (Cultural Resource Analysis Inc.) people within the region have been eating corn for nearly 800 years; corn is still a popular food within the Huntington region (Niquette and Crites, 2008). Dr. Elizabeth Engelhardt from the University of Texas at Austin also says food can define a culture. Engelhardt says food does the work of culture. Food begins with its uses, preparations, and costs, but ends with social histories of race, class, gender, and place that hide the ingredients and food practices. Engelhardt also found that Appalachians preferred cooking cornbread because it was easy and quick (Griffith, 2005). When the health issues arose within Appalachia, cornbread became a target (Tabler, 2010). Much of Appalachian food is based on corn in some form. The trend can be traced back to prehistoric Indians living within the region. Then also the people suffered from diet issues. People many years ago suffered from poor diet which is shown by evidence in the tooth decay once corn was introduced into the diet (Larsen, 2002, p. 1428).

Politically the local government leaders do not want to fight with the people and business

owners over the fat content within the food. The region needs as many businesses as possible and the strong hold of politicians trying to tell people what they can and cannot eat and restaurants what they can and cannot serve would be political suicide in a region that is so reluctant to change its diet (Associated Press, 2008).

### **Seasonal Affective Disorder (SAD) characteristics**

Seasonal affective disorder can be triggered by the lack of available natural sunlight that one receives, causing a drop in vitamin D. There are two types of SAD that recur each year: winter and summer onset. Summer onset is very rare; the majority of the people affected by a form of SAD are affected by the winter onset type. According to the Mayo Clinic (2009), symptoms can start in the fall lasting throughout the winter. Commonly thought of as the “winter blues” this depression takes people's energy away making them feel moody and depressed. The effects of SAD is sleeping more, eating more, and being less active.

In 1984, Norman Rosenthal and colleagues reported on a study of twenty-nine patients who experienced recurring bouts of depression that occurred annually during the fall and winter seasons. It was in this article that the term Seasonal Affective Disorder (SAD) was named and described (Rosenthal, et al. 1984). Their preliminary studies on 11 of those patients suggested that being exposed to bright artificial light during the day had an antidepressant effect. In one patient connections were made to northerly latitudes and exposure to daily sunlight on vacation. After exposing another patient to early morning artificial light therapy, her depressive symptoms dramatically improved. Patients participated by using light therapy in the form of a light box utilizing bright, white full spectrum fluorescent light for three hours before dawn or at dusk while reading or doing other tasks. The Rosenthal study is considered the main study bringing SAD to our mainstream attention. The problem had been known for a long time but theirs was

the first to describe the symptoms, name the disorder, and connect it to environmental factors such as light exposure, latitude, and climate.

Since that study a number of others have been published. In a more recent article in the *British Journal of Psychiatry*, John M. Eagles brings us up to date on the highlights of research into seasonal affective disorder since the 1984 Rosenthal study (Eagles, 2003). Over those nearly twenty years, numerous aspects of SAD have been examined: biology/physiology, relationship of SAD to other affective disorders, epidemiology, light therapy rate of success, normalcy or illness of SAD, as well as overviews of the diagnosis and management of SAD. Eagles is convinced that a great number of people are affected by the symptoms of seasonal affective disorder although they may not feel they need to seek help.

Jacobson, Wehr, Sack, James, and Rosenthal published an article in the *American Journal of Public Health* in 1987 which listed the symptoms of seasonal affective disorder in tabular form. Symptoms reported by 156 patients included high percentage of decreased activity, sadness, irritability, anxiety, increased appetite, carbohydrate cravings, increased weight, decreased libido, increased sleep (including later awakening, earlier onset, change in quality, and daytime drowsiness), milder symptoms near the equator, menstrual, work, and interpersonal difficulties. Forty-six percent (46%) had received no treatment for their symptoms. The authors obviously felt there was a public health issue and suggested further studies on the general population and applicability of light therapy.

John M. Eagles and others in 2002 in the *British Journal of Psychiatry* addressed the fact that patients with SAD are heavy users of health care services. The article points out the costs in terms of health care necessary for patients with SAD symptoms and “help-seeking” behaviors

(just can't do it without help or can't get motivated to change). Also the many symptoms they report are not specific and many tests are run in order to arrive at a diagnosis. Also SAD may be overlooked or not diagnosed. Eagles provides as background that little is known about the presentation and management of seasonal affective disorder in primary care (Eagles et al. 2002). It was interesting to note that none of the 123 patients studied had an actual diagnosis of SAD from the primary care physician although they showed a number of symptoms associated with the disorder.

As previously mentioned, Rosenthal and Sack in 1984 said some of the symptoms of SAD are increased appetite, carbohydrate cravings, and increased weight. The National Institutes of Health reported in 2008 on the growing problem of obesity in children and ties to depression (Reeves et al., 2008). A section of the article was devoted to the existence of seasonal affective disorder in youth. Based on a community study of over 2,000 youth, up to 5.5% of youths ages 9-19 years old are affected by seasonal affective disorder. The children reported that they felt worse, ate the most, slept the most, and were the most irritable in the winter months. Inclusion of youngsters in the seasonal affective disorder conundrum adds another dimension to the problem. As with adults, there are probably more children experiencing symptoms and they are not being diagnosed or helped. In seasonally affected adults, decreases in the brain chemical serotonin during winter mood episodes has been reported, resulting in carbohydrate cravings and overeating. It would not be a stretch to say this occurs in children too.

According to the Seasonal Affective Disorder Association (SADA) the following symptoms of SAD are: depressed feelings, sleeping more often and oversleeping with difficulty staying awake throughout the day causing fatigue to affect the abilities to carry out regular daily routines, an increased craving for carbohydrates and sweet foods leading to an increase in

weight, difficulty concentrating or remembering, irritability, social withdrawal, and anxiety (The Seasonal Affective Disorder Association, 2011). Melatonin is the hormone that is affected within one's system that initiates all of the symptoms of SAD. It regulates one's sleep patterns and mood. Melatonin is activated by the amount of sunlight that one receives (Mayo Clinic Staff, 2009).

To prevent these symptoms from occurring, the Mayo Clinic suggests that people be exposed to sunlight ten to fifteen minutes twice a week (Mayo Clinic Health Library, 2005). In the Huntington-Ashland metropolitan area this level of exposure can be difficult to achieve all year round, let alone in the winter months. According to NOAA (National Oceanic and Atmospheric Administration) the Huntington-Ashland metropolitan area gets very few clear days for proper sunlight exposure. For 34 years NOAA's records show that there is an average of 63 sunny, 99 partly cloudy, and 203 cloudy days per year (NOAA, 2008), which means more than half of the year there is little to no sun to be exposed to. For the past 30 years NOAA has not only recorded a high number of cloudy days but also a high amount of precipitation that is accumulated throughout the year. On average there are 42.31 inches of rain each year in Huntington. It is close to the amount of 37.07 inches of rain each year for Seattle, Washington, popularly believed to be the rainiest city in the US. The difference is that Huntington gets an even amount of rain each month in an average of 3.55 inches of rain each month whereas Seattle, Washington, gets rainy seasons followed by dry spells. For a few months Seattle can receive up to six inches of rain, then less than half an inch of rain the following few months (NOAA, 2008).

The health issue in Huntington, West Virginia, is thought to be a result of the culture in which people are poor, lazy, and uneducated. I argue that the region is suffering from SAD-like symptoms year round due to the weather patterns that the region endures. The numbers of

cloudy, partly cloudy, and rainy days are causing the winter-onset SAD symptoms to occur year round. In nature a bear eats a lot to build up a fat supply for hibernation. Symptoms of SAD get people to eat more during the winter months; SAD symptoms also make people feel lethargic keeping them from being out of the house as much. The abundance of gray days triggers the mind thinking that it is winter all year around causing the obesity problem within the region. As discussed previously, the stereotypes of a poor, lazy, and uneducated population are reinforced by media coverage and become a self-fulfilling prophecy. Next to be discussed is how this project was carried out to see if there is any correlation between people's eating habits and the weather patterns.

## **Methods**

Huntington, West Virginia, was chosen for this study because of the health issue that the Center for Disease Control (CDC) has reported on, that Huntington, West Virginia, is the unhealthiest city in the United States. This particular study was developed because of astute observation of the climate that the region endures. Many believe that economic downturn is the result for the poor health conditions within Huntington. I heard of the report that Huntington was the unhealthiest city in the nation. I was new in town and noticed the way the climate was. I noticed myself being less productive and energetic than I usually was. I searched for information on seasonal affective disorder occurrence in the Huntington region and found none. I did find that diagnosed depression was reported in a third of the population in a recent Gallup poll.

The survey planned was an introductory one to see if the case could be made that the area may have as yet unrecognized cases of seasonal affective disorder occurring year round that may be connected to unhealthy habits and behaviors. The convenience group that could be studied was through Marshall University via a free on-line survey, Survey Monkey. This would allow for a descriptive and preliminary study to find out if the student group could provide a microcosm of what might be occurring in the general Huntington population.

### **Methods for Collection of Data:**

To examine the theory that the SAD symptoms are prevalent year round and not just during certain seasons an online survey was developed to carry out this study to see if the climate is having an effect on the health of the people living in Huntington, West Virginia. This survey was distributed at the end of the summer, fall, winter, and spring seasons, to a convenience sample of undergraduate and graduate students in social science courses at Marshall University



located in Huntington. The survey was left open for two weeks at the end of each season for collecting of data. To measure the data a series of questions was developed to evaluate what people were eating and drinking, how much sunlight people regularly got, whether they were fully rested, and what kind of activities they did regularly. These queries were based on the type of symptoms that have emerged in health studies as being associated with seasonal affective disorder.

The questions chosen for the survey were based on studies previously done by others regarding persons displaying SAD symptoms. Rosenthal, et al., in 1984 described SAD sufferers as having hypersomnia (oversleeping, unplanned daytime sleep and an inability to remain alert), overeating, and carbohydrate craving. For these reasons questions were designed for the survey regarding sleep patterns, eating habits, and types of food partaken. The survey questions regarding eating habits were designed to include beverages consumed, snacks eaten, food groups chosen, and how meals were prepared in order to gauge overeating and carbohydrate cravings. These are all factors which can lead to obesity among the population. Sleep habits were included in a separate question. Jacobson, et al., followed in 1987 with a list of SAD symptoms which included the above along with decreased activity, feelings of fatigue, and mood changes. The survey explored these symptoms in questions regarding activity levels, time spent on electronics, and evaluation of productivity levels. Both Rosenthal and Jacobson engaged in research using light therapy for improvement of symptoms, so a question was included in the survey regarding the amount of time spent outdoors in natural light.

Eagles, et al. (2002), proposed that many cases of seasonal affective disorder are either unreported, undiagnosed, or reported as other illnesses. That may be the case in the Huntington region. The sample chosen, while small, was expected to provide a microcosm of the larger

regional population as almost 80 percent of Marshall University students come from the region. If many cases go unreported, then the symptoms should be expected to show up in the answers obtained from the sample survey. Research on the number of sunny, cloudy, overcast days, and amount of rainfall which fell in the region, for the purpose of comparing them with the survey question answers, was pulled from NOAA, which keeps continuing records of these factors.

Each survey consisted of ten questions asking what people were eating and drinking, how much sunlight people were getting, whether they were fully rested, and what was their level of regular physical activity. The actual survey questions asked are shown in the Appendix.

The first question covered the demographics to keep track of the age and gender of the respondents.

Question two asked what kind of beverages respondents have been drinking mostly to see if sugary drinks were chosen.

The third question asked what kind of snacks respondents have been eating to see what kind of snacks would be mostly consumed.

Question four asked what kind of food groups have been consumed most since carbohydrate consumption has previously been linked to SAD.

The fifth question dealing with what kinds of meal preparations were used was asked to see if people made the same kind of meals in different seasons.

Question six asked how much time was spent on electronics to see if people spent the same amount of time all year round on electronics.

In question seven respondents were asked what their physical activity level was to see if it changed throughout the year.

Question eight addressed what respondent's productivity level was to see if it was in conjunction with his or her activity level.

The ninth question inquired how much time respondents spent outdoors in natural sunlight. Lack of natural sunlight exposure has previously been associated with SAD.

The tenth and final question asked how much sleep respondents were getting to see if they were they getting enough sleep.

Each of these questions was asked at the end of each season because over the three months of each season people will have gotten into a routine of the questions asked.

To examine this theory that the weather is affecting the health of the region an online survey was developed using surveymonkey.com. Surveymonkey.com is an online survey site that allows surveys to be emailed out to people. For students a free ten question survey is allotted for up to 100 participants per survey. The survey is made up of ten multiple choice questions. In this survey construction, six of the questions contain only one answer that could be chosen and four questions contain multiple answers to be chosen with an optional fill in blank if one of the options does not apply to the respondent. A random selection of 100 students each season in social sciences courses were emailed and asked to participate in the short survey each season totaling up to 341 out of 400 respondents.

The survey was distributed in four waves corresponding to the end of each season to see if patterns are consistent with each season. The end of each season was chosen so that people

could reflect on what they have been doing over the past few months. This was done with the thought in mind that people will tend to possibly get into a habit of eating and drinking a particular food or drink, doing a particular act, such as video game playing or jogging, and following certain sleep patterns.

The group of students from Marshall University also provided a good sample from the general population of the region. The gender ratio of students at the university is 44 percent male and 56 percent female. The average age of students is 23 years; however undergraduate students over 25 years of age comprise 21 percent of the student population. The above figures are from Marshall University profiles from 2008 to 2010.

