

What is SAD?

Abby Postlewaite

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Dr. Kazmerski

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### Abstract

Seasonal affective disorder, or SAD, is an affliction that most people know nothing about. It is a disorder that has possibly been common in humans since the beginning of time, but this is unknown because of a surprising lack of research on this particular form of depression. This essay will describe a few studies that have been performed on people and animals of different cultures and how the results can help predict where this disorder may occur most. Different hypotheses of this unusual affliction will be described as well. There are many different hypotheses as to why SAD occurs, but the scientific community has yet to agree on a sound theory. It will also be explained how these studies can help researchers use the only known cure to treat victims of this disorder. Many people suffer from SAD and do not realize it. It is a form of depression and thus should be dealt with as such.

## What is SAD?

During the winter, or even starting in the fall, many people around the world may experience mild to extreme sadness once to every year for all of their lives. The people that experience mild sadness may decide to simply go to bed earlier as they figure this feeling will soon pass them. But when the air starts to get chillier outside and the sun begins to set at an earlier time, the people that suffer from extreme sadness realize that something is wrong. Most of these people, however, are unaware of what is happening to them and that it does in fact have a name. This then makes these people unsure how to deal with what they are going through. The disorder being described in this scenario is called seasonal affective disorder, or SAD. Uttam et al., (2012) said, “Winter seasonal affective disorder (SAD) was first defined in 1984 by Rosenthal et. Al (1984) as a syndrome characterized by recurrent episodes of depression in the autumn and winter with remission in the spring and summer” (Introduction, para. 1). It is a prevalent affliction that affects a lot of the world’s population, of which it is virtually unheard.

“Between 4 and 6 percent of the US population suffer from SAD, while 10 to 20 percent may suffer from a more mild form of winter blues (Franklin, 2003)” (Flaskerud, 2012, p.266). Although it might not seem like a lot of people at first glance, this percentage only applies to people in the United States that researchers have found. Because most people are unaware of it, however, the actual percent is most likely even higher.

People suffering from this disorder will present symptoms much like a person who is suffering from standard depression. Some of the most common symptoms include: depressed mood, increased appetite, weight gain, decreased energy, and circadian rhythm abnormalities. Unlike what is to be considered standard depression, SAD usually only occurs during the fall and winter months of the year. There is another form of SAD, summer seasonal affective disorder,

but it is much less common than winter seasonal affective disorder (SAD). The symptoms of the two are virtually the same, but as the name suggests, this disorder occurs during the spring and summer months as opposed to the fall and winter months of the year.

In a study performed by Rawana and Kohut, a group of 311 students (grades 9-12) from an urban high school in Ontario completed a self report survey which asked them about their mental health and peer, school, and family functioning. The results were measured using the Kiddie Seasonal Pattern Assessment Questionnaire (K-SPAQ) to assess the changes in moods and behaviors across seasons in children and adolescents. Usually, a SPAQ (Seasonal Pattern Assessment Questionnaire) is used to measure an adult's seasonality. In this case, however, a K-SPAQ was used to determine the seasonality in children. A Depression Scale, Mizes Anoretic Cognitions Questionnaire, Cognitive Emotion Regulation Questionnaire, and a Revised Self Report of Aggression and Social Behavior Measure were also used in this study to determine effects of eating attitudes, cognitive coping styles, and peer victimization. Researchers then used these results to determine if the teenagers that tested positive for SAD were more likely to have a change in eating attitude, coping style, and were more likely to be victimized by peers.

Rawana and Kohut (2012) found that "increases in seasonality were related to increases in rumination, catastrophising, self control, rigid weight regulation, and relational and physical peer victimization" (p.204). There were no significant differences in eating attitudes between the groups, however rigid weight regulation was a sign of seasonal depressive symptoms, which did not support the hypothesis that the eating habits would differentiate students with depression symptoms from students that did not present depression symptoms. Also, participants with seasonal depressive symptoms experienced more variations in mood, energy, sleep, and eating

than participants who did not have these symptoms. Overall, the hypothesis was only partially supported by the results.

Clearly, SAD is not a disorder that most people can discern by just looking at a person, but it can easily be mistaken for standard depression. A major topic of the study by Rawana and Kohut, is that there are only a few differences between people suffering from standard depression as opposed to people suffering from SAD, one of which is that the depression reoccurs annually. Another difference is that a patient with SAD will present monthly mood variations of depressive symptoms. This study proves that people that suffer from SAD undergo many psychological problems that may make it difficult for them to function as alert and focused as they would be if they were not suffering from this disorder, which is a big problem that comes with being a victim of SAD.

Because SAD is such a different disorder, there have been many theories as to why it may occur. The most popular theory is the phase-shifted circadian rhythms hypothesis.

