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The Seasonal Pattern of the Natural World and its Affect on Students Mood, Motivation and Academic Performance

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Running head: SEASONAL PATTERN AFFECT ON STUDENTS

The Seasonal Pattern of the Natural World and its Affect on Students

Mood, Motivation and Academic Performance

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Table of Contents

Title Page	1
Acknowledgements	2
Abstract	7
Introduction	8
Review of Literature	8
Celebrating the Seasons	8
Historical Understanding of Seasonal Influences	9
Seasonal Affects on the Human Mind and Body	9
Inner clock	10
Melatonin	10
Serotonin	11
Seasonal Affective Disorder	12
SAD in Children and Adolescents	13
Cognitive Difficulties	16
Mood Problems	16
Physical Illness	17
Changes in Eating and Sleeping	17
Classroom Environment and Learning Implications	18
Treatments	19
Light Therapy	19
Dawn Simulation	22
Medication	23

Cognitive Behavioral Therapy	26
Lifestyle change	27
Conclusion	28
Method	30
Setting	30
Participants	30
Procedure	31
Measure	31
Question A1	32
Question A2	33
Question A3	33
Question A4	33
Question A5	33
Question A6	33
Question A7	33
Question B8	33
Question B9	33
Question B10	33
Question B11	33
Question B12	33
Question B13	33
Question B14	33
Question B15	34

Summary	34
Results	34
Table 1: Comparison of SAD symptoms experienced in Winter and Spring	34
Table 2: Winter Questionnaire Behavioral Changes	35
Table 3: Spring Questionnaire Behavioral Changes	35
Table 4: Winter and Spring Part B Mean Score Comparison	36
Discussion	36
Question A1	37
Question A2	37
Question A3	37
Question A4	38
Question A5	38
Question A6	38
Question A7	38
Question B8	38
Question B9	39
Question B10	39
Question B11	39
Question B12	40
Question B13	40
Question B14	40
Question B15	40
Analysis	41

Limitations	41
Implications	44
Conclusion	45
References	46
Appendix A	49
Appendix B	50

Abstract

Discusses the importance of understanding and treating Seasonal Affective Disorder in children and adolescents. A study was conducted to determine the extent to which the seasonal pattern of the natural world affects students, and to what degree mood, motivation and overall academic performance are influenced. The methods used in this study were described, including setting, participants, procedure, and evaluations. The findings were detailed along with a discussion about the implications of the results. Included in the literature review was the historical understanding of seasonal influences and the effects on seasons on the human mind and body. Symptoms of Seasonal Affective Disorder were described as well as specific indications in children and adolescents. Finally, various treatments and lifestyle changes to reduce the symptoms and challenges of SAD in children and adolescents were introduced and explored.

The Seasonal Pattern of the Natural World and its Affect on Students Mood, Motivation and Academic Performance

The changing of the seasons significantly influences our world and everything in it. While the regeneration of light is constant, the relative length of time between the rising and setting of the sun is affected by the seasonal pattern. This yearly occurrence in our natural environment effects more than simply the esthetics of our back yard and temperature of the air, it influences our biological rhythms. We respond to these rhythms in the way we feel and behave. The goal of this study is to determine if the seasonal pattern of the natural world effects students and to what extent mood, motivation and overall academic performance are influenced by the change of the seasons.

Review of Literature

Celebrating the Seasons

The sun has been honored and celebrated around the world by cultures for its source of inspiration, both physical and spiritual. The light and warmth has played an essential role in the maintenance of the fragile balance of life. Throughout history many societies have used the sunlight as an indicator of the winter and summer solstice to enhance their sense of awe over a mysterious, yet predictable universe. Around the time of winter solstice it was tradition to extinguish and rekindle the fire, symbolizing the end of one year and the beginning of another (Rosenthal, 2006). Even today, festivities that take place around the winter solstice are celebrated with lights: candles on Hanukkah and strings of lights decorating houses and trees on Christmas. The use of these rituals also

serve to lift spirits during the darkest days of the year (Rosenthal, 2006). The process of the earth is cyclical with each season interwoven into the next. These instinctive forces influence all aspect of our environment and in turn all living creatures. The seasons provide a motion for the solar calendar and help us come to terms, both intellectually and emotionally, with the passing of time (Rosenthal, 2006).

Historical Understanding of Seasonal Influences

Seasonality in humans—particularly the way in which light affects mood—has been observed throughout the ages. A relationship between seasons and moods was first observed over two thousand years ago by Hippocrates, who noted, “It is chiefly the changes of the seasons which produces depression” (Rosenthal, 1989). Hippocrates further discussed the relationship between seasonal changes and depression, surmising that seasons actually caused disease (Rosenthal, 2005). In the fifth century Hippocrates considered mania and depression to be disorders of the spring, while Kraeplin, a founding father of biological psychiatry, documented seasonal episodes of illness in some patients with a prevalence of manic episodes in the spring and depressive episodes in the winter (Papolos & Papolos, 2005). Hippocrates stated, “Whoever wishes to pursue the science of medicine in a direct manner must first investigate the seasons of the year and what occurs in them” (Wehr, 1989).

Seasonal affects on the human mind and body

Humans have evolved under the sun. “We are the naked ape”, stated Paul Arbisi Ph. D, a clinical psychologist at the Minneapolis Veterans Affairs Medical Center. Although

humans don't actually hibernate, our response to winter may be somewhat like that of bears, which move into a torpor state in the winter (Gaines, 2005). Over hundreds of thousands of years our bodies have been encountering the four seasons and so we have developed a method of dealing with the seasonal changes. When the leaves begin to fall from the trees and the days become shorter the winter months are soon to be upon us. We respond to these rhythms in the way we feel and behave. Biological rhythms control much of the body's normal functions, including performance and behavior (Marino, 2005).

Inner clock. The circadian system is known as the body's twenty four hour clock that controls the cycles of sleep (Gaines, 2005). The suprachiasmatic nucleus (SCN), located in the hypothalamus is the heart of the circadian clock (Ishida et al., 2005). The SCN is actually a pair of structures. One sits on the left hemisphere and one in the right, just below the eyes. It depends on light for entrainment synchronizing the inner clock with the cycles of light and darkness in the world outside (Caldwell). The SCN conveys information concerning light-dark cycles to other light managed parts of the body. (Marino, 2005).