#### **Methods for analysis of data:**

Once the survey was conducted for each season, the results were organized by survey monkey and put into graphs where each season can be compared against the weather patterns of each season as reported by the National Oceanographic and Atmospheric Association. The weather patterns were put into Microsoft Excel graphs categorized by clear, partly cloudy, and cloudy days. The amount of rainfall for each month of the season was also put into a Microsoft Excel graph to compare each season's rain amount per month.

Finally, once the quantitative material was collected, each of it was examined to assess whether the climate could indeed be a factor contributing to Huntington's health issues.

In analyzing the data received from the respondents, the following types of information were sought from the questions being asked.

Question 1. Asking the ages of the respondents provided a background demographic to the survey. Any future studies could contrast or compare with this demographic.

Question 2. This question was asked because I was looking to see if the respondents were drinking high amounts of soda or sugary drinks. The weather patterns in the region provide less exposure to sunlight which can result in a lack of energy. The sugar in the soda could give people a quick energy boost that is void from the lack of sunlight.

Question 3. This question was asked because snacks loaded with carbohydrates may be filling the void of natural sunlight energy that people may not be getting due to weather patterns in the region.

Question 4. This question was asked because the amount of carbohydrate foods the respondents ate may indicate that the weather is affecting people as to the foods that they are eating. Given the weather statistics people may be more likely to consume carbohydrate foods for a boost in energy levels.

Question 5. Respondents' answers to this question would show if the meals prepared throughout the seasons were systolic or varied. Given that the weather patterns stay relatively the same, it would be predicted the meal preparations would stay the same.

Question 6. To see if there was a correlation with the weather patterns and the amount of time spent on electronics, respondents were asked how much time they spent on digital electronics. Were they spending more, less, or the same amount of time throughout the different seasons. More could mean less time outside because of weather conditions along with less activity and less productivity.

Question 7. In asking about activity level I was questioning if it stayed the same or was low or high year round, or varied. I was looking to see if it was low indicating that respondents were not as active because of the weather patterns. One of the symptoms of SAD is lethargy.

Question 8. The respondents were asked about productivity level in order to see if respondents were more or less productive at different times of the year or if respondents' productivity levels were staying consistently high or low throughout the year. A low productivity level year round could indicate lethargy due to weather patterns and lack of sunlight exposure.

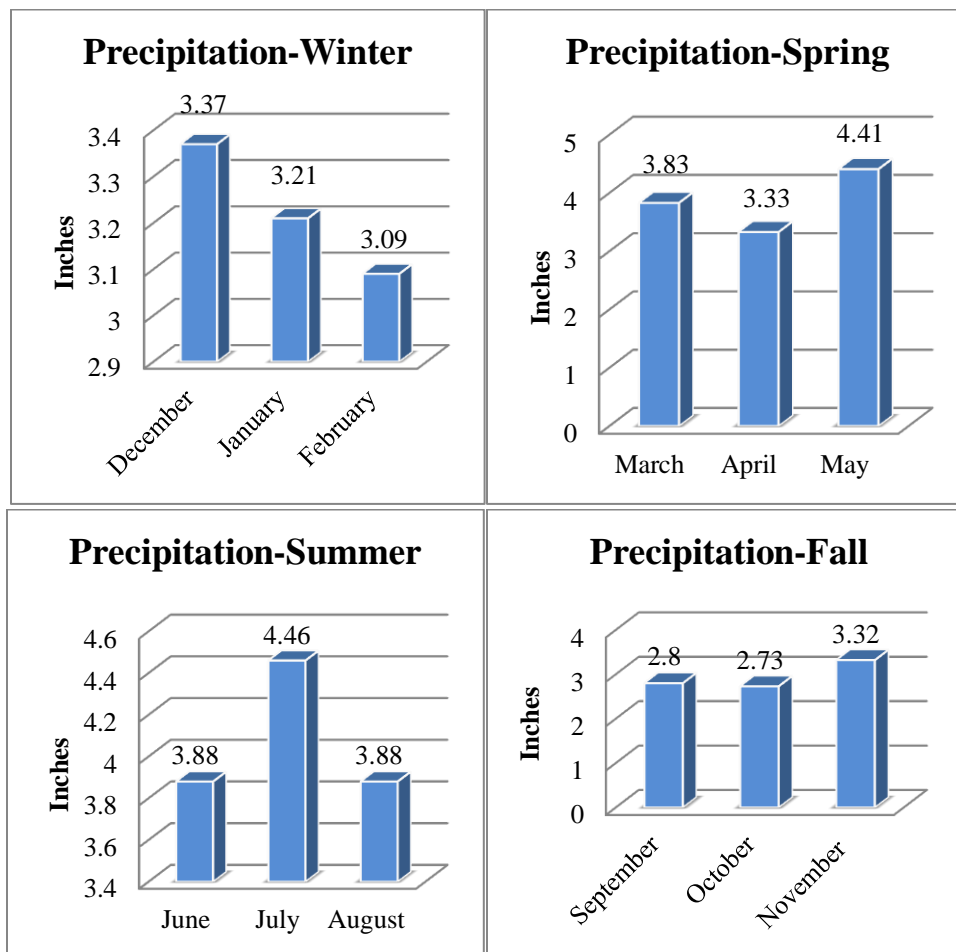
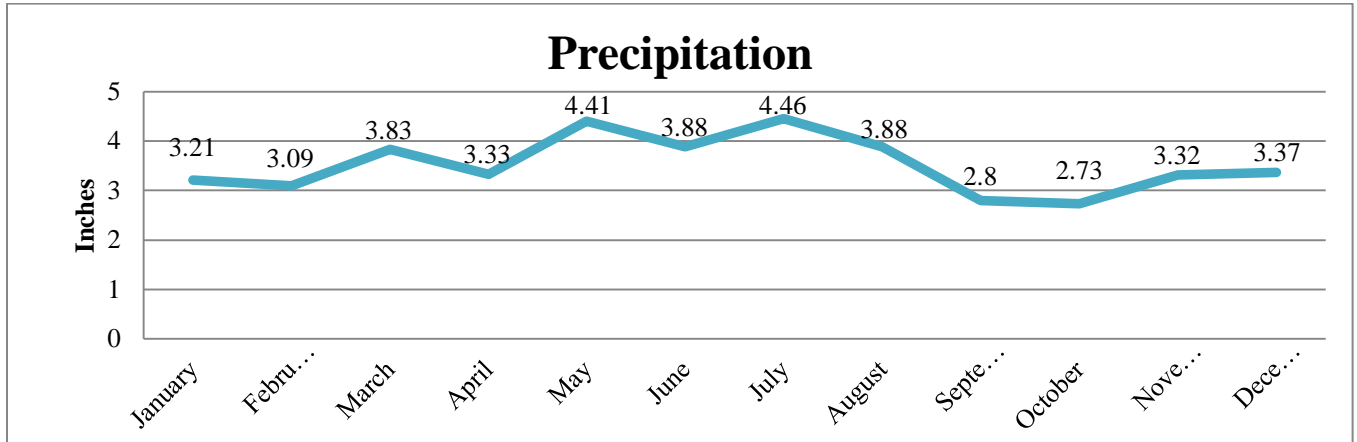
Question 9. In posing this question I was looking to see if respondents spent time in natural sunlight outdoors because a lack of exposure to natural sunlight on the human body is one of the main factors that studies have previously found contributes to seasonal affective disorder. A mainstay of treatment for patients with seasonal affective disorder has been supplying artificial full spectrum light to patients with light boxes.

Question 10. Again, one of the symptoms of SAD is that people feel lethargic. In asking this question regarding sleep, I was looking to see if people in the Huntington region were not getting enough sleep or were getting too much sleep compared to the weather patterns that have been observed to affect Huntington year around.

Once the survey was closed the online survey automatically organized the data. This survey data, along with the crucial weather patterns from National Oceanographic and Atmospheric Association (NOAA), were compared to see if any connections could be made between the two which could explain the health problems affecting Huntington, West Virginia.

## Results

Throughout the year the level of precipitation stays relatively the same for each month.



For the winter season in Huntington, West Virginia, the average precipitation recorded for the past thirty years shows to be within a half inch of each other. Each month shows to be averaging the same amount of rainy days: for December it is 3.37, for January it is 3.21, and for February it is 3.09.

For the spring season in Huntington, West Virginia, the average rain fall recorded for the past thirty years shows each month the precipitation level fell within approximately one inch of each other, coinciding with the partly cloudy and cloudy days of each month. For March it is 3.83 inches, for April it is 3.33 inches, and for May it is 4.41 inches.

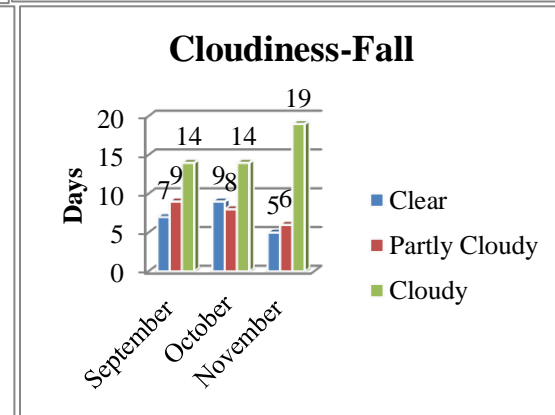
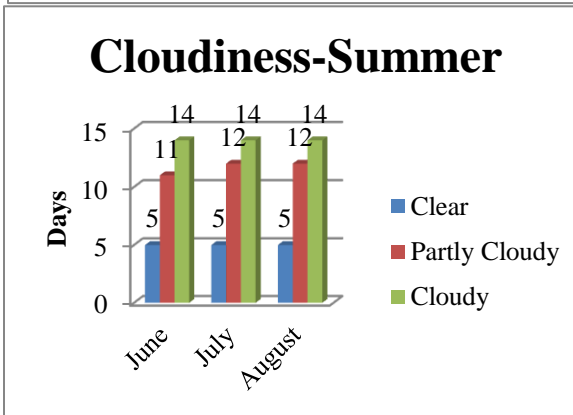
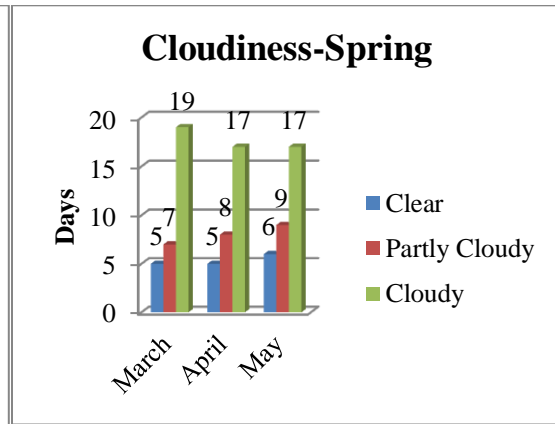
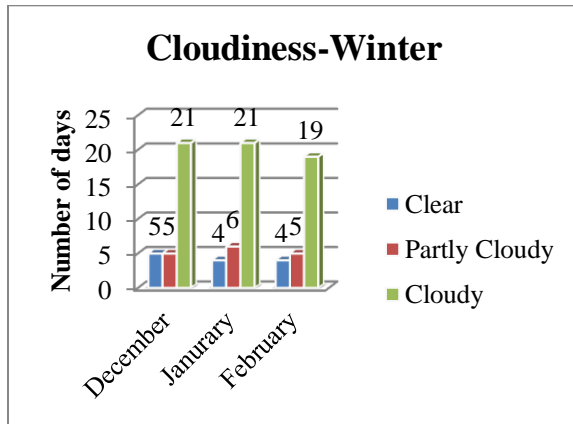
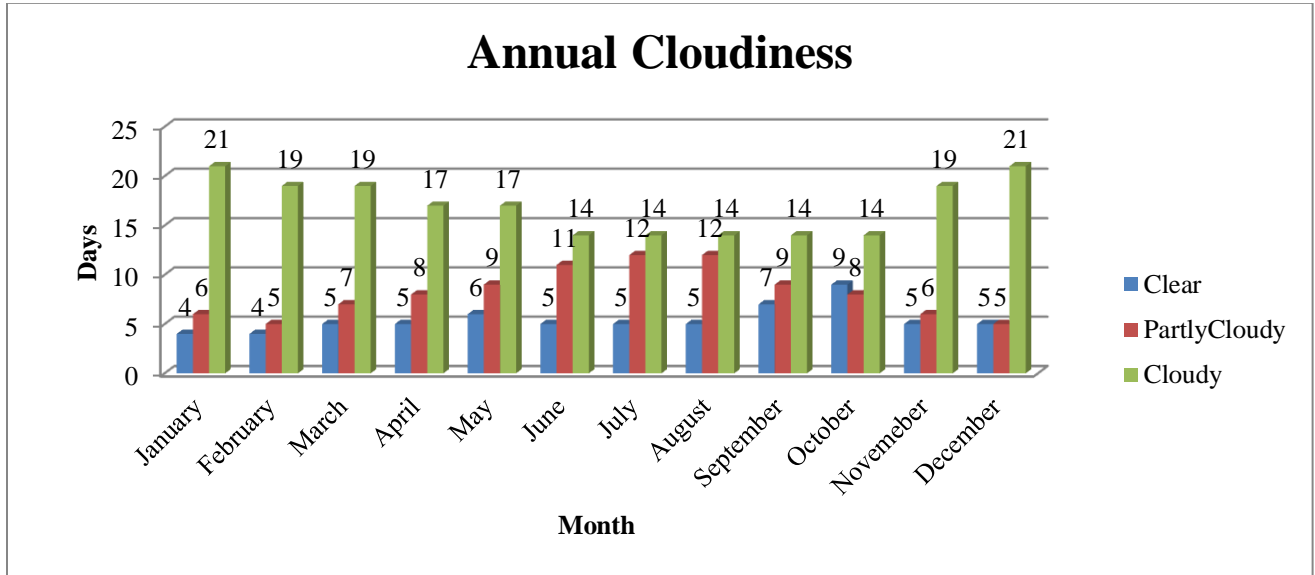
For the summer season in Huntington, West Virginia, the average rain fall has been recorded for the past thirty years. Again the precipitation levels for the summer months were very close, June and August having the same and July having just slightly over a half an inch more. For June it is 3.88 inches, for July it is 4.46 inches, and for August it is 3.88 inches.