The phase-shifted circadian rhythms hypothesis states that sunlight acts to synchronize circadian rhythms in humans and that with decreased exposure to sunlight, the biological clock that regulates mood, sleep, and hormones is delayed, running more slowly in winter. The timing of light exposure rather than the amount of light exposure influences the magnitude and direction of the circadian rhythm shift. SAD occurs as a result of circadian rhythms that are phase delayed relative to periods of sunlight and darkness. (Flaskerud, 2012, p.267)

An example of a study that partially proves this theory was conducted on diurnal grass rats by Leach, Adidharma, and Yan. These grass rats are a great focus for a study of SAD because humans are also diurnal creatures. “The objectives of the present study are to develop an animal model for some of the features/symptoms of SAD using the diurnal grass rat *Arvicanthis niloticus* and to explore the potential underlying neural substrates mediating the light-dependant mood changes” (Leach et al., 2013, Introduction, para. 2). Simply, testing grass rats perceived to

be suffering from SAD will help researchers better understand the neurological responses people with SAD may have as well. The phase shift hypothesis states that depressive episodes of SAD occur because of changes in the circadian rhythms and habitual sleep times. However, this study mainly focuses on the environmental factors, such as lighting from the sun, and how they affect moods. The study hypothesized that the rats that were exposed to more bright light would have less cases of SAD than the rats that were exposed to dim light.

To test day length and light intensity, grass rats were housed in a 12:12 hr light/dark cycle with either bright (BLD) or dim light (DLD) during the day, followed by assessment of depression- and anxiety-like behaviors (Leach et al., 2013, Introduction, para. 3). These rats then underwent multiple tests on the two different kinds of rats including the Saccharin solution preference (SSP) test, a test of the intake of sweet water in the rats. The forced swim test (FST), a test of the time of a rat's immobility in the water. The open field test (OFT), a test of a rats motivation to explore. The rats' locomotor activities were also recorded and an Immunocytochemistry (ICC) was also carried out.

Overall, rats exposed to dim light had an increase in immobility and a decrease in climbing compared to rats exposed to bright light. There was no significant difference in swimming between the two groups (Results, para. 1). "During the open field test (OFT), both groups of animals spent most of the time running through the outer squares or the edge of the arena" (Leach et al., 2013, Results, para. 3). "During the light/dark box test, the animals spent more time in the light than in the dark chamber, which reflects their diurnal nature" (Leach et al., 2013, Results, para. 4). Therefore, this study shows that decreasing the amount of light given to the diurnal grass rats increases depression-like behaviors, one of the reasons being because it is the rat's nature to seek out sunlight over dark light, but does not disrupt their daily rhythms. This

could probably be concluded to be true for humans as well because, as it was stated earlier, humans and rats are both diurnal creatures. Thus, this study only partially proves the phase-shifted circadian rhythm hypothesis.

As one might see, SAD is an unusual disorder, which explains why researchers have many hypotheses as to why it may occur as there has not been a sound theory presented yet. Another hypothesis as to why this disorder occurs is the genetic vulnerability hypothesis. “The genetic vulnerability hypothesis states that certain individuals and homogeneous populations may be more or less vulnerable to SAD. These studies have focused on familial patterns, heritability, and molecular genetics” (Flaskerud, 2012, p.267).

In a study performed by Uttam et al., a seasonal pattern assessment questionnaire (SPAQ) was mailed to many Amish individuals in Lancaster County, Pennsylvania. Of those people, 1,306 responded with a completed questionnaire, thus taking part in the examination. The purpose of the study at hand was to find if genetics factors had an influence on the prevalence of SAD. Because the Amish are a very close knit group of people, they are great subjects for this application. Researchers also used this study to find if people exposed to natural light, as opposed to electrical light, had higher or lower rates of SAD. The Amish were again great subjects for this application because most Amish people spend a lot of time outdoors and they do not have access to electrical light. SAD was defined according to three criteria: (a) GSS score, (b) “problem” and (c) seasonal pattern (Uttam et al., 2012, 2.2 Seasonal pattern assessment questionnaire, para. 2). During this study, s-SAD was also taken into account, a form of SAD that has milder forms of depression.

11 cases of SAD were found amongst the original 1,306 samples with 34 cases over all (taking into account the people with SAD as well as s-SAD). Uttam et al., (2012) found that

there was a higher prevalence of SAD in women than men. There was little difference in age between those with and without SAD, although subjects with total SAD were significantly younger than those without total SAD. Awareness of SAD was similar between men and women. Subjects aware of SAD tended to be younger and were more likely to have SAD (3.2 Characteristics of SAD and total SAD in the Amish, para. 1-2). Heritability of GSS was estimated to be about 13.6% (3.3 Heritability). There was also a discussion about different latitudes in which the researchers concluded that higher latitudes present more cases of SAD and that environmental factors contributed to SAD more than genetic factors. Again, the results of this study only partially prove the genetic vulnerability hypothesis. However, it did prove the phase-shifted circadian rhythm hypothesis.