Melatonin. During periods of darkness our body sends out the hormone melatonin. Melatonin is produced by the pineal gland that sits just above the brainstem (Marino, 2005). Once called the mystical "third eye", the pineal is a still somewhat mysterious brain structure, and long thought to be the interpreter of the outside world to the inner one (Gallagher, 1991). Each night the pineal gland releases melatonin into the bloodstream and continues to do so until dawn (Rosenthal, 2006). This hormone is responsible for

many of the body's daily rhythms, including sleeping, waking and appetite. The presence of light stops or slows melatonin production triggering a new pattern of physical activity. Too much of this sleep related hormone can alter the physical functions that are disturbed in depression, such as eating, sleeping, weight control and sex drive (Rosenthal, 2006). Throughout winter months there are fewer daylight hours; as a result the level of melatonin secretion increases along with the number of hours of darkness (Marino, 2005). People affected by the light-dark cycles instinctively shift their melatonin levels with the seasons, paralleling the hibernation patterns of mammals (Mercola, 2001). The result is a sluggish, irritable feeling that persists throughout the day (Jenkins 2002). Other individuals appear to be immune to shifts in the natural daylight, with their melatonin levels remaining stable throughout the seasons (Mercola, 2001)

Serotonin. Serotonin is a neurotransmitter involved in the inhibition of activity and behavior (Buelow, Hebert, & Beulow, 2000). It is also thought to play an important role in Seasonal Affective Disorder. The University Of Pennsylvania School Of Medicine found that light decreases the body's production of serotonin (Gaines, 2005). The amount of serotonin in the blood coming from the brain varies directly with the amount of sunlight on a particular day (Rosenthal, 2006). Constant darkness leads to a decrease in serotonin levels in the brain (Gaines, 2005). The hormone serotonin is responsible for passing electric signals from one nerve cell in the brain to the next. Serotonin transmitters are important because they move serotonin from the synapse, when it has delivered it's chemical message, back to the presynaptic nerve, as part of the serotonin recycling program (Kaufman , 2001). Deficient transmission of signals from one serotonin neuron to another can lead to a depressed state (Rosenthal, 1993). Placebo-

controlled studies support the hypothesis that rapid lowering of brain serotonin function can trigger depressive symptoms (Partonen & Lonnqvist, 1998). People affected by the darkening days of winter show exaggerated responses to a drug that help to stimulate serotonin receptors, such as Prozac, Zoloft, Celexa, and Lexapro (Rosenthal, 2006).

Seasonal Affective Disorder

The change in the seasons can influence people in many different ways. Internal changes, coinciding with those in the natural world, have inspired artistes and writers to express the shifting beauty of the landscape. For others the darkening days of winter cause discomfort and disability (Rosenthal, 2006). In spite of the historical awareness of the seasonal influence on people and their daily functioning it is only in the last twenty years that a name has been given to the phenomenon that has affected so many. Seasonal Affective Disorder or commonly referred to as SAD was first defined in the publication of Rosenthal et al's 1984 paper Seasonal affective disorder: a description of the syndrome and preliminary findings with light therapy (Carskadon & Acebo, 1993). The name given to this disorder SAD, is broken down as 'Seasonal', because the ailment is influenced by the seasons, 'Affective', because it is an expression of mood and 'Disorder' because in all cases it brings about a change or imbalance in the body's normal way of functioning (<http://holistic-online.com> 11/13/05). SAD is a condition of recurrent depression in the winter with a remission in the spring or summer (Magnusson, 1998). A broad body of information describing the disorder has been accumulated from clinical and epidemiological studies of SAD in adults leading to the inclusion of seasonal subtypes for affective disorders in the DSM-III-R (1987) third edition, revised (Carskadon & Acebo, 1993).

SAD has been attributed to a biochemical imbalance in the hypothalamus due to the shortening of daylight hours and the lack of sunlight in the winter. As the seasons change there is a shift in people's "biological internal clocks" or circadian rhythm due to changed in sunlight patterns. About fifteen million Americans experience symptoms of SAD. The major diagnostic symptoms related to SAD are recurring periods of depression and mood change throughout several years of seasonal changes. Other symptoms include nighttime carbohydrate cravings (sugars, starches and alcohol) and weight gain, irritability and anxiety, an inability to focus, guilt, lethargy, hopelessness, suicidal thoughts and decreased sexual appetite (Rosenthal, 2006).

SAD can be a vicious cycle. Behaviors that typically occur in patients actually make SAD symptoms worse, which in turn aggravates the very same behaviors. An example of this is when a child sleeps in late on the weekend. Sleeping in late prevents the child from being exposed to light in the early morning, which often makes SAD (and oversleeping) worse (Rosenthal, 2006).

Most of those affected are women who live in northern areas (Arbisi, 1998). The incidence of SAD varies by location; rates in the US range from one percent in Florida to ten percent in Vermont, Alaska, and Maine (Wakefield, 2005).

SAD Children and Adolescents

Although adults with SAD have been thoroughly researched over the past twenty years, there have been relatively few studies of childhood and adolescent displaying symptoms of the disorder. One third of adult patients studied by Rosenthal (2006) reported winter symptoms going back to early years of childhood. The few cases, along with data from adult patients indicate that SAD occurs in children and adolescence

though the prevalence is unclear (Carskadon & Acebo, 1993). Rosenthal (2006) found that SAD appears to affect only about one percent of children in lower grades, while increasing the frequency dramatically in the sophomore, junior and senior years of high school. The increase corresponds to the onset of puberty and is more pronounced in girls than in boys, suggesting the secretion of the female sex hormone may be one factor in the development of the symptoms of SAD. By the last year of high school, approximately five percent of students in a mid-Atlantic suburb report seasonal problems severe enough to qualify them as suffering from SAD (Rosenthal, 2006). Another study researching latitude and seasonality among seventh and ninth graders found that the experience of seasonal mood changes is so common among adolescents living in northern latitudes that they seem to be almost normative concerns (Sourander et al., 1999).

In 1993 Drs. Mary Carskadon and Christine Acebo, at Brown University, conducted a study of seasonality in children. Parents of children in grades four through six were surveyed for a history of seasonal changes. They found that nearly one half (48.5%) of the 1,680 parents responding to the mailed survey reported that their child ate more, slept more, or were sadder, more withdrawn, more tired, or more irritable in the winter. Four percent of the children were reported to have increased sadness and at least two other symptoms during the winter. These results suggest that “winter blues”, if not full seasonal affective disorder, may be relatively common among grade school children (Carskadon & Acebo, 1993). Swedo et al. (1995) suggested if all schoolchildren from ages nine to seventeen in the United States are considered together, about three percent, or about a million children and adolescence are estimated to suffer from SAD. This makes the problem about as common as attention deficit disorder (ADD). Unlike the

symptoms of attention-deficit/hyperactivity disorder, which include easy to spot restlessness, learning difficulties and hyperactivity, SAD are often less conspicuous and easily missed (Rosenthal, 2006).

While some children are able to recognize that they have a seasonal problem, many children or adolescence with SAD don't understand what it is that is wrong. Frequently children are not aware that the change is internal, instead they will blame it on the world around them. They experience the world as cruel and uncaring. Children perceive teachers as demanding and parents excessively strict (Rosenthal, 2006).

Rosenthal et al. (1986) suggests that the disorder may be milder and more amenable to treatment in children than in adults. By the time many adolescents seek treatment they have been experiencing symptoms for an average of six winters (Rosenthal, 2006). Some symptoms of SAD fit the typically stereotype of what people may expect to find in adolescence, such as lack of motivation, lethargy and irritability. Research has shown that these stereotypes are a myth and that adolescence is frequently happy and pleasant time (Rosenthal, 2006).

One of the most pressing concerns for children and adolescents experiencing symptoms of SAD is the direct effect it will have on his or her academic performance. Presenting symptoms in children and adolescents are often orientated toward school dysfunction, including: memory impairment, poor organizational skills, difficulty in writing, loss of desire to take part in activities and decline in academic achievement (Carskadon & Acebo, 1993). Giedd et al. (1998) suggested that a pattern of best performance in the first and last quarters, with worsening grades in the second and third quarters may be a clue to the possible presence of SAD. John Docherty found that people

with SAD typically experience school related problems in order of frequency as follows: decreased concentration, productivity, interest and creativity; inability to complete tasks; increased interpersonal difficulties at school; increased absences from, school; and simply dropping out of school (Rosenthal, 1993).