For the fall season in Huntington, West Virginia, the average precipitation recorded for the past thirty years shows to be within less than a half an inch of precipitation from month to month. Each month shows to be averaging the same number of rainy days. For September it is 2.80, for October it is 2.73, for November it is 3.32.

The amount of precipitation that occurs in Huntington, West Virginia, each month is between 2.73 and 4.46 inches. Thus a consistent amount of about 3 to 4 inches of precipitation falls each and every month of the year.



Coinciding with the amount of precipitation patterns, the number of cloudy and partly cloudy days follows a similar pattern.



For the winter season in Huntington, West Virginia, recorded for the past thirty years, the clear (CL), partly cloudy (PC), and cloudy (CD) days are as follows: December has an average of five clear days, five partly cloudy days, and twenty-one cloudy days; January has an average of four clear days, six partly cloudy days, and twenty-one cloudy days; February has four clear, five partly cloudy days, and nineteen cloudy days.

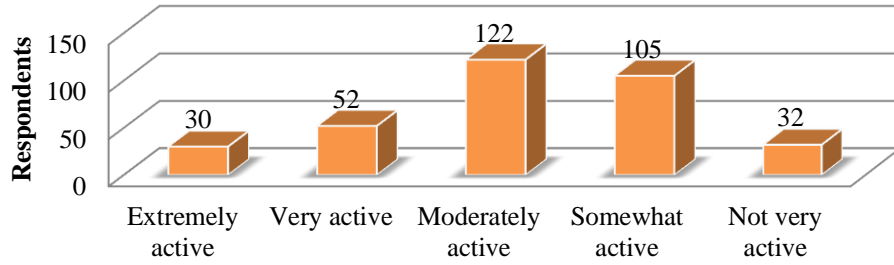
For the spring seasons in Huntington, West Virginia, March has an average of five clear days, seven partly cloudy days, and nineteen cloudy days; April has an average of five clear days, eight partly cloudy days, and seventeen cloudy days; May has an average of six clear days, nine partly cloudy days, and seventeen cloudy days.

For the summer season in Huntington, West Virginia, June has an average of five clear days, eleven partly cloudy days, and fourteen cloudy days. July has an average of five clear days, twelve partly cloudy days, and fourteen cloudy days. August has an average of five clear days, twelve partly cloudy days, and fourteen cloudy days.

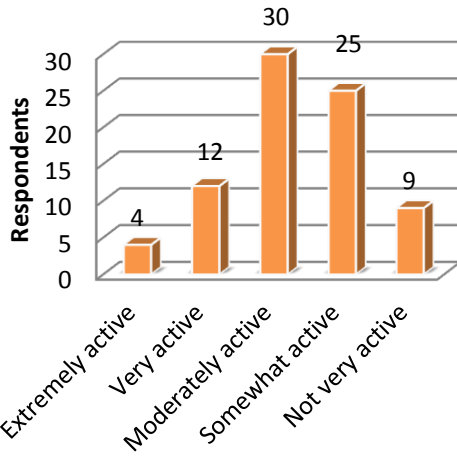
For the fall season in Huntington, West Virginia, September has an average of seven clear days, nine partly cloudy days, and fourteen cloudy days; October has an average of nine clear days, eight partly cloudy days, and fourteen cloudy days; November has an average of five clear days, six partly cloudy days, and nineteen cloudy days.

Just as the precipitation levels show a consistent pattern for each month, the same consistent patterns for partly cloudy, cloudy, and clear days are showing as well. There are between 23 and 27 cloudy or partly cloudy days each month of the year.

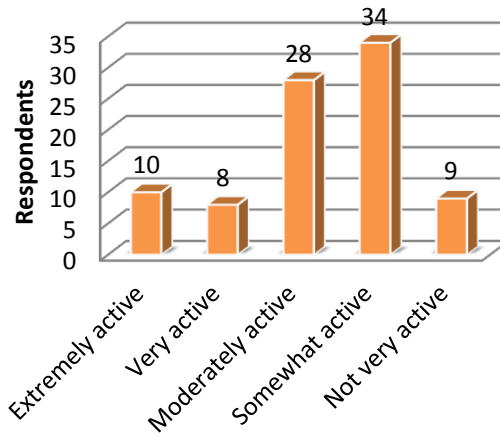
## Annual Activity Level



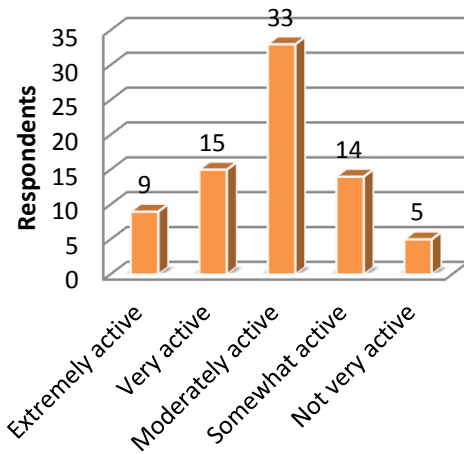
### Winter Activity Level



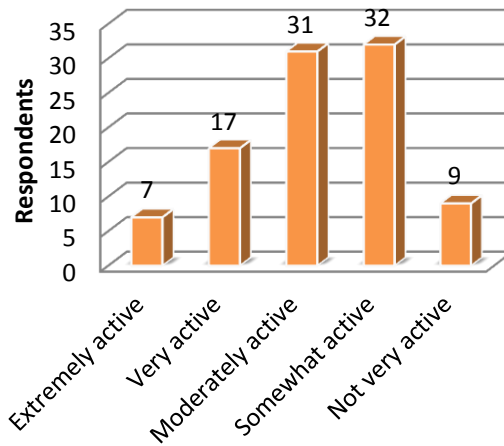
### Spring Activity Level



### Summer Activity Level



### Fall Activity Level



### **Winter Activity Level**

All eighty respondents completed this section. Only one choice could have been selected. Four (5%) said that they were extremely active, twelve (15%) said that they were very active, thirty (37.5%) said that they were moderately active, twenty-five (31.3%) said that they were somewhat active, nine (11.3%) said that they were not very active at all, in the past three months.

### **Spring Activity Level**

Not all ninety respondents completed this section. Only one choice could have been selected. One respondent decided to skip this section. Ten (11.2%) said that they were extremely active, eight (9.0%) said they were very active, twenty-eight (31.5%) said they were moderately active, thirty-four (38.2%) said they were somewhat active, and nine (10.1%) said they were not very active at all, in the past three months.

### **Summer Activity Level**

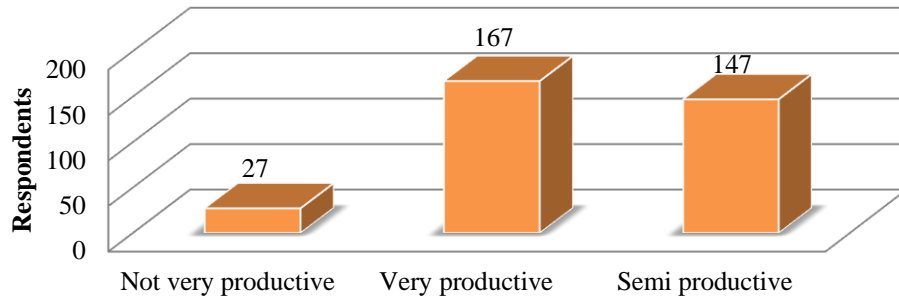
All seventy-six respondents completed this section. Only one choice could have been selected. Nine (11.8%) said that they were extremely active, fifteen (19.7%) said they were very active, thirty-three (43.4%) said they were moderately active, fourteen (18.4%) said they were somewhat active, and five (6.6%) said they were not very active at all, in the past three months.

### **Fall Activity Level**

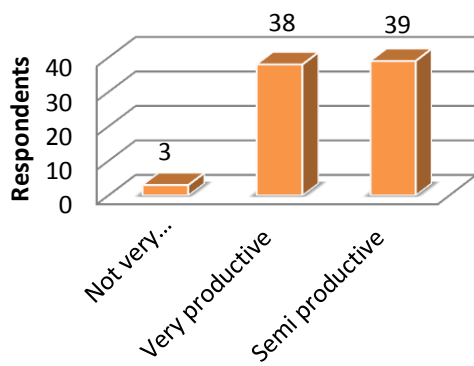
Only ninety-six respondents completed this section; one skipped. Only one choice could have been selected. Seven (7.3%) said that they were extremely active, seventeen (17.7%) said they were very active, thirty-one (32.3%) said they were moderately active, thirty-two (33.3%) said they were somewhat active, and nine (9.4%) said they were not very active at all, in the past three months.

For three-fourths of the year, the activity levels fell in the middle of the graph at moderately active and somewhat active. These levels would be in line with the symptoms of seasonal affective disorder such as lack of energy and decreased activity. Only during the summer did the activity level elevate to moderately active and very active and this would coincide with fewer cloudy days recorded for summer months providing more sunlight to counter SAD as would be predicted by the thesis.

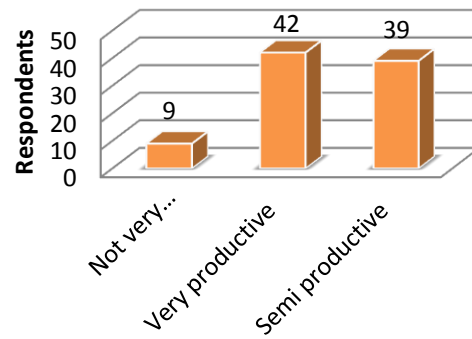
## Annual Productivity Level



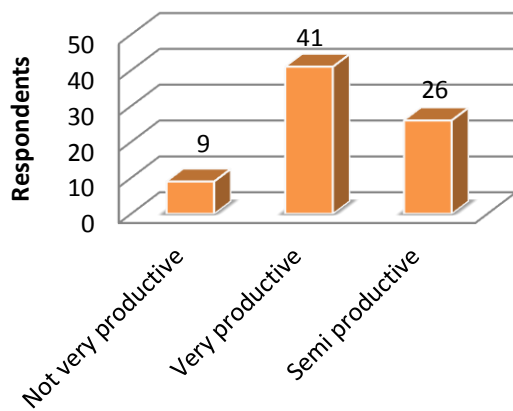
### Winter Productivity Level



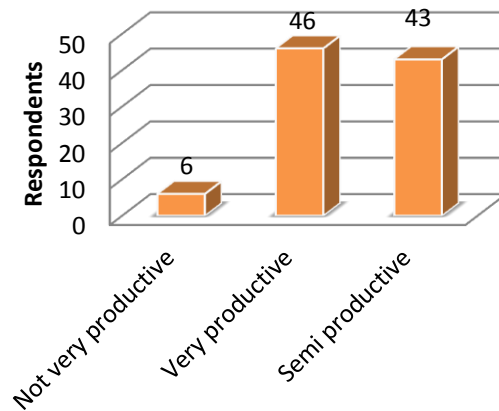
### Spring Productivity Level



### Summer Productivity Level



### Fall Productivity Level



### **Winter Productivity Level**

All eighty respondents completed this section. Only one choice could have been selected. Three (3.8%) said that they were not very productive, thirty-eight (47.5%) said that they were very productive, and thirty-nine (48.8%) said that they were semi productive in the past three months.

### **Spring Productivity Level**

All ninety respondents completed this section. Only one choice could have been selected. Nine (10.0%) said they were not very productive, forty-two (46.7%) said they were very productive, and thirty-nine (43.3%) said they were semi productive in the past three months.

### **Summer Productivity Level**

All seventy-six respondents completed this section. Only one choice could have been selected. Nine (11.8%) said they were not very productive, forty-one (53.9%) said they were very productive, and twenty-six (34.2%) said they were semi productive in the past three months.

### **Fall Productivity Level**

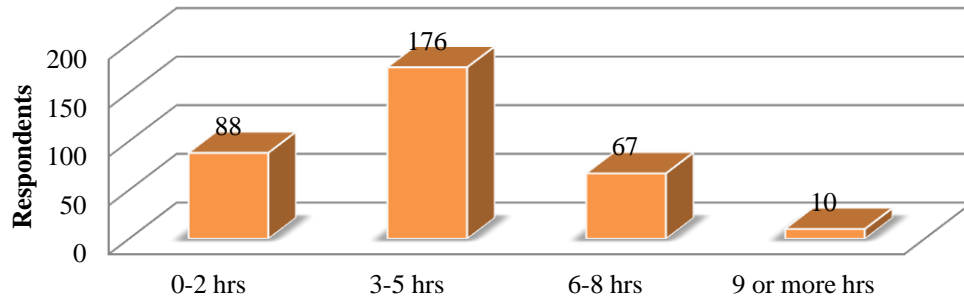
Only ninety-five respondents completed this section; two skipped. Only one choice could have been selected. Six (6.3%) said they were not very productive, forty-six (48.4%) said they were very productive, and forty-three (45.3%) said they were semi productive in the past three months.

