

Atypical and Depression: Depression Symptoms Can Be Worse at Night

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Abstract

Depression is a form of manic depression characterized by low mood, slow thinking, and reduced speech and movement. Depression seriously troubles patients' life and work and brings a heavy burden to family and society. About 15% of patients with depression die of suicide. Depression has become the second leading cause of disease burden in China, according to a joint study by the World Health Organization, the World Bank, and Harvard University. However, when are people more prone to depression? Because exploring the period of depression makes sense for depression interventions. By understanding when depression is most common, people can better use this knowledge to care about the emotions of those around them. Firstly, I reviewed the factors that influence the occurrence of depression more easily in the evening. Meanwhile, we used a questionnaire survey to explore the period of depression in different age groups. According to the study, it is found that rumination is the most common factor of depression tendency, which is almost twice that

of other factors. Also, male subjects are believed to be more likely to be depressed at night compared to female subjects. This study lays a solid foundation for the follow-up research on depression which is more likely to occur at night.

Keywords

Depression; Night; Factor; Rumination; Loneliness

Introduction

Depression is the fourth most common disease in the world. Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest. Also called a major depressive disorder or clinical depression, it affects how people feel, think and behave and can lead to a variety of emotional and physical problems. Clinically visible, the mood is low and the reality is not happy, the mood for a long time depressed, from the beginning of the unhappy to the final grief, self-abasement, pain, pessimism, world-weariness, feel alive every day is in despair to torture themselves, negative, escape,

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and finally even more suicidal tendencies and behavior. The patient has somatization symptoms. Chest tightness, shortness of breath. There is a palpable sense of anxiety. More serious person can appear auditory hallucinations, persecutory paranoia, multiple personalities and other schizophrenia symptoms. Depression lasts for at least two weeks, a year, or even several years at a time, with the tendency to relapse in most cases. According to the data, it is said that there are 322 million people who are diagnosed with depression (4.4%). As for domestic data in China, there are 30 million depressed people in China, and 95 million in China suffer from depression at some point in their lives. 180 million people will develop a mental disorder at some point in their lives. The diagnosis rate of depression in China is (4.2%±1.9%). Therefore, a study of depression is very essential nowadays. According to media reports, the detection rate of depression among Chinese teenagers has reached 24.6 percent, among which the detection rate of severe depression is 7.4 percent.(Smith 2014)

When searching on the Internet, it is found that different ages, gender, different occupation, different influences brain area have been studied by prior researchers but no studies have looked at why depression is more common at night. For example, a study by Rashid and Tahir (2015) found that people who suffer the depression most are those with primary education or less. The same study also found that employed older were less likely to suffer from major depression. Women are about twice as likely as men to be diagnosed with depression and show twice as many depressive symptoms. To sum up, I decided to focus more on the relationship between time and depression in my EPQ paper research. The purpose of my experiment is to study why people are more prone to depression at night, feeling bad and

feeling depressed, and to understand the root causes and correlation of depression in people to better prevent depression. At first, I searched google scholar for some papers related to my research objectives. The keywords I searched included factors, rumination, insomnia, loneliness, and depression, which served as the knowledge basis for me to start my research and set up the questionnaire. Under the guidance of my professional tutor, I completed the setting of the first version of the questionnaire and the modification of the final version, shared it with my social software, and called on my friends and some participants interested in the experiment to fill in my questionnaire. According to the citations of previous articles and my experimental data, I completed this paper, including abstract, introduction, literature review, method, result, conclusion, review, reference and appendixes.

Factors Influencing Nocturnal Depression

Rumination

There is good evidence for the role of pre-sleep cognitions in maintaining insomnia (Harvey et al., 2002). Its types include obsessive thinking, which passively compares the gap between the current situation and unattainable goals, and introspective meditation, which passively compares the gap between the current situation and unattainable goals. The latter refers to purposeful, inward solving of cognitive problems. The term rumination comes from the daily observation that some animals return food they have swallowed to their mouths and chew it slowly before swallowing it. This process of repeated chewing, digestion, and absorption is called rumination. Rumination refers to the tendency of spontaneous repeated thinking that occurs when an individual experiences negative life events such as failure in exams and great work pressure. Typically, rumination worsens or prolongs negative emotions or depressive symptoms, especially when people focus on

their negative feelings, isolating themselves and dwelling on the problems they are worried about.

Most studies confirm a positive relationship between rumination and depression, but depression can include a variety of components, including inattention, hopelessness, suicidal ideation, poor sleep quality, and weight loss. What is the relationship between rumination and the components of depression? As a risk factor for Hopelessness and suicide, it also attracts the attention of researchers. Feeling hopeless about the future is an important part of depression.