Cognitive Difficulties. Abstract thinking skills and the ability to concentrate are among the most troublesome symptoms of adolescents and children with SAD (Kaufman, 2001). According to Rosenthal et al. (1986) children with SAD may not present with mood disturbance so much as fatigue and school problems. Typically, concentration and information processing are things that happen automatically. It is only when having difficulties that they are noticed. People with SAD have problems with thinking clearly and quickly. It is difficult to keep up with what is going on around them or what needs to be done. The ability to concentrate and process information varies greatly over the course of the year. In the summer everything comes with ease; by mid winter minor tasks take on major proportions (Rosenthal, 1993). The SAD schedule does not exactly work in conveniently with the school calendar year, as most students are off for the summer months. The difficulty thinking greatly impairs a student's ability to function at school. Tasks involving logic have shown to be especially troublesome.

Mood Problems. The emotional aspects of depression are among the most painful experiences known to humankind (Rosenthal, 1993). Children and adolescents suffering from SAD are more likely to be cranky and throw tantrums without cause. Children suffering from Seasonal Affective Disorder often suffer from fatigue and irritability, but not necessarily depression (<http://holistic-online.com> 11/13/05). Though few show signs of depression, it is not among the common symptoms (Rosenthal, 2006).

Physical Illness. Students with SAD may suffer from many types of physical ailments throughout the winter months—from backaches, muscle aches, and headaches, to different types of infection. Many people with SAD feel as if though they suffer from the flu all winter long. It is unknown whether having SAD makes people more likely to get the flu or whether it just feels worse for them to be sick while already suffering from SAD. The mind and brain exerts an influence on the human body in general especially the immune system (Rosenthal, 1993).

Changes in Eating and Sleeping. Most people with SAD eat more in the winter. Food preferences have also been known to change varying with the seasons. In the summer salads, fruits and other light foods are craved. In the winter high carbohydrate foods such as breads, pastas, potatoes and sugary foods are preferred. Foods rich in carbohydrates can spark the production of serotonin. People with SAD often have a ravenous appetite for foods rich in carbohydrates in winter months reporting that such foods comfort them, energize them, or other wise make them feel good when nothing else seems to do the trick. One of the problems of regulating mood with food is that the results are short lived. Shortly after eating a large amount of carbohydrates the individual is hungry, lethargic, or irritable once again and sets out to treat these feelings with more carbohydrates (Rosenthal, 2006).

A study by Arbisi (1996) found that people with SAD are less able to detect sweetness than non-depressed individuals. Taste buds return to normal when warmer weather arrives. Another study by Kurt Krauschi and Anna Wirz-Justice found that patients with SAD secrete more insulin in response to a glucose load than nonseasonal controls. When a person consumes sugar or other carbohydrates, the pancreas secretes

insulin, which causes sugar to pass from the blood into the tissues, resulting in lower blood sugar levels hours after the glucose is consumed. If patients have an exaggerated insulin response to carbohydrates, resulting in lower than normal blood sugar levels, this could trigger cravings for more carbohydrates and so on. Ultimately the calories consumed are converted into fat and lead to the weight gain often seen in patients with SAD (Rosenthal, 2006).

People with SAD frequently complain about changes in their sleep patterns. One common problem reported is difficulty getting up in the morning. People with SAD tend to sleep more hours but do not feel refreshed in the morning. This is due to the decrease in a type of deep sleep called “slow wave” sleep which accounts for day time fatigue. Adolescence is often a time when sleeping and eating habits are erratic, so reports of changes in these behaviors are less helpful than others (Rosenthal, 2006).

The Classroom Environment and Learning Implications. Schools have a yearly rhythm just as our environment does. It changes with the cycle and demands of the school calendar. Thinking abilities are constantly being called upon and evaluated in schools. A parent or teacher may notice seasonal decline in academic achievement, activity and mood; these are all common symptoms of SAD in children.

The influence of the school calendar must also be considered when studying the symptoms of children and adolescence with SAD. It can be difficult to decipher the difference between “school blues” and “winter blues” (Hoffman, Pleeter, Richter & Swedo et al., 1995). It is Arbisi suggests that symptoms may also be related school patterns. “If we recall our elementary school days we can readily admit we feel better during breaks and in the summer than we did sitting in the classroom in February”.

Recognizing troublesome conditions may help adolescents to organize her/his leisure, sports, and school activities during the dark months (Rosenthal, 2006). Families can organize activities in the great outdoors during the winter months.

Treatments

Although there may be little a person with SAD can do about the weather, there are now many options in alleviating its effects. There are many ways that in which people can help themselves or be helped through winter depression. Studies suggest that pediatric SAD may be similar to the adults not only in symptoms, but also in response to treatment (Swedo et al. 1997).

Light Therapy. In 1984 Norman Rosenthal first reported on the positive reactions of depressed patients when they were exposed to bright light on a daily basis in fall and winter days. Their symptoms of depression improved. Today, the therapeutic value of light therapy is readily acknowledged (Papolos & Papolos, 2005). The most common form of treatment for people with Seasonal Affective Disorder is through the interaction of light with the eyes; know as Phototherapy or Light Therapy. Patients develop their symptoms during the short, dark days of winter of when they are deprived of sun light for any reason. The basic principal involved in light therapy is to replace the light that is missing to help a person feel more energetic and cheerful (Rosenthal, 2006). Since the time of Hippocrates, physicians have suggested manipulating specific climatic factors to treat particular patterns of depression. Most focused on temperature believing that heat elevates mood. Others thought that light and darkness could influence depression. Greek and Roman physicians believed depression was a kind of internal darkness (Wehr, 1989). Light was used to treat depression and lethargy nearly 2,000

years ago. Aretaeus wrote, “Lethargics are to be laid in the light and exposed to the rays of the sun for the disease is gloom.(1856).” Carelius Aurelianus specified that the light must be applied to the eyes to be effective (1950).

There are many ways to bring more light into a person’s life during the winter months. One can make a point of going outdoors on a bright winter’s day or bring more lamps into the house or workspace. The most effective and best-studied way of enhancing environmental light is by means of a special light fixture or light box (Rosenthal, 2006). Light therapy has been a popular and proven effective treatment for SAD. Effective phototherapy requires full spectrum lighting and must be taken in through the eye. The light-detecting retina signals a cluster of nerve cells called the suprachiasmatic nucleus, which then signals other areas of the brain such as the hypothalamus. Some believe the light shifts the time of secretion of the hormone melatonin (Gaines, 2005). After several days or weeks of exposure to light, wake/sleep patterns will generally become adjusted. Artificial light serves to readjust the body’s set point for light, restoring normal patterns of hormone secretion for the brain to the bloodstream and resetting the internal circadian clock to be in synch with the environmental rhythms (Ishida et al., 2005).

Anyone who undertakes light treatment for SAD should be supervised by a physician or counselor so they may monitor a person’s mood and any side effects that may develop in the course of treatment. It is also important that the diagnosis be confirmed by a qualified person and that a history is taken (Rosenthal, 2006).