The productivity level through three seasons was answered as very productive. This result would be unexpected if people were experiencing symptoms of year round SAD. Only

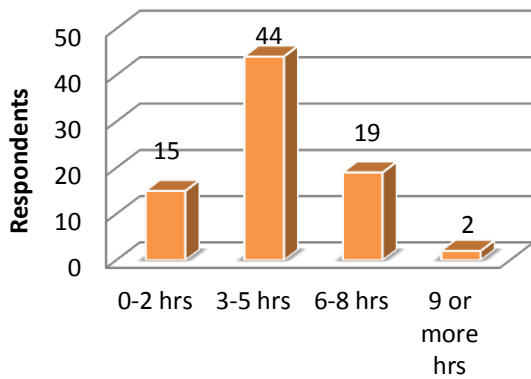
during the winter season was semi-productive chosen first. That result would be more consistent with winter onset SAD.



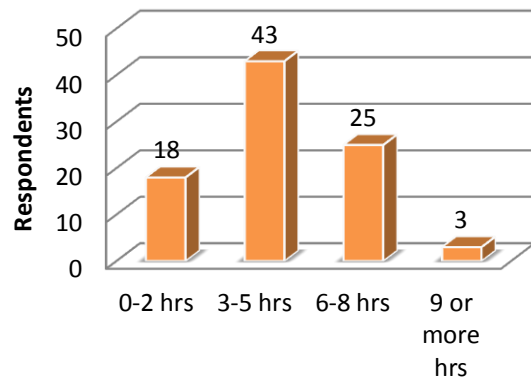
## Annual Time on Electronics per day



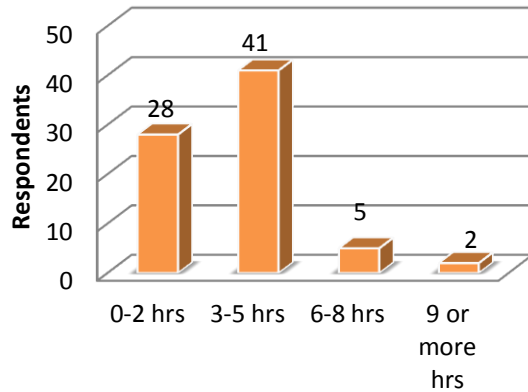
### Winter Time on Electronics per day



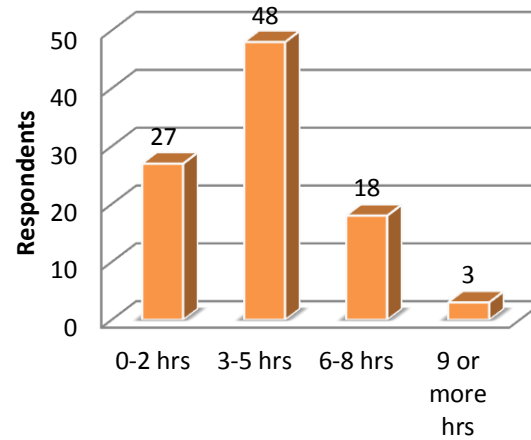
### Spring Time on Electronics per day



### Summer Time on Electronics per day



### Fall Time on Electronics per day



### **Winter Time on Electronics per day**

All eighty respondents completed this section. Only one choice could have been selected. Fifteen (18.8%) spent 0-2 hours per day, forty-four (55%) spent 3-5 hours per day, nineteen (23.8%) spent 6-8 hours per day, and two (2.5%) spent nine or more hours a day on electronics.

### **Spring Time on Electronics per day**

Not all ninety respondents finished this section; one skipped. Only one choice could have been selected. Eighteen (20.2%) spent 0-2 hours per day, forty-three (48.3%) spent 3-5 hours per day, twenty-five (28.1%) spent 6-8 hours per day, and three (3.4%) spent 9 or more hours per day on electronics.

### **Summer Time on Electronics per day**

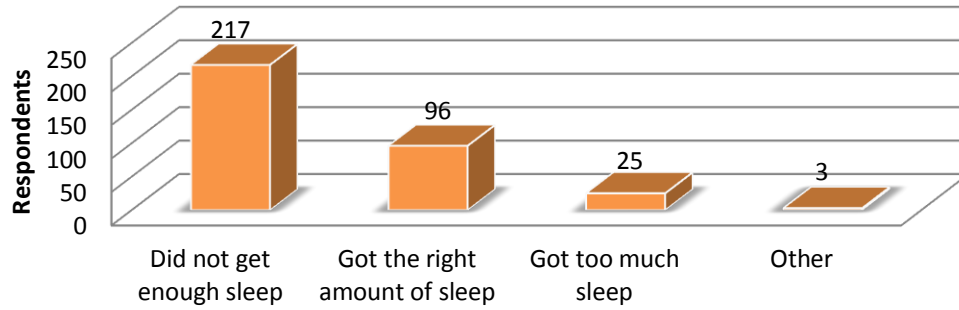
All seventy-six respondents finished this section. Only one choice could have been selected. Twenty-eight (36.8%) spent 0-2 hours per day, forty-one (53.9%) spent hours per day, five (6.6%) spent 6-8 hours per day, and two (2.6%) spent nine or more hours per day on electronics.

### **Fall Time on Electronics per day**

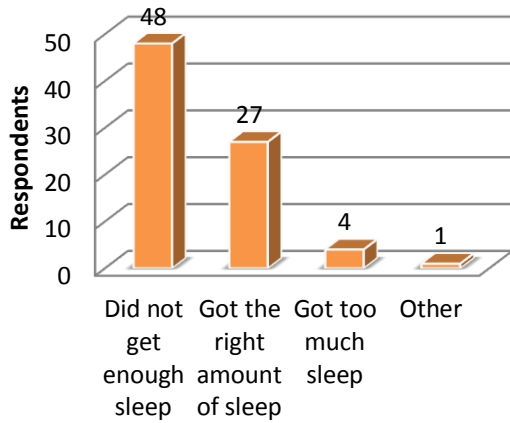
Only ninety-six respondents completed this section; one skipped. Only one choice could have been selected. Twenty-seven (28.1%) spent 0-2 hours per day, forty-eight (50.0%) spent 3-5 hours per day, eighteen (18.8%) spent 6-8 hours per day, and three (3.1%) spent nine or more hours per day on electronics.

The use of electronics for each season was 3 to 5 hours a day. It would be expected that with seasonal affective disorder due to the weather one would spend time on electronics because of not being outside due to poor weather.

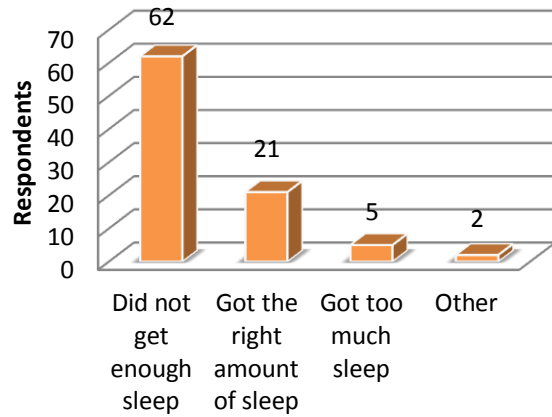
## Annual Sleep



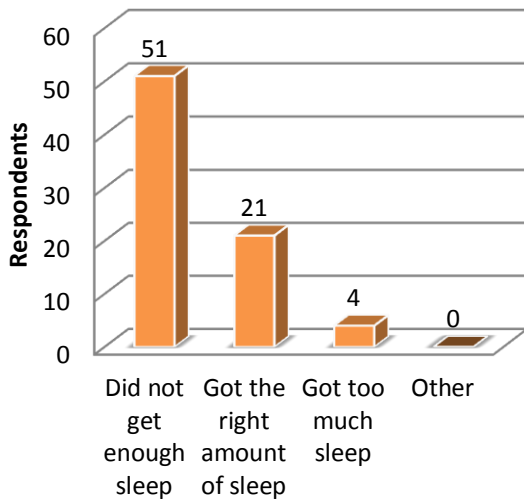
## Winter Sleep



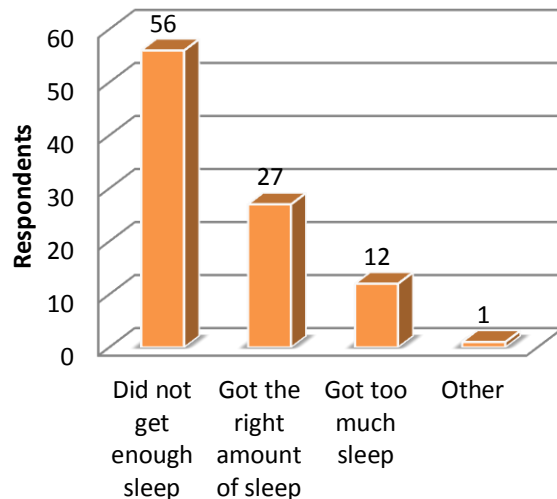
## Spring Sleep



## Summer Sleep



## Fall Sleep



### **Winter Sleep**

All eighty respondents completed this section. Only one choice could have been chosen. Forty-eight (60%) said that they did not get enough sleep, twenty-seven (33.8%) said that they got enough sleep, four (5%) said that they got too much sleep, and one (1.3%) selected other. Other specified: "I've gotten the same amount of sleep as always, but I sleep too much anyway".

### **Spring Sleep**

All ninety respondents answered this section. Only one choice could have been selected. Sixty-two (68.9%) said that they did not get enough sleep, twenty-three (23.3%) said that they got the right amount of sleep, five (5.6%) said that they got too much sleep, and two (2.2%) chose other, and responded with a write-in "I can't sleep at night so I come home from school and work and sleep all evening," and "close enough, not enough though."

### **Summer Sleep**

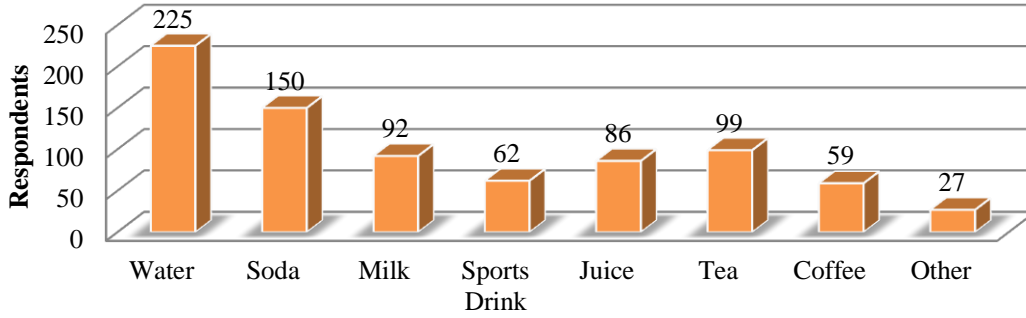
All seventy-six respondents answered this section. Only one choice could have been selected. Fifty-one (67.1%) said that they did not get enough sleep, twenty-one (27.6%) said they got the right amount of sleep, four (5.3%) said they got too much sleep, and zero chose other.

### **Fall Sleep**

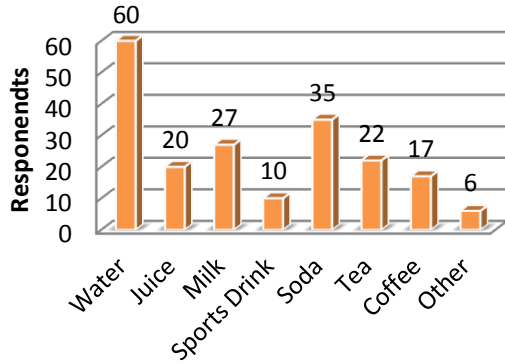
Ninety-six respondents answered this section; one skipped. Only one choice could have been selected. Fifty-six (58.3%) said that they did not get enough sleep, twenty-seven (28.1%) said they got the right amount of sleep, twelve (12.5%) said that they got too much sleep, and one selected other. Other specified: "My sleeping pattern is weird anyways."

One of the symptoms of seasonal affective disorder is sleep disturbances. The continual pattern of not getting enough sleep would represent a sleep disturbance.

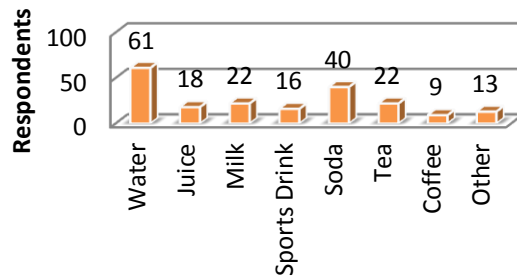
## Annual Beverages



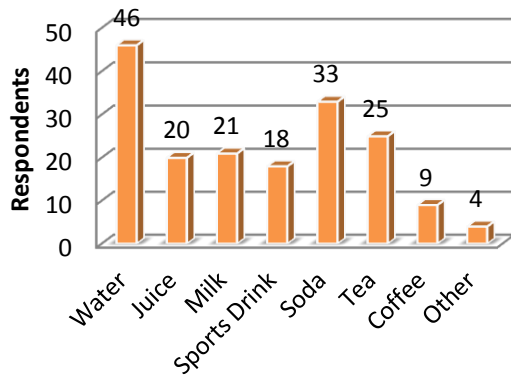
### Winter Beverages



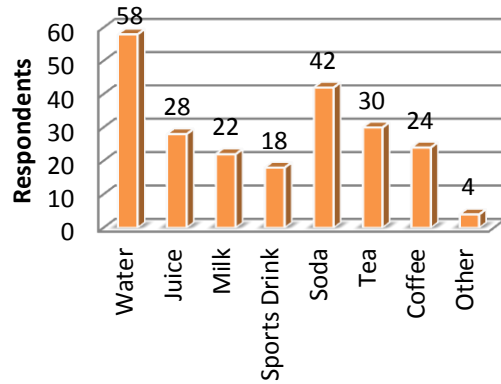
### Spring Beverages



### Summer Beverages



### Fall Beverages



## **Winter Beverages**

All eighty respondents started and completed this section of the survey. Each respondent selected as many choices as he or she pleased. Sixty (75.0%) chose water, twenty (25.0%) chose juice, twenty-seven (33.8%) chose milk, ten (12.5%) chose sports drink, thirty-five (43.8%) chose soda, twenty-two (27.5%) chose tea, seventeen (21.3%) chose coffee, and six (7.5%) chose other. The other specified are: two energy drinks, two beer, one hot chocolate, one protein drink.