In the previous study, a change in latitude was also thought to be a possible cause of SAD. This hypothesis does not have a specific name but it has been studied as well. It is also sometimes considered to be a part of the phase-shifted circadian rhythm hypothesis because a lower latitude is generally presented with less cases of SAD. 1047 people who had lived in Norway for at least 3 years, but were originally born in either Turkey, Sri Lanka, Iran, Pakistan, or Vietnam, participated in this study performed by Hauff, Kumar, and Saheer. All of these countries had warmer climates and minimal seasonal variation in weather and amount of sunlight as opposed to the much cooler and harsher weathered Norway. Norway is also located at a higher latitude than the previous countries. The many immigrants to Norway answered a questionnaire which included questions about physical activity, mental health, social activities, education, employment, alcohol consumption and dietary and smoking habits. They also answered a secondary questionnaire that contained selected parts from the seasonal pattern assessment questionnaire (SPAQ). “Three scales of the SPAQ were included in this survey. One of the



scales used was the seasonality score index (SSI) which investigates seasonal variations of sleep, social activity, mood, weight, appetite, and energy. Participants were also asked to rate the degree to which they feel the seasonal changes as a problem. The third scale asked the subjects to rate the month of the year they felt seasonal changes worst. These three scales were used to calculate the prevalence rates of W-SAD, S-SAD and Summer-SAD” (Hauff, Kumar, and Saheer, 2013, p.238). W-SAD refers to the more common winter seasonal affective disorder and S-SAD refers to a much milder form of winter SAD in which the victim only exhibits mild symptoms of SAD throughout the winter. Summer-SAD, as was mentioned earlier, exhibits virtually the same symptoms as winter-SAD, but it occurs during the spring and summer months.

The prevalence rates of W-SAD, Summer-SAD and S-SAD for the total sample were 15.2%. “According to the Spearman rank order correlation the total sample showed a statistically significant small negative correlation between age and GSS score” (Hauff et al., 2013, p.240). Also, if the immigrants were grouped with people from their original countries, the correlations between age and number of years lived in Norway varied, thus becoming insignificant. Hauff et al., (2013) found that country of birth, presence of mental distress, self reported poor health, smoking, frequent visits to the GP and to the psychiatrist, and presence of chronic disease were significantly associated with the presence of W-SAD. S-SAD showed a statistically significant relationship only with country of birth, smoking, and alcohol consumption (p.240). The prevalence of any form of SAD was not very high, although it was present in the immigrants of Norway that were studied, which only partially proves the hypothesis.

Yet again, another hypothesis that could have potentially been the cause of SAD was only partially proved. Here is also a study that discusses yet another possible hypothesis as well as discusses the previous hypotheses. To test the influence of latitude on the prevalence of SAD,

researchers examined 30 studies of SAD rates in 17 countries around the world using the Seasonal Pattern Assessment Questionnaire (SPAQ). Effects of latitude, genetics distance, and cultural influences were all taken into account. To study cultural influences, researchers observed Norwegians who lived in two months of total darkness.

“The average SAD rate in low latitude countries was significantly lower than that in higher latitude countries. This finding would support the phase-shifted circadian rhythm hypothesis; longer periods of darkness in higher latitudes and month-to-month variability in light and darkness would tax a phase delayed symptom (Lam 2000)” (Flaskerud, 2012, p.267). It was also found that populations that are generally similar have similar rates of SAD. Culture as well was found to play a role in prevalence of SAD. As more people were presented with SAD symptoms in the Norwegian darkness group, it became more acceptable as the norm for that culture.

As one might see, there are many theories as to why SAD may occur, but researchers have yet to find the true cause. This has led researchers to develop a treatment for the symptoms of SAD using the most popular hypothesis, the phase-shifted circadian rhythm hypothesis. This treatment is called bright light therapy, or just light therapy.

Support for the phase-shifted circadian rhythm theory of SAD has led to the use of light therapy for treating seasonal depression. Light therapy, in which the person experiencing SAD is exposed to high-intensity light, is often used-usually for one to two hours per day. Light therapy has been found to be an effective treatment for people correctly diagnosed with seasonal symptoms in the winter and does not appear to have serious side effects. (Flaskerud, 2012, pg. 267-268)

This treatment has also been found to be effective because it is believed to decrease melatonin secretion, which is a hormone found in plants, animals, and humans that is only secreted in darkness. This release of melatonin inside the body can change the sleeping pattern of a person when it is released because of occurrences such as the sun setting sooner or later in the

day. Therefore, light therapy can be used to treat this because the person suffering from SAD is exposed to bright light instead of dim light, decreasing, or even stopping, the secretion of melatonin.

As it has been said, SAD is a very different disorder. It is a form of depression, but is different from standard depression because it occurs annually. Victims of this affliction can also experience mild to extreme sadness, which explains why most people suffering from SAD do not realize that they are experiencing a disorder. This can be a big problem for these people in the long run as SAD can cause disruptions in victim's lifestyles, making it harder for them to be as alert and focused as they would usually be if they were not suffering from this affliction. There are many hypotheses as to why SAD occurs in humans, with the most popular being the phase-shifted circadian rhythm hypothesis, but researches have yet to find a sound theory. Because of this, one of the few treatments, bright light therapy, was created to decrease symptoms of SAD in hopes to aid victims of the disorder. Although seasonal affective disorder is not the most prevalent disorder, it is a form of depression and thus should be dealt with as such. If more people knew about this disorder, it is assumed that many more people would realize what is ailing them and seek treatment. This would then lead to less depression in the fall and winter months and ultimately to much happier lives around the world.

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