One of the many benefits light therapy is that it can be administered without the help of a professional and may be done in the privacy and comfort of an individual’s

home. A person must first obtain a suitable light box which delivers bright, broad spectrum light. The light box should be set up in a convenient place at home. The individual will then need to sit in front of the light box for a certain predetermined amount of time each day. It is important that the person gets light therapy as early in the morning as possible and that he or she is sitting in such a way that the correct amount of light falls on the eye, usually with the box about eighteen inches from the face . Although it varies from person to person, most feel the effects of light therapy within two to four days of starting treatment (Rosenthal, 2006).

There are very few side effects from light therapy. Some people who are extremely sensitive to light, may experience some redness, similar to a sunburn type reaction. Changing the distance between themselves and the light box can help. Other patients report eye irritation. Using eye drops usually relieves this side effect (Seuss, 2005).

A study by Robert Golden found that light therapy is as effective for SAD as antidepressants have been shown to be for nonseasonal depression (Rosenthal, 2006). Light therapy also reduces the body's tendency to over secrete insulin in response to a glucose level, reducing carbohydrate craving in SAD patients and for most patients avoiding unwelcome weight gain (Rosenthal, 2006). Light therapy has proven to be effective for children and adolescents just as it is in adults. Swedo et al. (1997) evaluated the efficacy of light therapy for the treatment of pediatric SAD finding that a combination of light therapy and dawn simulation decreased the children's depressive symptoms. In another study done by Andes Magnusson (1998) it was found that light therapy increased

student's ability to concentrate and had a positive effect on student's ability to wake up in the morning during the winter.

One of the drawbacks of light therapy is the amount of time that needs to be set aside daily for treatment (Gaines, 2005). People do not necessarily have the time to sit in front of a light box every morning anywhere from a half an hour to two hours. Many people will choose to use the time in front of the light box to read the paper, eat breakfast or catch up on work. Children and adolescents may be persuaded to stick with their daily light therapy by allowing them to do a limited activity that they enjoy such as play video games or watch television. Light therapy has been found to be an effective tool in SAD but is usually only part of the solution. Studies show that it works best in conjunction with other elements of treatment (Rosenthal, 2006).

Dawn Simulation. Another form of light therapy is dawn simulation. In this treatment a dim light is administered just before the patient wakes and gradually increases in intensity. A device is used to simulate a summer dawn on a winter morning (Rosenthal, 2006). Every day, the light of natural or simulated dawn makes its way to the suprachiasmatic nucleus (SCN) and advances the inner clock, allowing it to catch up with local time. A dawn simulator also works while the user is still asleep due to the fact that the nerve pathway from the eyes into the SCN bypasses those parts of the brain that register conscious site (Caldwell, 1999). The inner clock can react to ambient light before the individual starts his or her day because it is capable of responding to even the small amounts of light transmitted through the sleepers closed eyelid (Caldwell, 1999). A study on the dawn and dusk conditions of SAD was conducted at the New York State Psychiatric Institute. Researchers used blood tests in demonstrating that the dawn

simulation slowed the production of melatonin and restored the circadian rhythm (<http://www.holistic-online.com> retrieved 11/13/05). Interestingly, the very first alarm clock ever invented incorporated both sound and light. Jean Eugene Robert Houdin (1805-1871) created a contraption containing a bell that would ring as a lighted candle came out of a box (Rosenthal, 2006). Swedo et al (1997) found that dawn simulators are most effective when used in conjunction with another form of treatment such as a light box.

An advantage of dawn simulation compared with the light box is that the patient is asleep during treatment. Children and adolescents who are reluctant to wake up earlier than usual to use a light box may benefit from a dawn simulator. Treatment with a dawn simulator does not require any extra time or effort on the part of the patient (Meesters, 1998).

Medication. Dozens of studies have been undertaken to examine the value of medications in the treatment of SAD (Rosenthal, 2006). Antidepressants can and will change the way the individual taking them feels, views him or her self, and sees the world. Proper use of them requires close communication between doctor and patient to ensure maximum benefits (Rosenthal, 1993). Some SAD sufferers find that standard antidepressant medications provide the relief that other treatments do not (<http://www.holistic-online.com> retrieved 11/13/05). There are many different drugs available for treating depression. Selective Serotonin Re-uptake Inhibitors (SSRIs) have been found to be most useful in the treatment of SAD. These drugs block the reuptake of the neurotransmitter serotonin into nerve terminals. This allows serotonin to transmit its message to the next neuron for longer duration (Rosenthal, 1993). Since depressant

symptoms are thought to be due to the deficient transmission of signals from one neuron to another, increasing the strength of the signals is thought to help reverse symptoms.

Administration of the medication usually proceeds by trial and error because at this point there is no scientific method for predicting the best medication for a particular patient. All antidepressants take time to work. At least two weeks should be allowed after the medication is administered in sufficient dose before a judgment is made on its effectiveness. If the first medication does not work, a second should be tried. It may take several attempts before finding the right one. Although antidepressants may be used instead of light therapy in some patients, typically they are used to supplement it. In addition if light therapy is used in conjunction with medication, it is often possible to get by on lower doses and correspondingly lower side effects. It is often necessary to adjust the dosage with the changing seasons-increasing it as the days become shorter and decreasing it as the days become longer and brighter (Rosenthal, 1993).

Norman E. Rosenthal and Dr. Jack Modell (2004) conducted a large-scale study on the effects of Wellbutrin XL, a once a day formulation antidepressant. Wellbutrin XL was the drug of choice because of the significantly low list of side effects that do not include weight gain, sexual side effects, and lethargy which are common with other antidepressants. In comparing the effects of Wellbutrin XL versus placebo, the results were positive. The drug reduced the chance of developing a winter depression by thirty-five to fifty percent. This was the first study to show that depression can be prevented by starting an antidepressant before it begins. Another important finding was that patients did not relapse after the medication was discontinued at the beginning of spring. Patients with SAD often need to be treated only during the fall and winter months when they are

at risk. Antidepressant medication can be tapered off toward the end of winter and allow the patient to be medication free for the spring and summer months (Rosenthal, 2006).

Researchers at the National Institute of Mental Health are currently exploring a totally different pharmacologic approach to SAD administering a beta blocker which acts at the pineal gland to shut off the signal of melatonin production (Gaines, 2005).

The overall use of antidepressants in pediatric patients, particularly the selective serotonin reuptake inhibitors (SSRIs), has rapidly increased in the past decade. It is estimated that the rate of antidepressant use in youths aged 18 years and younger was 1.0 per 100 people by 1996. More recent analyses, conducted by the FDA Division of Surveillance, Research & Communication Support on data collected through the IMS Health, National Prescription Audit Plus and National Disease and Therapeutic Index programs, found that an estimated 10.8 million prescriptions were dispensed in 2002 for youths aged 1 to 17 years. The primary pediatric diagnoses associated with the use of the SSRIs and other antidepressants was anxiety disorders in children aged 1 to 11 years and mood disorders in adolescents aged 12 to 17 years (Leslie, Newman, Chesney and Perrin, 2005). There has been a great deal of publicity about the development of suicidal ideas in children shortly after beginning taking antidepressants. It has recently caused sufficient concern that the Food and Drug Administration (FDA) has issued a “black box” warning concerning the use of antidepressants in children. The “black box” is highlighted on the outside of the box to prevent the warning from being lost in the fine print (Rosenthal, 2006). Although such effects have been seen in adults taking SSRIs, it is unclear whether they occur more frequently in children. Psychiatrists say they must

weigh the risks and benefits of SSRIs in treating children and adolescents and choose the course that seems most likely to help (Couzin, 2004).