## **Spring Beverages**

All ninety started and completed this section of the survey. Each respondent selected as many choices as he or she pleased. Sixty-one (67.8%) chose water, eighteen (20.0%) chose juice, twenty-two (24.4%) chose milk, sixteen (17.8%) chose sports drink, forty (44.4%) chose soda, twenty-two (24.4%) chose tea, nine (10.0%) chose coffee, and thirteen (14.4%) chose other. The other specified are: five alcohol, one hot chocolate, one Kool Aid, one Ensure, one diet soda, one Power aid, and three energy drinks, two of which specified Red bull.

## **Summer Beverages**

Seventy-six respondents started and completed this section of the survey. Each respondent selected as many choices as he or she pleased. Forty-six (60.5%) chose water, twenty (26.3%) chose juice, twenty-one (27.6%) chose milk, eighteen chose sports drink (23.7%) thirty-three (43.4%) chose soda, twenty-five (32.9%) chose tea, nine (11.8%) chose coffee, and four (5.3%) chose other. The other specified are: one lemonade, one unsweetened tea, one alcohol, beer, one diet soda (not containing Splenda).

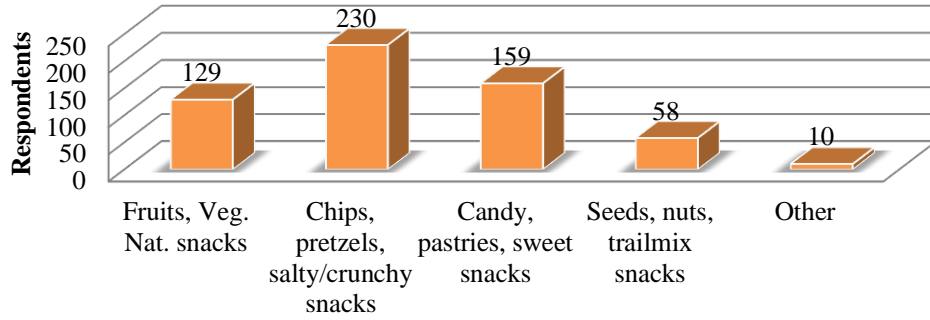


## **Fall Beverages**

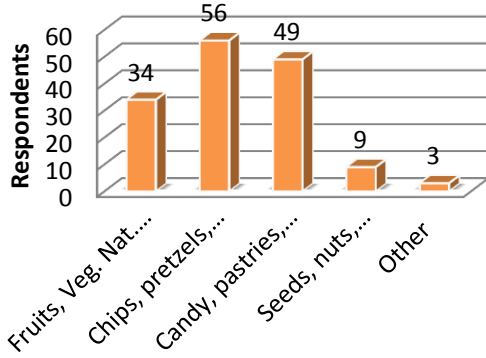
All ninety-seven respondents started and completed this section of the survey. Each respondent selected as many choices as he or she pleased. Fifty-eight (59.8%) chose water, twenty-eight (28.9%) chose juice, twenty-two (22.7%) chose milk, eighteen (18.6%) chose sports drink, forty-two (43.3%) chose soda, thirty (30.9%) chose tea, twenty-four (24.7%) chose coffee, and four (4.1%) chose other. The other specified are: two alcohol, one beer, one wine and whiskey.

The number one choice each season was water. The expected answer would be soda, since a symptom of seasonal affective disorder is lethargy which could be offset by consuming sugary soda drinks. But a second look at the answers reveals soda as second in three seasons and the choice of juice which is also high in natural and added sugars, sports drinks which likewise contain sugar, along with the choice of tea and coffee, both high in caffeine and which may have sugar added by the participant, a more expected result.

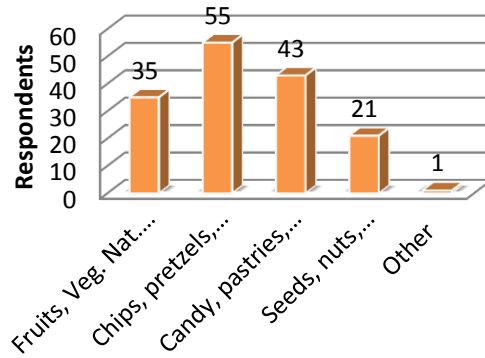
## Annual Snacks



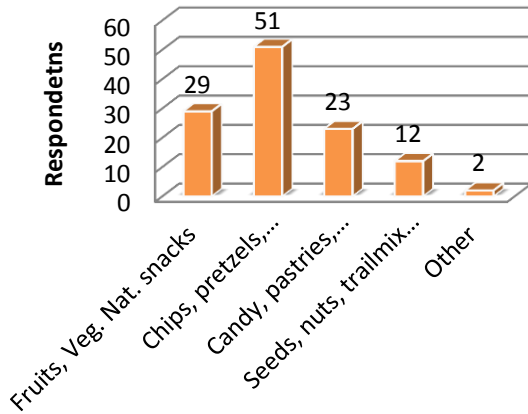
### Winter Snacks



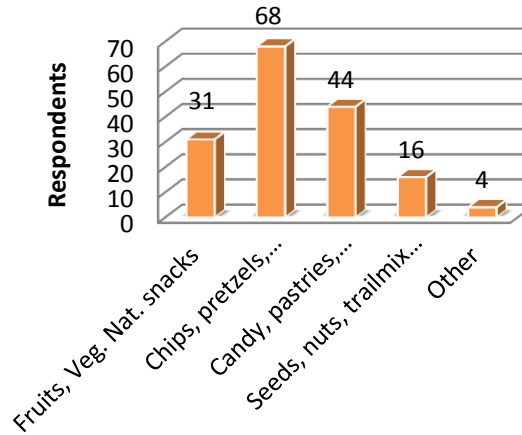
### Spring Snacks



### Summer Snacks



### Fall Snacks



## **Winter Snacks**

Seventy-nine respondents completed and one skipped the snack section of the survey. Each respondent selected as many choices as he or she pleased. Thirty-four (43.0%) said they ate fruits, vegetables, natural style snacks, fifty-six (70.9%) said they ate chips, pretzels, popcorn, salt/crunchy snacks, forty-nine (62.0%) said they ate candy, pastries, sweet style snacks, nine (11.4%) said they ate seeds, nuts, trail mix style snacks, and three (3.8%) selected other. The other specified: one said “don’t often snack,” two said granola bars and rice cakes.

## **Spring Snacks**

All ninety respondents completed the snack section of the survey. Each respondent selected as many as choices as he or she pleased. Thirty-five (38.9%) said that they ate fruits, vegetables, natural style snacks, fifty-five (61.1%) said that they ate chips, pretzels, popcorn, salty/crunchy style snacks, forty-three (47.8%) said they ate candy, pastries, sweet style snacks, twenty-one (23.3%) said that they ate seeds, nuts, trail mix style snacks, and one (1.1%) selected other. The other specified: “one said he or she was not a big snack eater”.

## **Summer Snacks**

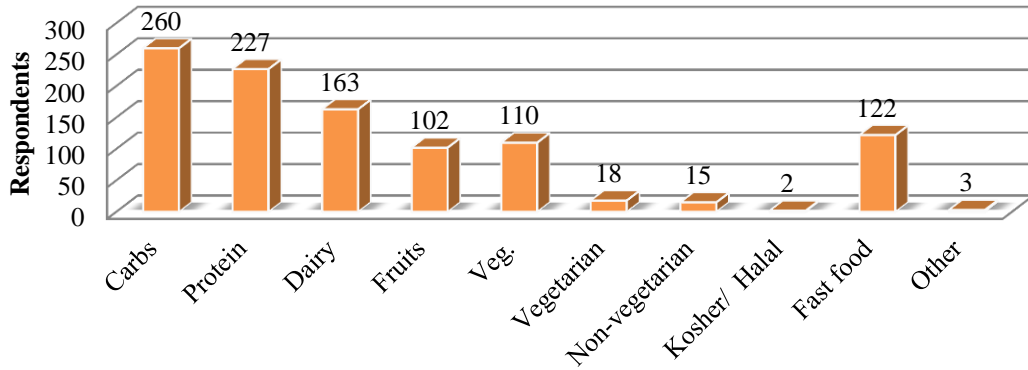
All seventy-six respondents completed the snack section of the survey. Each respondent selected as many choices as he or she pleased. Twenty-nine (38.2%) said that they ate fruits, vegetables, natural style snacks, fifty-one (67.1%) said that they ate chips, pretzels, popcorn salty/crunchy style snacks, twenty-three (30.3%) said that they ate candy, pastries, sweet style snacks, twelve (15.8%) said that they ate seeds, nuts, trail mix style snacks, and two (2.6%) selected other. The other specified: one specified dairy, yogurt, and string cheese and one specified frosted mini wheats.

## **Fall Snacks**

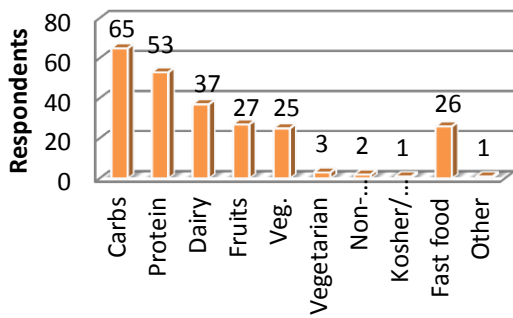
All ninety-seven respondents completed the snack section of the survey. Each respondent selected as many choices as he or she pleased. Thirty-one (32.0%) said that they ate fruits, vegetables, natural style snacks, sixty-eight (70.1%) said they ate chips, pretzels, popcorn, salty/crunchy snacks, forty-four (45.4%) said they ate candy, pastries, sweet style snacks, sixteen (16.5%) said they ate seeds, nuts, trail mix style snacks, and four (4.1%) selected other. The other specified: one specified he or she usually ate ramen or other quick microwaveable things, one specified protein/energy bars, one specified baked crackers, and one said he or she rarely eats snacks.

Chips, pretzels, salty and crunchy snacks were the top choice in all seasons. A close second in three seasons was candy, pastry, and sweet snacks. During the summer season the second choice was fruits, vegetables, and natural snacks which could be due to availability or respondents being students spending summer at home. These were the expected results for seasonal affective disorder with a craving for sweet and high carbohydrate (bread or potato based) snacks.

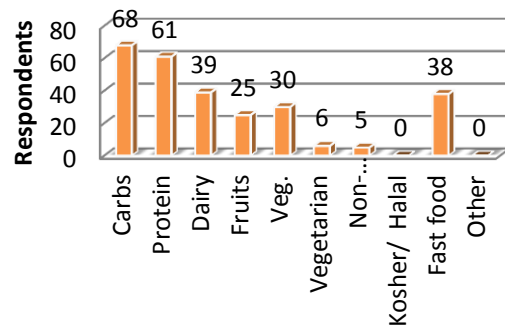
## Annual Food Groups



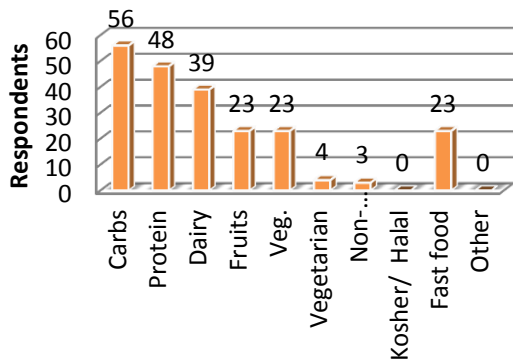
### Winter Food Groups



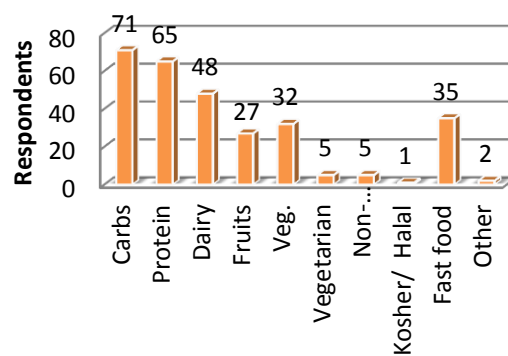
### Spring Food Groups



### Summer Food Groups



### Fall Food Groups



### **Winter Food Groups**

All eighty respondents completed this section of the survey. Each respondent selected as many choices as he or she pleased. Sixty-five (81.3%) said they ate carbohydrates, fifty-three (66.3%) said they ate protein, thirty-seven (46.3%) said they ate dairy, twenty-seven (33.8%) said they ate fruits, twenty-five (31.3%) said they ate vegetables, three (3.8%) said they ate vegetarian, two (2.5%) said they ate non-vegetarian, one (1.3%) said he or she ate kosher/halal, twenty-six (32.5%) said he or she ate fast-foods, and one (1.3%) selected other. Other specified: one said that he or she ate both A and B (Carbohydrates and Protein) in relatively equal parts.

### **Spring Food Groups**

All ninety respondents completed this section. Each respondent selected as many choices as he or she pleased. Sixty-eight (75.6%) said they ate carbohydrates, sixty-one (67.8%) said they ate protein, thirty-nine (43.3%) said they ate dairy, twenty-five (27.8%) said they ate fruits, thirty (33.3%) said they ate vegetables, six (6.7%) said they ate vegetarian, five (5.6%) ate non-vegetarian, zero (0.0%) ate kosher/halal, thirty-eight (42.2%) ate fast food, and zero selected other.

### **Summer Food Groups**

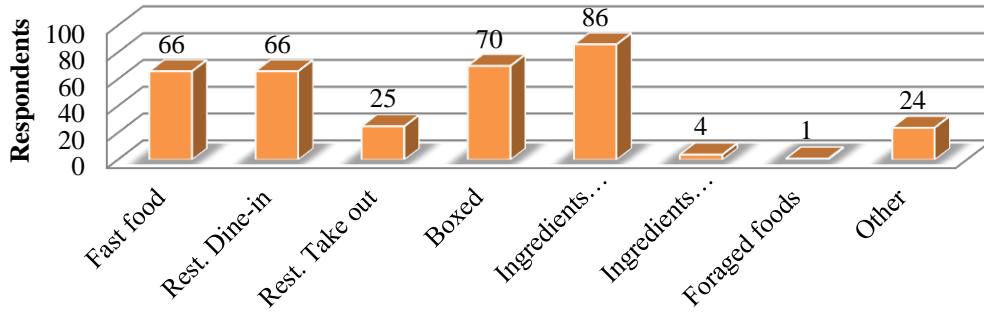
All seventy-six respondents completed this section. Each respondent selected as many choices as he or she pleased. Fifty-six (73.7%) said they ate carbohydrates, forty-eight (63.2%) said they ate protein, thirty-nine (51.3%) said they ate dairy, twenty-three (30.3%) said they ate fruits, twenty-three (30.3%) said they ate vegetables, four (5.3%) said they ate vegetarian, three (3.9%) said they ate non-vegetarian, zero said they ate kosher/halal, twenty-three (30.3%) said they ate fast food, and zero selected other.

## **Fall Food Groups**

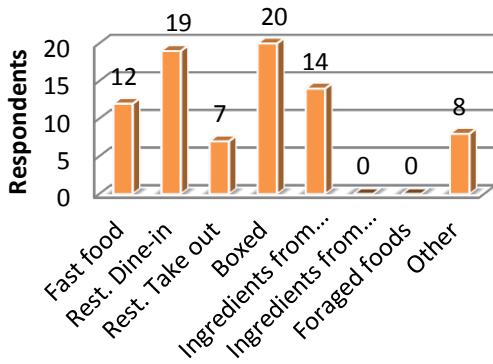
Only ninety-five respondents completed this section of the survey; two skipped. Each respondent selected as many choices as he or she pleased. Seventy-one (74.7%) said they ate carbohydrates, sixty-five (68.4%) said they ate protein, forty-eight (50.5%) said they ate dairy, twenty-seven (28.4%) said they ate fruits, thirty-two (33.7%) said they ate vegetables, five (5.3%) said they ate vegetarian, five (5.3%) said they ate non-vegetarian, one (1.1%) said he or she ate kosher/halal, thirty-five (36.8%) said they ate fast food, and two (2.1%) selected other. Other specified: one said any and all potatoes and one said vegetarian protein sources such as beans, nuts, eggs, at least 60% organic.

A symptom of seasonal affective disorder is a craving for carbohydrates to make up for the energy lost due to lack of sunshine on the body. The carbohydrate food groups were the top answer in all four seasons. This would be the expected result.

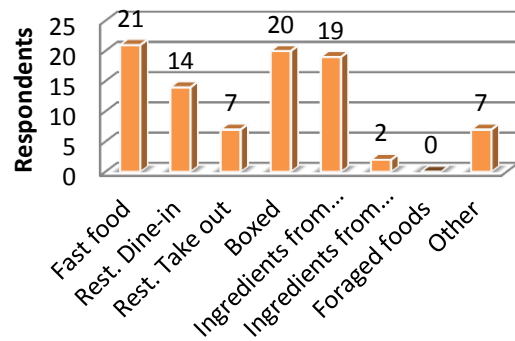
# Annual Meal Preparations



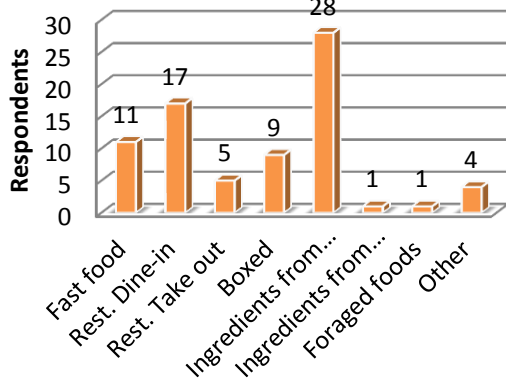
## Winter Meal Preparations



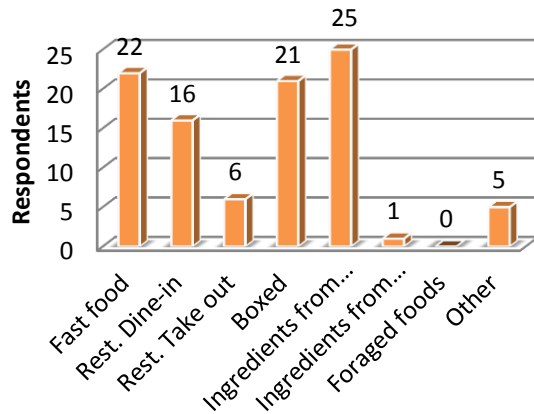
## Spring Meal Preparations



## Summer Meal Preparations



## Fall Meal Preparations





### **Winter Meal Preparations**

All eighty respondents completed this section. Only one choice could be selected. Twelve (15%) selected fast food, nineteen (23.8%) selected dining in restaurants, seven (8.8%) selected take-out, twenty (25%) selected home cooked meals from a box or a package meal, fourteen (17.5%) selected home cooked meals with ingredients purchased from a grocery store, zero selected home cooked meals with ingredients purchased from a farmers market, zero selected that they foraged for foods, and eight (10%) selected other. The other specified: All eight said they ate at the dining hall.

### **Spring Meal Preparations**

All ninety respondents completed this section. Only one choice could be selected. Twenty-one (23.3%) selected fast food, fourteen (15.6%) selected dining in restaurants, seven (7.8%) selected take-out, twenty (22.2%) selected home cooked meals from a box or prepackaged meal, nineteen (21.1%) selected home cook meals ingredients purchased from a grocery store, two (2.2%) selected ingredients from a farmers market, seven (7.8%) selected other.

### **Summer Meal Preparations**

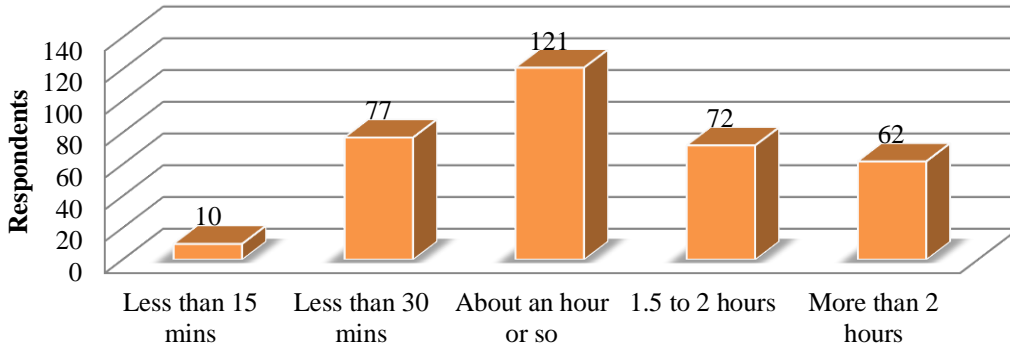
All seventy-six respondents completed this section. Only one choice could be selected. Eleven (14.5%) selected fast food, seventeen (22.4%) selected dining in restaurants, five (6.6%) selected take-out, nine (11.8%) selected home cooked meals from a box or a packaged meal, twenty-eight (36.8%) selected home cooked meals with ingredients purchased from a grocery store, one (1.3%) selected home cooked meals with ingredients purchased from a farmers market, one (1.3%) selected that he or she foraged for foods, and four (5.3%) selected other, all of whom said they had meals from the campus dining hall.

## **Fall Meal Preparations**

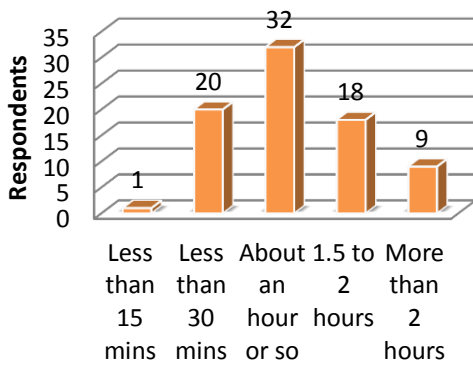
Only ninety-six respondents completed this section. One skipped. Only one choice could be selected. Twenty-two (22.9%) selected fast food, sixteen (16.7%) selected dining in restaurants, six (6.3%) selected take-out, twenty-one (21.9%) selected home cooked meals from a box or a package meal, twenty-five (26.0%) selected home cooked meals with ingredients purchased from a grocery store, one (1.0%) selected home cooked meals with ingredients purchased from a farmers market, zero (0%) selected that they foraged for foods, and five (5.2%) selected other. The other specified: four said they ate from the campus dining hall, and one said “about half restaurant and half home cooked literally 50-50”.

For meal preparation the choices varied: the top choice being meals made at home using box or package ingredients for two seasons, fast food for one season and home cooked meals from a grocery store for one season. The boxed or packaged meals are known to be high in carbohydrates, the fast food meals are both high in carbohydrates and fat, and the summer top choice of grocery-bought ingredients in a home cooked meal might, due to the student participants, indicate they were home and their parents were cooking the meals. That would leave us with the expected answer for seasonal affective disorder of craving high carbohydrate foods.

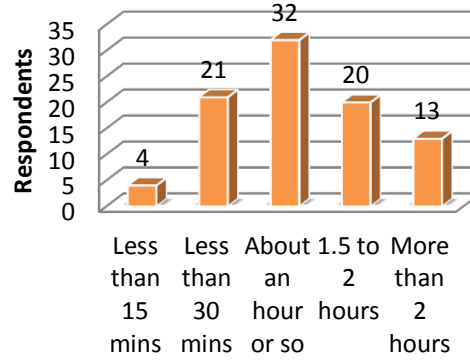
# Annual Sunlight Procurement



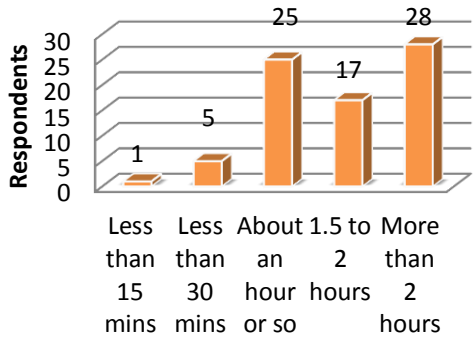
## Winter Natural Sunlight Procurement



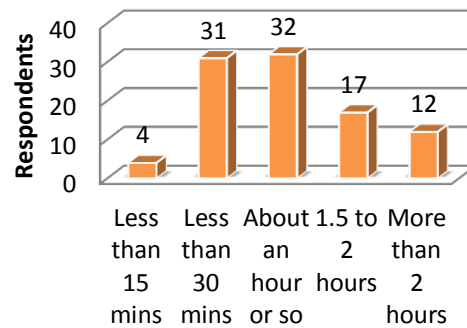
## Spring Natural Sunlight Procurement



## Summer Natural sunlight Procurement



## Fall Natural Sunlight Procurement



### **Winter Natural Sunlight Procurement**

All eighty respondents completed this section. Only one choice could have been selected. One (1.3%) said that he or she procured less than fifteen minutes of natural sunlight per day, twenty (25%) said that they procured less than a half hour of natural sunlight per day, thirty-two (40%) said that they procured about an hour or so of natural sunlight per day, eighteen (22.5%) said they procured between an hour and a half to two hours of natural sunlight per day, and nine (11.3%) said they procured more than two hours of natural sunlight per day over the past three months.

### **Spring Natural Sunlight Procurement**

All ninety respondents completed this section. Only one choice could have been selected. Four (4.4%) said that they procured less than fifteen minutes of natural sunlight per day, twenty-one (23.3%) said they procured less than a half hour of natural sunlight per day, thirty-two (35.6%) said they procured about an hour or so of natural sunlight per day, twenty (22.2%) said they procured between a hour and a half to two hours of natural sunlight per day, and thirteen (14.4%) said they procured more than two hours of natural sunlight per day.

### **Summer Natural Sunlight Procurement**

All seventy-six respondents completed this section. Only one choice could have been selected per day. One (1.3%) said that he or she procured less than fifteen minutes of natural sunlight per day, five (6.6%) said they procured less than a half hour of natural sunlight per day, twenty five (32.9%) said they procured about an hour or so of natural sunlight per day, seventeen (22.4%) said they procured between a hour and a half to two hours of natural sunlight per day, and twenty-eight (36.8%) said they procured more than two hours of natural sunlight per day.