Cognitive Behavioral Therapy. An alternative to light therapy is the commonly used form talk therapy, cognitive-behavioral therapy, often referred to as CBT. CBT examines the content of an individual's cognition, emotion and behavior and their relationship to one another. The therapy then seeks to alter or correct any apparent disturbances within the three domains (Rosenthal, 2006). CBT therapists employ the age old technique of practice to help their client to overcome their problems. A therapist typically assigns written homework in which they ask patients to record their feelings, thoughts and actions. Therapists teach patients to question any downers and turn them into uppers. This works through continuous repetition. "Practicing" changing negative into positive thought actually expands the portion of the brain involved in carrying out the task in question (Rosenthal, 2006). Studies have shown that CBT can help with people suffering from nonseasonal depression by making changes in brain regions involved in attention and memory which then drive antidepressant responses (Rosenthal, 2006). In 2005 Kelly Rohan conducted a study involving 61 patients, one group treated with daily light therapy, another with 12 sessions of CBT and the third with a combination of both treatments. All three groups showed comparable improvement across the six weeks of the study. The largest percent of patients (80 percent) responded in full when CBT and light therapy were used together. Most importantly those who underwent CBT, both alone and with light therapy, were less depressed at the one year follow up compared to those treated with light therapy alone. During the therapy, which occurs twice a week for six weeks, patients learn about the origins of SAD and how

learned behaviors and ingrained negative thought patterns contribute to their symptoms (Reidel, 2005). Other elements in Rohan's therapy include: pursuing positive thoughts and activities and avoiding negative ones, keeping active, and interacting with people who lift your spirits. Patients are encouraged to work hard to change their thoughts and behavior during the winter (Rosenthal, 2006). Rohan believes that CBT has more lasting effects and teaches lifelong coping skills (Reidel, 2005). Overall studies show that the therapy is a time-limited treatment and appears to have a better long term effect than light therapy alone (Wakefield, 2005).

Life Style Change. Although most people with SAD benefit from some form of light therapy (as well as or in addition to antidepressants or psychotherapy) there are many ways other in which people with SAD can help themselves to overcome winter depression. Sometimes taking SAD seriously means making significant life changes to ease the difficulties of everyday living during the winter (Rosenthal, 2006). While for others with less severe cases of SAD, simply maintaining a consistent eating and sleeping schedule can mitigate symptoms.

Exercise, one of the best known antidepressant can also help (Gaines, 2005). There is growing evidence that regular aerobic exercise has a beneficial effect on mood control in those who suffer from depression in general. In a study by Arcady Putilov, two different types of treatment were used in two groups of patients with SAD, light therapy and exercise. Both treatments were found to be equally effective (Rosenthal, 2006). It is easy for individuals to exercise while increasing light exposure at the same time. By walking or jogging outdoors the antidepressant effect is enhanced. Kelly Rohan suggests to clients, "Before investing in a light box, I encouraged SAD patients to go for a 30-

minute walk after sunrise every morning. This gets just as much light to the retina as using light therapy and has the added benefit of increasing physical activity” (Reidel, 2005). Exercise also has the added virtue of reducing weight gain or preventing the winter weight gain experienced by most sufferers of SAD. In addition, limiting the carbohydrate intake can help the individual to avoid the weight rollercoaster.

The benefit for increasing environmental light can be obtained not only from formal therapy in front of a light box but also whenever a person’s environment is brighter. This can be achieved with more light around the home and or work space. Installing more lighting on the ceiling or placing more lamps in the room will cause the individual to feel more comfortable and cheerful (Rosenthal, 2006).

Many people with SAD will choose to take vacations in the winter instead of the summer. Two weeks in a sunny climate can interrupt even the worst stretch of winter. Not only is the increased sunlight absorbed through the eyes but the rest of the body as well. There is a growing body of evidence suggesting that sunlight might affect mood via skin as well as the eyes (Rosenthal, 2006)

Conclusion

The changing of the seasons influences the natural world and all living beings within it. Seasonality in humans—particularly the way in which light affects mood—has been observed throughout the ages. Those affected by Seasonal Affect Disorder experience symptoms of mood swings, anxiety and irritability, nighttime carbohydrate cravings and weight gain, an inability to focus, guilt, lethargy, hopelessness, suicidal thoughts and decreased sexual appetite (Rosenthal, 2006). Children and adolescents with seasonal affective disorder often suffer from fatigue, anxiety and irritability, but not

necessarily depression. Presenting symptoms are often orientated toward school dysfunction, including: memory impairment, poor organizational skills, difficulty in writing, loss of desire to take part in activities and decline in academic achievement (Carskadon & Acebo, 1993).

There are many ways that in which individuals can help themselves or be helped through winter depression. Studies suggest that pediatric SAD may be similar to the adults not only in symptoms, but also in response to treatment (Swedo et al. 1997). Treatments most frequently used in pediatric SAD include various forms of light therapy and general lifestyle changes. The research indicates that one third of adult patients with SAD report symptoms going back to early years of childhood (Rosenthal, et al., 1984). In acknowledging and recognizing the symptoms of SAD at an early age, available treatment, parental and school involvement can help avoid years of cyclical depression and academic decline.

A study was conducted to determine the extent to which the seasonal pattern of the natural world affects students, and to what degree mood, motivation and overall academic performance are influenced by the change of the seasons. The hypothesis is that as the sunlight hours increase, students experience diminished SAD symptoms while increasing their overall academic performance. First, it is expected that the students will report experiencing an overall lift in mood, increased motivation, replenished energy and renewed concentration in the spring. Second, the overall class interest and participation will increase in the spring months. Overall, it is anticipated that as the spring arrives participants will have an increased overall well being while be more productive as students.

Method

Setting

This study was conducted in a suburban vocational high school in Western New York. The vocational program serves students from 10 area suburban districts. This high school consists of students in grades 10-12 from the various districts. Students attending a program at the school spend half of the day at the traditional high school and half of the day enrolled in one of 23 offered vocational courses. The total enrollment was 699, with .5%(4) students in tenth grade, 46%(321) students in eleventh grade, and 50% (352) students in the twelfth grade. The school was composed of 52% male students and 48% female students. The ethnicity breakdown for the school was; 4.9%(34) Hispanic, 1.3%(10) Asian, 7.6% (53) Black, and 85.3% (596) Caucasian and .85% (6) other. This study was conducted with students enrolled in the Culinary Arts program, who are in eleventh and twelfth grade. The questionnaire was administered in the culinary arts classroom.

Participants

The sample size was 30 students who are currently enrolled in culinary arts courses at the vocational high school. The initial intent was to have a 100% participation rate from a total of 71 students, 34 students from the morning class and 37 students from the afternoon class. Overall out of the 71 students asked to participate 30 completed the two questionnaires. The sample size was based on the number of students volunteering for the study. Participation was obtained on a volunteer basis from students enrolled in the morning and afternoon courses of Basic Culinary Arts and Advanced Culinary Arts. Students had the option of responding to the questionnaire. A written consent form was

signed by the subject prior to taking part in the study. Participation was based solely on the option to provide the information requested. No compensation or special credit was offered.