## **Fall natural Sunlight Procurement**

Only ninety-six respondents completed this section; one skipped. Only one choice could have been selected. Four (4.2%) said that they procured less than fifteen minutes of natural sunlight per day, thirty-one (32.3%) said that they procured less than a half hour of natural sunlight per day, thirty-two (33.3%) said that they procured about an hour or so of natural sunlight per day, seventeen (17.7%) said that they procured between an hour and a half to two hours of natural sunlight per day, and twelve (12.5%) said they procured more than two hours of natural sunlight per day.

Annual sunlight procurement was answered each season with at least an hour or more of sunlight. This result was not expected for seasonal affective disorder. However, when looking at the actual number of sunny days where sunlight is available, which is 4 to 5 days a month, it would seem that the respondents might have been answering with time spent outside rather than in direct sunlight.

## Demographics

		Male	Female
Winter	18-24	28	51
	25-64	6	5
	65+	1	0
Spring	18-24	28	51
	25-64	3	3
	65+	1	1
Summer	18-24	17	51
	25-64	3	3
	65+	1	1
Fall	18-24	23	55
	25-64	6	11
	65+	1	1

## **Discussion & Conclusion**

### **Discussion of the survey results**

#### **Activity Level**

Over the four waves of this survey moderately and somewhat active appears to be the trend for how active people are.

#### **Winter Activity Level**

The majority of the respondents said that they were moderately active. Again with one of the symptoms of SAD being lethargy, the numbers are showing that respondents are not as active as they could have been.

#### **Spring Activity Level**

Just as expected, the majority of respondents said that they were somewhat active. One of the main symptoms of SAD is lethargy. One feeling like not doing anything supports the dominant responses being somewhat active and moderately active. Respondents simply did not feel that they were as active as they could have been.

#### **Summer Activity Level**

For the summer survey, more respondents said that they were moderately active. There was a slight shift from the spring survey. It could be concluded that this was because of seasonal variation during the summer months providing more clear and partly cloudy days which allowed people to be more active. The weather patterns during the summer months differ slightly than the spring months.

## **Fall Activity Level**

Following along with previous surveys, a majority of the respondents said that they were somewhat active. Lethargy being a symptom of SAD supports the response to this question. This shows that respondents did not feel that they were as active as they could have been.



## **Productivity Level**

The overall average for the collection of seasons showed the majority of people said they were very productive.

## **Winter Productivity Level**

A majority of the respondents said that they were semi productive. Not far behind were respondents that said they were very productive. I suspect that this is because a majority of the respondents were students and they rated their productivity level based on the amount of school work that was done, or holiday preparations during the winter months could be a major factor.

## **Spring Productivity Level**

Going against the previous winter statistics, the majority of the respondents said that they were very productive. This may be due to the fact that the respondents, given their age and occupation (student), fulfilled the impression that they were very productive in the means of doing school work. In a region suffering from a high percentage of SAD symptoms, the predicted results would show a higher percentage of respondents to indicate that they were not very productive.

## **Summer Productivity Level**

The majority of the respondents said that they were very productive. It may be that the respondents, given their age and occupation (student age group), fulfilled the impression that they were very productive in the means of doing school work. It would be expected that a region experiencing SAD symptoms would see a higher percentage of respondents say that they were not very productive.

## **Fall Productivity Level**

The majority of the respondents said that they were very productive. This kind of response is not what would be expected. Two possible reasons for this response are: A. majority of the respondents were students and they rated their productivity level based on the amount of school work that was done, or B. given the fall season respondents have a winter preparation period, where they are productively prepping for the winter months where they change the thought process for clothing worn, foods eaten, activities done, and holiday preparations.

### **Time on Electronics per day**

In each of the four seasons, the respondents answered that they were spending three to five hours a day on electronics. These things could be television, personal computer, videogames, etc. One could expect the number of rainy and cloudy days recorded for the area to contribute to the amount of time people spend on electronics.

### **Winter Time on Electronics per day**

For the winter season, the respondents, overall, said that they spent three to five hours a day on electronics. The respondents may have been spending this time on electronics for the sole purpose of not being able to be outside in some sort of activity.

### **Spring Time on Electronics per day**

The majority of people responding said that they spent between three to five hours a day on electronics. Given the majority of the respondents to be college students and not having to sit behind a desk all day at a job, even during the spring months the respondents said that they still spent the same time on electronics.

### **Summer Time on Electronics per day**

The majority of people responding to the summer survey said that they spent between three to five hours a day on electronics. A significant drop occurred in the six to eight hour category from the spring survey to summer survey; a higher number of people said they only spent zero to two hours per day on electronics. Apparently in the spring respondents were spending time on electronics for the sole purpose of not being able to be outside in some sort of

activity. But by summer the shift was simply due to the season's slight variation in weather to allow less time to be involved with electronics and more time to be outside.

### **Fall Time on Electronics per day**

For the fall season, just as for the previous seasons, the overall majority of respondents said that they spent between 3-5 hours a day on electronics. Given the majority of the respondents to be college students and not having to sit behind a desk all day at a job even during the fall months, the respondents said that they spent the same 3-5 hours a day on electronics.

## **Sleep**

The sleep patterns for the region according to the survey results are as expected—not enough sleep. The lack of sunlight exposure can result in one’s belief that he or she are not getting enough sleep.

### **Winter Sleep**

For sleep, respondents said that they did not get enough sleep during the winter season. Respondents showed to be not getting enough sleep which can be the result of a lack of sun in the region causing a pattern that can be recognized as SAD.

### **Spring Sleep**

Respondents said that they did not get enough sleep just as would be predicted by SAD symptoms. Given the nature of the weather in the region, a resulting SAD symptom is the amount of lethargy that one feels.

### **Summer Sleep**

Respondents said that they did not get enough sleep, just as would be expected. These statistics do not match with the statistics that people had plenty of sun. The results of not getting enough sleep during the summer may be because, while the number of clear days is still low, they are more plentiful than other times of the year. A major symptom of SAD is lethargy.

### **Fall Sleep**

For sleep, respondents said that they did not get enough during the fall season. Respondents showed to be not getting enough sleep which is a result of a lack of sun in the region causing a pattern to be recognized as SAD.

## **Beverages**

Water was the beverage of choice in all four seasonal surveys with soda coming in second. A possible explanation for these results is that the respondents are students in a college environment where they are learning that water is better for them than soda, or simply that water is cheaper for the struggling student.

## **Winter Beverages**

Water was the beverage of choice with soda falling right behind in second. Soda, as a second choice forms a major component of the beverage of category. Soda, even as second selection of the beverage of choice, is significant because it substitutes for the energy that would be received from sunlight if the weather patterns of the region provided more clear and partly cloudy days.

## **Spring Beverages**

Water was the dominant choice with soda again right behind. Soda would have been the predicted beverage of choice for the spring survey because of the craving for carbonated soft drinks for a quick energy boost. This craving comes from a lack of energy from the lack of sunlight. The lack of sunlight creates a higher percentage of people suffering from SAD.

## **Summer Beverages**

Again water was the dominant choice with soda right behind. Soda would have been expected to be the beverage of choice for the summer survey because of the craving for carbonated soft drinks for a quick energy boost. This craving comes from a lack of energy from

the lack of sunlight. The lack of sunlight creates a higher percentage of people suffering from SAD symptoms.

### **Fall Beverages**

Again water was the beverage of choice with soda falling in as the second beverage of choice. Water being the beverage of choice may be explained because the majority of the respondents are college students selecting water because of learning that water is healthier for them, or simply because it is free. Soda, even as second selection of the beverage of choice, is significant because it substitutes for the energy that would be received from sunlight if the weather patterns of the region provided more clear and partly cloudy days.

## **Snacks**

In all four seasonal surveys salty and crunch snacks were the dominant choice. Sweet snacks which came in second would have been the predicted choice for persons having SAD symptoms. However, the snacks that people selected suggest that people were selecting based on SAD symptoms influenced by the weather patterns. One of the basic ingredients in many salty and crunchy snacks is flour or potatoes which is converted quickly to sugar for quick energy.

### **Winter Snacks**

People showed that salty and crunchy type snacks are the snack of choice. This pattern is supporting the original theory that the carbohydrates that one gets from the white flour, which turns into sugar once it is digested, is an ingredient in many snacks such as these.

### **Spring Snacks**

Snacks, according to the results, were dominated by salty and crunchy type snacks. The prediction, in accordance with the sugar intake, would have been a higher percentage for candy, pastries, and sweet snacks for an energy boost to compensate the lack of energy from the sunlight. Salty/crunchy snacks still can be attributed to the carbohydrate category because potato chips and pretzels add a quick energy source.

### **Summer Snacks**

According to the results, snacks were dominated by salty and crunchy type snacks. The sweet snacks which came in third would have been the dominant choice if predicting due to SAD symptoms. Salty/crunchy snacks still can be attributed to the carbohydrate category. Snacks such



as potato chips and pretzels (which are bread based-baked goods) add a quick energy source. Fruits and vegetables came in second; this category may have been chosen due to the availability of fresh snacks during the summer months, and that students were at home where fresh snacks were more readily available.

### **Fall Snacks**

For the Fall survey the pattern continues with salty and crunchy type snacks being the first choice. This pattern is supported in the original theory that the carbohydrates that one gets from white flour and potatoes, which turn into sugar once digested, are the ingredient of many snacks such as these.

### **Annual Food Groups**

Carbohydrates were the dominant choice for food groups throughout the four waves of the survey. With the suggested symptoms of SAD and the given weather patterns, carbohydrates were the food group of choice which was as expected.

### **Winter Food Groups**

Carbohydrates were the dominant choice of food during the winter survey. With the proposed theory of what is corrupting the overall well-being of the region, carbohydrates are the top proprietor of the issues which support the belief of the overwhelming SAD symptoms in the region.

### **Spring Food Groups**

Out of the ten food group categories, as would be predicted, dominating on the chart was carbohydrates and, not second, but high was fast-food. Also, proving the results that were expected, fruits and vegetables showed to be the least favored. As previously noted, in Huntington and the majority of Appalachia, carbohydrates and fast foods are favored. According to the Mayo clinic staff one of the symptoms of SAD is a craving for carbohydrate starchy foods.

### **Summer Food Groups**

Out of the ten food group categories, just as would be predicted, carbohydrates dominated the charts. Again for the summer, just like the spring, fast-food was not second but was high. As previously noted, in Huntington, West Virginia and the majority of Appalachia, carbohydrates and fast-foods are favored.

## **Fall Food Groups**

Carbohydrates, throughout the course of these surveys, have been the dominant choice. With the proposed theory of what is corrupting the well-being of the region, carbohydrate is the top proprietor of the issues which can be a top supporter of the overwhelming SAD symptoms.

### **Annual Meal Preparations**

Throughout the seasons people said that they prepared meals from ingredients brought from the store. Adding up all of the other choices, it suggests that people had meals prepared for them.

### **Winter Meal Preparation**

For meal preparations for the winter months most of the respondents said that they prepared meals from a package or boxed meal purchased from the store. Again with carbohydrates being the food group of choice, one can believe that pasta type meals must have been prepared to supplement the lack of energy that the sun was not able to provide.

### **Spring Meal Preparations**

Just as would be predicted, meal preparations showed to be dominated by fast foods and boxed meals. These kinds of results support the SAD symptoms by the majority of respondents saying that they had high carbohydrate and starchy meals prepared for them. Close behind were meals that respondents made for themselves from ingredients bought at the store. Coinciding with the previous chart, showing that carbohydrate foods were the favored food groups, we can speculate that the foods prepared were things such as pasta, a carbohydrate meal.

### **Summer Meal Preparation**

The results for the meal preparations of the summer session were what most people would expect, but went against what would be expected if looking at SAD symptoms. Respondents said that they prepared meals with ingredients purchased from a store.

Given the nature of the sample being surveyed, respondents being students, they were probably at home and ate foods which parents prepared.

### **Fall Meal Preparation**

For the fall, a majority of the respondents said that they prepared meals with ingredients purchased from the store. Given that carbohydrates were the food group of choice, one must believe that pasta type meals must have been prepared to supplement the sun's ability to produce energy.

## **Natural Sunlight Procurement**

On average throughout the year people said that they got about an hour or so of natural sunlight. Given the statistics from NOAA, it was expected the amount of sunlight that people got each day would have been lower than what the majority of respondents said. Respondents may have chosen this answer to simply mean that they spent about an hour or so outside during the day time in general, not necessarily getting actual sunlight exposure.

## **Winter Natural Sunlight Procurement**

For the winter months the majority of respondents said that they procured about an hour or so of sunlight each day. Given the days are shorter during the winter months; it is possible to speculate as to what was the caliber of natural sunlight that the respondents were truly procuring.

## **Spring Natural Sunlight Procurement**

For the spring survey, respondents indicated that they procured about an hour or so of sunlight each day. Again the respondents might simply have been outdoors for this period of time rather than exposed to the sun's light on them for an hour.

## **Summer Natural Sunlight Procurement**

For the summer survey the statistics show that people got more than two hours a day of natural sunlight. Only from speculation in looking at NOAAs statistics showing more clear days during the summer, respondents may have gotten more hours on the selectively clear days. People got more sun on the limited clear days than any other season surveyed.

## **Fall Natural Sunlight Procurement**

The majority of the respondents said that they procured about an hour or so of sunlight each day along with many of the respondents saying that they procured less than thirty minutes of sunlight. With the seasons changing these numbers fall in line with how SAD can begin to affect people. Again what is questionable is what the respondents considered sunlight procurement.

## Conclusion

Over the years of my studies I have observed that certain areas of the country have different climates and the people who have lived in them develop a culture based on the environment where they live. The first Americans 10,000 years ago resided in the four corners area of the United States (New Mexico, Arizona, Colorado, and Utah) where the environment was suited for rapid advancement in a lifeway that other areas were not able to achieve. North of that region, years after the Clovis culture rose and fell, the people known as the Desert Archaic held a lifeway for nearly 8,000 years without much change in any aspects. They adapted to the environment in which they endured and lived out their days. Viewing those prehistoric cultures of the West against those of the East, one can observe that the Eastern Woodlands cultures, while having had a similar lush ecosystem as the Clovis, did not rise to become world renowned like the Southwest Native Americans, given that the Eastern Woodlands cultures existed only a few hundred years ago. Even during the era of Native Americans rummaging the Huntington region, the ecosystem may have obstructed their lifeway as well. They not only showed a material development that was relaxed, but they showed a mix of hunting and gathering lifestyle with an agriculture lifestyle. The Native Americans in the Huntington region were consuming large amounts of corn, which today in the Huntington region is still a major food staple. Corn holds sugar and in return is a good form of fill that can be quickly turned into some form of rapid energy. As stated previously, a corn-based diet is known to be a source of tooth decay even in prehistoric times.

Huntington, West Virginia, has been noted as the unhealthiest city in the nation. The belief is that the culture along with economics of the region is the reason for this epidemic. I have proposed that the weather is a major contributor to the unhealthiness. The weather patterns



for the region support characteristics of SAD (seasonal affective disorder) year round. According to NOAA (National Oceanic and Atmospheric Association) and the tables that are provided from NOAA's figures, the region is dominated by cloudy and rainy days year round, which can trigger these SAD symptoms not only during the winter months but every month. From the data that has been collected for the survey and put together over the four seasons of the year 2011 it can be shown that much of what has been proposed by this thesis shows some legitimacy.

Once the data collection was completed I found the majority of what I have proposed to be accurate. One of the concerns in the region is the high intake of sugary, starchy beverages. As one of the symptoms of SAD, lethargy can be combated with soft drinks which contain many sugars and carbohydrates. In the final results soda pop was one of the popular choices for beverages throughout each season. This supports my theory that given the weather patterns for the region people are choosing soda to drink to boost energy levels which they are not getting because of the lack of sunlight.

Snacks that people said that they ate the most of also supports the theory. Throughout the data collection carbohydrate and sweet snacks were the dominant snacks of choice. People chose these snacks I believe in order to boost energy levels. These two choices were the dominant choices throughout the data collection period supporting the theory that the region has SAD-like symptoms year round.

A major issue is the meals that people prepare for their families and themselves. Over the course of the data collection the three top meal preparations that people said that they chose were: boxed type meals, prepackaged meals which are full of carbohydrates, dine-in and fast-food restaurant meals. Many skeptics believe these types of meal preparations to be

economically fitted for the region. According to the SAD symptoms one can suggest that these three styles can all be supporting the lack of energy to prepare any kind of other meal, and all three of these styles are filled with carbohydrates which again help boost people's energy levels.

Another pattern that was recognized was the consistent amount of time that was spent on electronics. Throughout the year the majority of people spent the same amount of time on electronics. Given NOAA's weather statistics, the time that people spent on electronics can be supported by the fact the weather did not allow them to do other things. One would think that given the variance of seasonal weather patterns this kind of activity would vary in the time that was spent on electronics. The consistent weather patterns that are showing throughout the year for Huntington are compatible with respondents consistent time spent on electronics.

When asking what people's activities levels were, respondents consistently said that they were *moderately* active. I find this to be slightly out of line with what I was expecting, but many respondents said that they were *somewhat* active. This leads me to believe that between the two choices many people were teetering on their selection because of the weather patterns having an impact on people's activity level within the region.

The same kind of conclusion can be suggested for how respondents chose for their productivity level. The overall majority of respondents said that they were very productive day to day, but many respondents said that they were semi-productive. Just as respondents' responses to their activities were put in question, it seems that they were teetering between two choices which leads me to believe that respondents chose the better sounding option for these two questions.

According to the staff at the Mayo Clinic, people are to receive roughly fifteen minutes a day of natural sunlight on their skin. NOAA's statistics show that each month of the year has

roughly five clear days each month. Overall the majority of people said that they got about an hour a day of sunlight. I question whether they truly got direct sunlight. Given the statistics that NOAA provides, one can speculate that while people answered affirmatively on spending about an hour in the sunlight, they were just outdoors, not necessarily getting direct photosynthetic type sunlight, which is the sun's natural process of producing carbohydrate energy in plants, but produces energy in humans through raising serotonin levels.

Just as I expected the overall majority of respondents said that they did not get enough sleep, which is a direct symptom of all of the issues correlated with SAD. With lack of sunlight, just as mentioned, one does not produce the proper serotonin levels causing people to be lethargic and feeling the need to consume more carbohydrate foods spiraling all of the things in question downward and leaving one with the feeling that he or she did not get enough sleep.

People tend to forget that humans are animals too, mammals to be factual. During the winter most animals hibernate. People in a way do the same thing. The days are cold and gray. The Huntington region shows a high number of gray days year round resulting in people subconsciously preparing themselves for winter by eating carbohydrates to fatten up and then staying inside when it's gray outside.

Each item in question that can be affected by the weather patterns shows SAD symptoms are actually occurring. Given the science that is provided, overall gray, cloudy, and rainy days can cause a culture to be affected resulting in the people oversleeping, overeating, and developing an unhealthy well-being. Since this study has been very revealing regarding the Marshall University student sample, it would be anticipated that a larger study of the Huntington

region population that included a range of ages may provide an even better understanding of the problem and allow for some possible solutions for the situation.

There appear to be no existing statistics on how many people in the Huntington region are affected by SAD (seasonal affective disorder). In fact Eagles (2002) revealed, in regard to his research, that "none of the patients in his study had a diagnosis of SAD and in only a very few (from what was recorded in their case records) had the possibility ever been considered." The implication of his research was that generally SAD was not diagnosed. This situation could exist in Huntington, West Virginia, and contribute to the region's health problems. Gallup's 2010 poll revealed 32 percent of the population of Huntington reported as having been diagnosed with depression; many of these diagnoses could possibly be further diagnosed as seasonal type.

This survey's research was undertaken in order to gauge whether the weather conditions peculiar to this region are creating seasonal affective disorder type behaviors which until now have not been studied. The overall conclusions reached from the informal 10 question survey of students at Marshall University are strong enough to indicate there is a basis for further study regarding weather patterns inherent to the geographic locale as being a contributing factor to the unhealthy lifestyles associated with the region.

## **Limitations**

In the thoughts of extending this study I would look into having a much larger population take the survey. Along with a larger, more general population, I would be interested in what level of education the respondents have achieved. This would allow me to see if there was any correlation between health and education within the region. It is currently believed that poor health comes from a lack of education.

Another point I would try to do differently is to limit the number of possible answers people were able to choose. I would want to see if people were strictly favoring one item instead of having multiple choices. Along with rewording some of the questions, I would make the particular question about how much sunlight people have gotten be more specific. I feel that people responded by the amount of time that they spent outside whether it was gray or sunny out, not necessarily getting pure direct sunlight.

In comparison with other regions I would look into the ethnicity of both regions. I would want to look into the background of the ethnicities to see if a particular type of lifeway could be causing the issue or if the original theory that annual SAD symptoms are causing some kind of issue could affect any ethnicity.

Another possible progression of the survey research already accomplished would be to run SPSS on the conclusions. Alternatively, one could do qualitative study. In that instance I would pick a much smaller group to study and talk with each person one-on-one personally for each season. This way I could learn if people were showing significant signs of changes or relatively stayed the same. I would be looking to see if they were generally apathetic about things or upbeat. Individual interviews would have to happen more than once each season to see if people were responding to the quality of the day. For instance, if it was a gray day did they

seem less responsive; if it was a sunny day were they more responsive? How did they dress? When we met were they more dressed up given the sunny quality of the day or more relaxed if it was a gray day? For example, on a gray day is the dress a more comfortable dress as if they were vegetating on the couch with a soda. Those would be the some of the personal notes that I would look into.

The same questions that were used in the survey would be used in an interview, only the answers could be more in-depth. I would be looking for a conversation instead of a strict interview. For example, if I asked how active have you been lately, and they responded very active, then I would ask what kinds of things have been you been doing. That would open the door for them to talk about the things that they have been doing, for example getting outside and doing yard work, building a new book shelf, grilling on the back porch, taking a walk, etc. This kind of response could be given to any of the questions. This allows the person to say what he or she have been doing instead of choosing A,B,C, or D. I feel that the answers that I received from the survey were indicating how much work students were getting done for school, not necessarily being active physically.

These are things that I would consider in further research of this topic. Some of these ideas may be applied to deconstruct the issue at hand more deeply on a larger scale or a more personal level. Doing so might provide additional insight into effects of seasonal affective disorder on the health of residents of the Huntington, West Virginia, region.

## **Appendix A:**

### **Survey questions:**

**1. Which of the following choices best describe you?**

- A. Male 18-24**
- B. Female 18-24**
- C. Male 25-34**
- D. Female 25-34**
- E. Male 35-64**
- F. Female 35-64**
- G. Male older than 65**
- H. Female older than 65**

**2. When thinking about beverages over the past 3 months, would you say you most often had...**

**(select as many as apply)**

- A. Water**
- B. Juice**
- C. Milk**
- D. Sports drinks**
- E. Soda**
- F. Tea**
- G. Coffee**
- H. Other (please specify)**

**3. When thinking about snacks over the past 3 months, would you say you most often had...**

**(select as many as apply)**

- A. Fruits and vegetables or other natural snacks**
- B. Chips, pretzels, popcorn or other salty/crunchy type snacks**
- C. Candy, pastries or other sweet type snacks**
- D. Seeds and nuts or other trail mix type snacks**
- E. Other (please specify)**

**4. When thinking about basic food groups over the past 3 months, would you say you most often had...**

**(select as many as apply)**

- A. Carbohydrates (bread, pasta, whole grains)**
- B. Protein (meat, fish, chicken)**
- C. Dairy (milk, eggs, cheese, yogurt)**
- D. Fruits (fresh, dried, canned, frozen)**
- E. Vegetables (fresh, dried, canned, frozen)**
- F. Vegetarian or vegan prepared foods**
- G. Non-vegetarian prepared foods**
- H. Kosher or Halal prepared foods**
- I. Fast foods from local or national chains**
- J. Other (please specify)**

**5. When thinking about meal preparations over the past 3 months, would you say you most often had...**

**(select only one)**

- A. Fast food meals from a local or national chain**
- B. Restaurant, dine-in meals**
- C. Restaurant, take-out or delivered meals**
- D. Home cooked, from a box or package**
- E. Home cooked, from ingredients purchased at grocery store**
- H. Home cooked, from ingredients purchased at farmers market**
- I. Foraged from foods grown at home or found locally**
- J. Other (please specify)**

**6. When thinking about digital and electronic entertainment (such as internet, games, TV, music, etc.) over the past 3 months, how many hours per day would you say you spent on digital or electronic entertainment...**

**(select only one)**

- A. 0-2 hrs per day**
- B. 3-5 hrs per day**
- C. 6-8 hrs per day**
- D. 9 or more hrs per day**



**7. When thinking about physical activity [such as going to the gym, walking the dog, hiking, riding a bike, ice skating, sports (football, soccer, baseball, basketball, on a team or with friends at the local park), outdoor work such as shoveling snow, cutting the grass, gardening, raking leaves] over the past 3 months, how would you describe your physical activity level?  
(select only one)**

- A. Extremely active**
- B. Very active**
- C. Moderately active**
- D. Somewhat active**
- E. Not very active at all**

**8. When thinking about projects in the past 3 months (home improvements, school projects, job related projects, etc.) how productive have you been?**

- A. Not very productive**
- B. Very productive**
- C. Semi productive**

**9. When thinking back over the past 3 months, how much time would you say you have spent outdoors in natural sunlight per day?**


- A. Less than 15 minutes**
- B. Less than a half hour**
- C. About an hour or so**
- D. 1-1/2 to 2 hours**
- E. More than 2 hours**

**10. Compared to the rest of the year, would you say in the past 3 months you have...**

- A. Not gotten enough sleep**
- B. Gotten the right amount of sleep**
- C. Gotten too much sleep**
- D. Other (please specify)**

## Appendix B:

### IRB Approval Letter

 MARSHALL UNIVERSITY www.marshall.edu	
<b>Office of Research Integrity</b> Institutional Review Board 401 11th St., Suite 1300 Huntington, WV 25701	FWA 00002704  IRB1 #00002205 IRB2 #00003206
September 26, 2011	
Richard Garnett, PhD Sociology/Anthropology Department	
RE: IRBNet ID# 27 1088-1 At: Marshall University Institutional Review Board #2 (Social/Behavioral)	
Dear Dr. Garnett:	
Protocol Title:	[27 1088- 1] Seasonal Lifestyles
Expiration Date:	September 25, 2012
Site Location:	MU
Submission Type:	New Project
Review Type:	Expedited Review
	APPROVED
In accordance with 45CFR46.110(a)(7), the above study and informed consent were granted Expedited approval today by the Marshall University Institutional Review Board #2 (Social/Behavioral) Chair for the period of 12 months. The approval will expire September 25, 2012. A continuing review request for this study must be submitted no later than 30 days prior to the expiration date.	
This study is for student Ryan Becka.	
If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/Behavioral) Coordinator Michelle Woomer, B.A., M.S. at (304) 696-4308 or woomer3@marshall.edu. Please include your study title and reference number in all correspondence with this office.	

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