Procedure

The questionnaires (Appendix B) were administered in Culinary Arts classes in a morning and afternoon session. Two teachers agree to distribute the questionnaire, each in one of the classes they taught. Participants read and signed a statement of informed consent prior to completion of the questionnaire. The statement informed students that the study would remain confidential and be known only to the researcher. It confirmed that names would only be on the consent form and latter be detached from the questionnaire. The statement further explained that if the study were to be published, results would be given anonymously and in group form only. The questionnaire was handed out by the teacher and researcher towards the end of class and collected upon completion. Participants took between 5-10 minutes to complete each questionnaire. Participants each took the same questionnaire two times. The first administration of the questionnaire was towards the end of winter in February on a chilly cloudy day. The second time was in the spring, in the middle of April on a warm sunny day.

Measure

The measure used to evaluate the students was a Questionnaire (Appendix B). The measure was self-created questionnaire, which included fifteen questions. The questionnaire was designed and adapted after the Seasonal Pattern Assessment Questionnaire (SPAQ), a measure that assesses the magnitude of seasonal change in sleep, social activity, mood, weight, appetite and energy over the span of a year. The

SPAQ, created by Rosenthal, Bradt and Wehr, was developed under the aegis of the NIMH, a government institution and is therefore in the public domain and can be used freely by scholars and researchers (Rosenthal, 2006). The SPAQ was developed for adults to evaluate seasonal variation in mood and behavior and had been used in numerous research efforts regarding SAD with a good reliability and validity (Sourander, 1999).

A questionnaire was chosen as the measure used to determine the effect of seasonal changes on the students over another measure such as a case study in order to obtain a large sample size within the time given to conduct the study. The researcher adapted the assessment to better measure seasonal changes specifically in adolescent vocational high school students. The questionnaire measured the prevalence of depressed mood and change in: energy, appetite, social activity, sleep, classwork interest, motivation and concentration. The validity and reliability was not measured. The questionnaire was broken up into two parts, A and B. Part A, questions 1-7 asked participants to answer yes or no to short questions. A Likert type scale was used in Part B questions 8-15. The rating went as follows “1” represented no change, “2” represented slight change, “3” represented moderate change and “4” represented extreme change. The scale consisted of 8 Likert-type items that are represented on a 4 point continuum with higher scores indicating greater seasonal effects on the participant.

Part A

Question 1. This item pertained to the prevalence of an overall depressed mood felt by the participant for most of the day.

Question 2. This item related to the loss of interest in things usually enjoyed by the participant.

Question 3. This item asked the participant if they were experiencing feelings of being worn out, run down or tired even when not doing much.

Question 4. This item pertained to possible loss of energy and the overall decrease experienced.

Question 5. This item related to the decrease in concentration levels of the participant, specifically in the classroom.

Question 6. This item focused on the indecisiveness often experienced as a symptom of SAD.

Question 7. This item related to the sluggish feeling of being slowed down in movements and activities.

Part B

Question 8. The overall degree to which sleep length had changed within the last month was determined.

Question 9. The change in social activity over the past month was reviewed.

Question 10. This item questioned the change in mood over the past month.

Question 11. Over all change in appetite was examined over the past month in this item.

Question 12. This item pertained to the change in energy felt in the past month.

Question 13. This item related to the change in motivation over the past month.

Question 14. This item examined the interest in school, specifically Culinary Arts.

Question 15. The completion of typical everyday tasks of a student, specifically homework over the past month was examined.

Summary

In summary, the study was conducted with 30 participants. A self-reporting questionnaire was administered in the classroom during the school day. Each participant had taken the questionnaire two times once at the end of the winter season and again in the spring. The spring and winter questionnaires were compared in order to determine the seasonal effects on students.

Results

The following results were obtained from the questionnaires given to students in the winter and again in the spring. The data from Part A questions 1-7 was compiled and compared according to the season. The data from Part B was compiled and averaged to produce a means score for the winter and the spring questionnaires. The difference of the mean scores was illustrated and will be discussed further in detail.

Table 1

Comparison of SAD symptoms experienced in Winter and Spring

Question	Winter		Spring	
	Yes	No	Yes	No
1. Felt sad, depressed or gloomy for most of the day?	20	10	10	20
2. Lost interest in things you normally enjoy?	11	19	8	22
3. Felt tired or worn out even when not doing much?	23	7	14	16
4. Had less energy than usual?	22	8	14	16
5. Inability to concentrate in Culinary Arts?	17	13	8	22
6. Inability to make decisions or think clearly?	11	19	11	19
7. Feeling very slowed down in your movements?	13	17	8	22

Table 1 discusses the prevalence of feelings, energy fluctuations and cognitive disruptions frequently associated with adolescent SAD. The data represents the number of students who answered yes or no to the questions. Of the seven questions, number 4, “Had less energy than usual?” showed to have the strongest impact on the participants with a total of 23 students, which decreased to 14 in the spring. Number 2 “Lost interest in things you normally enjoy” and number 6 “Inability to make decisions or thinking clearly” had the least effect on students both with a total of 11, neither increased in the spring. Overall, symptoms of SAD were more commonly experienced in the winter than in the spring months. All symptoms decreased in frequency while one stayed the same.

Table 2

Winter Questionnaire Behavioral Changes

Question	No Change	Slight	Moderate	Extreme
8. Sleep Length	12	10	6	2
9. Social Activity	16	10	4	0
10. Mood	8	16	4	2
11. Appetite	12	10	6	2
12. Energy Level	6	15	8	1
13. Motivation	11	12	8	0
14. Interest in Culinary	15	10	5	0
15. Completion of homework	12	10	8	0

Table 3

Spring Questionnaire Behavioral Changes

Question	No Change	Slight	Moderate	Extreme
8. Sleep Length	10	10	6	4
9. Social Activity	18	10	0	2
10. Mood	10	12	4	4
11. Appetite	12	8	6	4
12. Energy Level	12	10	4	4
13. Motivation	11	10	7	2
14. Interest in Culinary	20	6	4	0
15. Completion of homework	16	8	6	0

Tables 2 and 3 illustrate the degree to which every day behaviors such as eating, sleeping, energy level and academic performance are influenced by the change of the seasons. The data reflects the number of students that reported specific degrees of change in response to the question.

Table 4

Winter and Spring Part B Mean Score Comparison

Question	Mean Score		Difference
	Winter	Spring	
8. Sleep Length	1.9	2.1	+0.2
9. Social Activity	1.6	0.7	-0.9
10. Mood	2	1.7	-.03
11. Appetite	1.9	1.9	0
12. Energy Level	2.1	1.6	-0.5
13. Motivation	2	2	0
14. Interest in Culinary	1.6	1.4	-0.2
15. Completion of homework	1.9	1.6	-0.3

Table 4 presents the mean scores for the degree of change in behaviors from the spring and winter questionnaires. The scales for questions 8-15 correspond as follows: No Change = 1, Slight = 2, Moderate = 3, Extreme = 4. Of the eight items scored, Energy level had the most seasonal variation in the winter months with a mean of 2.1. Interest in Culinary and Social Activity changed the least with a mean of 1.6. Behavioral changes decreased in the spring with the exception of Appetite and Motivation which stayed the same and Sleep length which increased by 0.2.

Discussion

The purpose of this study was to determine the extent to which the seasonal pattern of the natural world effects students and to what degree mood, motivation and overall academic performance are influenced by the change of the seasons. The results

from this study indicate that while not all students experience cognitive, behavioral and emotional changes in the winter, many students do. The changes are more prevalent and are of stronger degree in the winter than in the spring. The results from the winter questionnaire were compared to the spring questionnaire and the findings will be discussed further in more detail.

Part A

Question 1. This item pertained to the prevalence of an overall depressed mood felt by the participant for most of the day. In the winter questionnaire 20 students reported feeling gloomy, and 10 reported they did not. In the spring the number dropped to 10 students reporting a depressed mood while 20 reported they did not. The percentage of students experiencing a depressed affect dropped from 66% in the winter to 33% in the spring.

Question 2. The second item inquired of the general loss of interest in things and activities usually enjoyed by the participant. 11 students reported the change in interest in the winter and 19 saw no change at all. In the spring 8 students experienced the loss of interest while 22 did not. This shows an overall increase in loss of interest in regularly enjoyed activities in the winter months of 36%, decreasing in the spring to 26%.

Question 3. This item focused in on feelings of being worn out or run down. Children suffering from Seasonal Affective Disorder often suffer from fatigue and irritability, but not necessarily depression (<http://holistic-online.com> 11/13/05). In the winter questionnaire, 23 or 76% of participants reported feeling tired without doing more than usual. 14 students, 47% reported a worn our feeling in the spring. Overall presence of these feelings dropped 29% in the spring.

Question 4. In the winter questionnaire 22 students reported a decrease in energy. 8 reported no change in energy levels. In the spring the number of students reporting energy loss dropped to 14, while the number of students experiencing no less energy than normal increased to 16. The decrease in those reporting an energy loss dropped 26%.

Question 5. This item related to the decrease in concentration levels of the participant, specifically in the classroom. In the winter, 17 Students reported a decline in concentration in Culinary Arts, while 13 saw no difficulty. In the spring 8 students found decreased concentration levels and 22 did not. Abstract thinking skills and the ability to concentrate are among the most troublesome symptoms of adolescents and children with SAD (Kaufman, 2001). While not all students experienced a decline in the winter months, more than half of them did (56%). This number significantly decreased as the seasons changed in the spring to 26%.

Question 6. This item focused on the indecisiveness often experienced as a symptom of SAD. In both the winter and spring questionnaire 11 students reported an inability to make decisions or think clearly while 19 did not. Overall this shows that the students may not have been affected by the change of the seasons but that they are accurately and repeatedly decisive in regards to their indecisiveness.

Question 7. This item related to the feeling of being slowed down in movements and activities. 13 students reported sluggishness in the winter questionnaire. This number decreased to 8 students in the spring showing a 16% decrease.

Part B

Question 8. The overall degree to which sleep length had changed within the last month was determined. In the winter 60% of students noticed some change in their length

of sleep with a mean score of 1.9. In the spring 67% of students noticed a change in their typical length of sleep with a mean of 2.1. Overall more students reported a change in sleep in the spring than in the winter with a mean difference of +0.2. These results suggest that students slept significantly more or less in the spring than in their normal routine. Rosenthal, 2006, suggested that adolescence is often a time when sleeping and eating habits are erratic, so reports of changes in these behaviors are less helpful than others in diagnosing SAD.

Question 9. The change in social activity over the past month was reviewed. In the winter 46% of students reported a change in social activity with a mean of 1.6. 40% of students noticed a change in the spring with a mean score of 0.7. Overall the number of students reporting a change in social activity decreased in the spring with a mean score difference of -0.9. This implies that student's degree of social activity increased with the change of the seasons in the spring

Question 10. This item questioned the change in mood over the past month. On the winter questionnaire 73% of students noticed some change in their mood with a mean score of 2.0. On the spring questionnaire the number of students who experienced a mood change decreased to 67% with a mean of 1.7. Overall the results show a decrease in prevalence and degree of mood change in the spring with a mean difference of -0.3 suggesting students were less moody in the spring months.

Question 11. Over all change in appetite was examined over the past month in this item. 60% of all students reported some change in appetite in both the winter and the spring each with the same mean of 1.9. These finding suggest that student's appetites were not affected by the change in the seasons. As mentioned earlier by Rosenthal

adolescence is often a time when eating habits are erratic and are difficult to measure as a symptom of SAD.

Question 12. This item pertained to the change in energy felt in the past month. In the winter 80% of students noticed a change in their energy level with a mean of 2.1. In the spring the amount of students decreased to 60% with a mean score of 1.6. These findings imply that students experienced an overall increase in energy levels in the spring.

Question 13. This item related to the degree of change in motivation over the past month. In both the winter and the spring 63% of students reported change. There was no difference in the number of students reporting a change or the degree to which the shift in motivation occurred with a mean score of 2.0.

Question 14. This item examined the interest in school, specifically culinary arts. In the winter 50% of students reported a change in overall interest in Culinary Arts with a mean score of 1.6. In the spring 33% of students reported a change in interest in school work with a mean score of 1.4. Overall more students reported a change in interest in school work in the winter than in the spring. The degree of the change also decreased in the spring with a mean score difference of -0.2. These findings suggest that student's interest in Culinary Arts increased in the spring months

Question 15. The completion of typical everyday tasks of a student, specifically homework over the past month was examined. 60% of students reported some change in completion of homework in the winter with a mean score of 1.9. In the spring this number decreased to 40% with a mean score of 1.6, a score difference of -0.3. Overall,

this suggests that students completed their homework more frequently in the spring than in the winter months.

Analysis

With respect to this study's expectations as stated above, the results indicate that both expectations were met. The first expectation was that students will report experiencing an overall lift in mood, increased motivation, replenished energy and renewed concentration in the spring. The results show that overall mood and energy levels both increased in the spring while decreasing in the degree of change. Motivation did not decrease or increase in the spring, and remained the same in the degree of change. The number of students experiencing a decline in concentration decreased from 56% over the winter months to 26% in the spring.

Second was that the overall class interest and participation will increase in the spring months. Interest in Culinary Art and completion of homework both increased in the spring months as the degree of change decreased. Overall as the spring came students had an increased sense of well being while achieving in their studies.

Limitations

As with all studies, there are some limitations to these findings. Conducting research involving the four seasons and the weather they bring allows for the environment to significantly influence results. Working with the unpredictable weather of Western New York can cause even more variation. The purpose of the study was to accurately measure student's mood, motivation and academic performance in two distinct seasons, winter and spring. One limitation of this study was the mild and sporadic winter of 2005-2006. Typically the winter months of Western New York consist of snow, below

freezing temperatures and many of cloud covered grey days. Based on 1961-1990 National Weather Service records western city, Rochester, New York, was the snowiest large city in the United States (population greater than 200,000) averaging 94 inches of snowfall annually. Buffalo, New York, another major city in Western New York followed with a very close second. According to the national Climate Data Center, the winter of 2005-2006 was the first warmest on record. Between the months of December-February New York state had above normal precipitation and much above normal temperatures. The winter consisted of long periods of sun filled skies and ground lacking the cover of snow. Although the daylight hours were still shorter than in the spring and summer months, a true Western New York winter was not experienced.

Another limitation in the research was the lack of obtainable measures to study SAD in school-aged children. Because no validated instruments existed for SAD specifically in adolescence at the time of the study, it is not possible to determine the prevalence rates of adolescent SAD. The questionnaire that was created by the researcher measures the prevalence of the symptoms of SAD and the change between the winter and spring months. It is not a reliable tool for diagnosing Seasonal Affective Disorder. During the course of the study an adapted questionnaire was published by S. Swedo and J. Pleeter from the Seasonal Pattern Assessment Questionnaire (SPAQ). The Seasonal Pattern Assessment Questionnaire for Children and Adolescents (SPAQ-CA) is a reliable measure of SAD for school-age children and includes items pertaining to students measuring change in school performance, grades, substance abuse, getting in trouble and social activity as well as standard items related to adult SAD such as mood, energy level, appetite, sleep patterns (Rosenthal, 2006).

The influence of the school calendar must be considered in interpreting these results of Seasonal Affective Disorder in students. It is not uncommon for some students to experience a lack of motivation or feel frustrated when it seems the work is piling on and there does not appear to be a school break in sight. Other symptoms of “school blues” can include slowness, procrastination, apathy regarding schoolwork, and a tendency toward truancy.

Twelfth grade seniors frequently report “senioritis” as the end of their high school experience comes to an end. After college admission letters arrive in early spring high school seniors feel even less pressure to push themselves academically (Wikipedia encyclopedia, retrieved 4/2/06). The data does not differentiate between “school blues” and “winter blues”. Howard Adelman stated, “Schools have a yearly rhythm-changing with the cycle and demands of the school calendar year. There is a season of Hope as the school year starts; then comes homework, discontent, conferences of concern, grading and testing crises, newspaper attacks, worries about burnout and the search for renewal”. To help avoid the potential limitation of “school blues” in future studies; in-person interviews should be conducted throughout the school year over a period of several years.

Overall as a society we no longer spend the time in nature as we once did. In times when people lived more outdoors they were more observant of the subtle temporal changes in which was their clock and calendar. Prior to the Industrial Revolution our society worked with the land and our environment. During the winter months there was not as much work and people slowed down. It is only since that we have shut ourselves away from the daylight and never properly adapted to the change. We have become an indoor species. Many people leave their homes for work in darkness, commute in

enclosed vehicles or underground subways, spend the day in small windowless offices with artificial lighting then repeat the process at night. These behaviors not only affect the working adults in our society but children and adolescents as well. It is not as common for children to be playing outdoors as it is to find them instant messaging on their computer, gaming with a friend, or staring into their television screen when school lets out. It is possible that these behaviors can explain obesity and bad behavior in children who experience lack of exercise, lack of social interaction, lack of sunlight. Could childhood SAD be provoking another of overeating? There is a need for future research in exploring the relationship of Seasonal Effective Disorder and childhood obesity, an epidemic that is sweeping the United States.

Early recognition of childhood SAD and intervention by parents, teachers and clinicians is particularly important to prevent unnecessary suffering. Identifying the symptoms of SAD may help the adolescent to organize his or her leisure, sports, and school activities during the dark months (Sourander, 1999). It is important to promote school sports and encourage family activities in the outdoors, rather than promoting leisure time indoors (Cook, 2004).

Implications

This study explored the extent to which the seasonal pattern of the natural world affects students, and to what degree mood, motivation and overall academic performance are influenced by the change of the seasons. The findings indicate that students are affected by the lack of sunlight in the winter months in both motivation and academic performance. The limited amount of literature on child and adolescent SAD states that students present symptoms that are often orientated toward school dysfunction, including:

memory impairment, poor organizational skills, difficulty in writing, loss of desire to take part in activities and decline in academic achievement (Carskadon & Acebo, 1993). It is important for teachers and school counselors to be educated on the symptoms of SAD, which are easily confused with other common childhood disorders such as ADD. The earlier treatment is begun, the sooner the student can get back to a successful academic track.

Because seasonal changes in child and adolescent behavior are not well understood, more studies are needed to better understand treatments and possible prevention. It would also be interesting to see a longitudinal study done looking at SAD symptoms and the persistence into adulthood.

Conclusion

The findings from this study suggest that students are affected by the lack of sunlight in the winter months in both motivation and academic performance. In conclusion, this study proposes that school counselors are educated on the signs and symptoms of seasonal affective disorder in children and adolescents to ensure early detection and treatment. The process of the earth is cyclical with each season interwoven into the next. These instinctive forces influence students in ways we cannot see or touch. The cyclical nature of the natural world affects students, teachers and counselors.

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Appendix A
Statement of Informed Consent

Statement of Informed Consent

This form describes a research study being conducted with students at Eastern Monroe Career Center. The purpose of this research is to study the seasonal pattern and its effect on student’s mood and motivation in the classroom. The person conducting this research is a graduate student at SUNY College at Brockport in the department of counselor education. If you agree to participate in this study, you will be asked to fill out two short questionnaires once in the end of winter, once in mid spring. The questionnaires will ask about your mood and motivation. Each will take between 10-15 minutes to fill out.

Any information that you give in this study remains confidential and will be known only to the researcher. Except for the consent form, all questionnaires will be given a code number and your name will not be on them. If publications in scientific journals arise from this research, results will be given anonymously and in group form only, so that you cannot be identified.

There are no anticipated personal benefits or risks because of participation in this project. Your participation in this study is completely voluntary. Being in it or refusing to be in it will not affect your grades or class standings. You are free to change your mind or stop being in the study at any time during it and there will be no penalty.

You are being asked whether or not you want to participate in this study. If you wish to participate, and you agree with the statement below, please sign in the space provided. Remember, you may change your mind at any point and withdraw from the study. You can refuse to participate even if your parent/guardian says you can.
I understand the information provided in this form, agree to participate as a subject in this project.

_____	_____
Signature of Participant	Date

Birth date of Participant	

If you are under the age of 18 years you must have your parents sign below

_____	_____
Parent/Legal Guardian Signature	Date

If you have any questions or concerned by any answers to questions on the survey you may contact:

- | | |
|------------------------------------|---|
| School Counselor Intern/Researcher | Beth Valerio
elizvalerio@gmail.com
(585)-259-6558 |
| School Counselor | Jenny Viggiani
EMCC School counselor
(585) 387-3818 |
| Faculty Advisor | Tom Hernandez
Department of Educational Counseling
SUNY Brockport
thernandez@brockport.edu
(585) 395-5498 |

Appendix B

Winter/Spring Questionnaire

Date _____

Please Circle yes or no to the following questions

A. In the past month have you...

- | | | |
|---|-----|----|
| 1. Felt sad, depressed or gloomy for most of the day? | Yes | No |
| 2. Lost interest in things you normally enjoy? | Yes | No |
| 3. Felt tired or worn out even when not doing much? | Yes | No |
| 4. Had less energy than usual? | Yes | No |

At the same time have you experienced any of the following...

- | | | |
|--|-----|----|
| 5. Inability to concentrate in Culinary? | Yes | No |
| 6. Inability to make decisions or think clearly? | Yes | No |
| 7. Feeling very slowed down in your movements? | Yes | No |

B. To what degree do did the following change within the last month...

No change = 1	Slight = 2	Moderate =3	Extreme =4
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8. Sleep length
9. Social Activity
10. Mood
11. Appetite
12. Energy Level
13. Motivation
14. Interest in Culinary
15. Completion of homework