Rumination may lead to depression, bulimia, and drug abuse. Depression and bulimia may promote increased rumination (Hoeksma, 2007). Adolescents at risk of depression are more likely to ruminate than adolescents without risk of depression. Nolen Hoeksma was one of the first to explore the relationship between rumination and depression in a series of studies that suggested rumination could affect depression. In 1991 she chose 16 non-clinical participants in the study, some of the subjects with a ruminant thinking way of response, while other participants adopted the transfer method, after in measuring responses and depression status, after some time of an earthquake, measuring the participants again on the earthquake ruminant thinking takes time and experience to the disaster losses. The results showed that the subjects who showed more ruminant response before the earthquake had significantly increased depression 10 days after the earthquake compared with the subjects who used less ruminant response. After controlling for initial depression and impairment, rumination and depression remained significantly positive, and the relationship persisted even at 7 weeks of follow-up. Nolen-hoekse-ma (1994) found that rumination

predicted depressive symptoms 6 months after the traumatic event regardless of depression score in the first month, and the higher the initial depression score, the greater the explanatory power of rumination in predicting depressive mood. Rumination predicts depression not only after a traumatic event but also in everyday life. The researchers took college students as subjects and asked them to record their daily depression and their responses to depression every day for 30 consecutive days. The results showed that the more the subjects tended to ruminate, the more symptoms they experienced every day, and the more severe the degree of depression. Rumination can predict the duration of depressive symptoms after controlling for initial depressive severity.

Nighttime Light Exposure

The irradiation of light is one of the necessary conditions for biological growth and development. Sleep, mood, and circadian rhythms can be disrupted by irregular 24-hour light and night light (Giménez, 2017). In some cases, a lack of light can also cause a creature to become depressed, becoming depressed. At night, people can only get light from indoor artificial light or outdoor lighting facilities. Compared with night, people can get natural and continuous light from the sun during the day, which also makes people more prone to depression at night.

In ovariectomized female hamsters, exposure to dim light at night was enough to trigger depression and low anxiety. However, although results (Fonken 2009) suggest that prolonged exposure to dim light in the sleeping environment may trigger temporary changes in the animals' brains, which may lead to depression. But the process is reversible, and the state can be restored by returning to sleep in total darkness. Bright light in the morning can help suppress residual melatonin in our bodies,

warding off drowsiness and providing a clear signal for the 24-hour clock in the brain that regulates our circadian rhythms. By strengthening the body clock in this way, we can feel sleepy at the right time when night falls again.

Circadian Rhythm Disruption

Nowadays, in modern human society, due to technological advances, productivity, and especially artificial light, people are allowed to be active at night, which includes night work and a lot of night entertainment. As a result, people's circadian rhythms are disrupted, and many people choose to stay up late, something that would have been virtually impossible without artificial light in the past. Circadian disruption is a common phenomenon in modern life. While jet lag and shift work are challenges for circadian organizations, more subtle environmental changes can disrupt circadian rhythms. Circadian factors may play a key role in causing depression.

A study (Walker 2020) has shown that light conditions and lifestyle disruptions to circadian rhythms make individuals vulnerable to a variety of mood disorders, including impulsivity, mania, and depression. Also associated with depression are circadian impairments in behavioral, endocrine, and metabolic functions. One of the first signs of disturbed circadian rhythms is that people can't fall asleep when they should. But once they do, the quality of sleep is the same as normal, just the amount of sleep is different. The reason for this is that circadian rhythms have been disrupted and the body clock has not been able to adjust to the new geophysical environment. These awakening-sleep cycle disorders can be divided into two main categories, namely primary disorders due to the malfunctioning of the body clock itself and secondary disorders due to environmental factors affecting the function of

the body clock. One of the hallmarks of major depression is a change in mood. Increased sadness and/or irritability are typical features of depression and include at least one of the following psychophysiological symptoms: changes in sleep, libido or appetite, inability to experience pleasure, delayed speech or movement, crying, and suicidal thoughts. Rates of major depression are on the rise worldwide, the number of people diagnosed with depression increased by 18% between 2005 and 2015 (Rashid 2015). It is worth noting that the incidence of major depression is associated with social modernization. The more modern countries and regions are, the higher the incidence of major depression will be. This may reflect increasing circadian disturbances such as night lighting, shift work, and jet lag, which may reflect interactions between circadian disturbances and other environmental factors in modern countries

Methods

Subject

We collected a total of 59 data. First, we pre-processed the data: remove 9 subjects who failed the screening test (the question said that please choose option A, those who did not choose option A failed), and exclude samples whose time was far less than the plus or minus three standard deviations (the average time to do the test was about 281.2s). Finally, there were 50 valid data, including 35 women and 15 men. The geographical distribution of filling in the questionnaire (Figure 1 below). The content and process of experimental design are guided by professional institutions and teachers.



Figure 1. The diagram of the geographically distribution of the sample. The darker the color is, the more sample is in that area

Stimulus Design

Pilot Study

After formulating the questionnaire, five students with relevant knowledge of depression were invited to evaluate the content and duration of the questionnaire. After they finished the pre-questionnaire, the questionnaire was adjusted, deleted sensitive topics and words and the big five personality questionnaire and some demographic variables are added to the title: "a number of brothers and sisters", "monthly income", "screening question", and the experimental guidance is added: "we will keep your data confidential, please fill in it according to your first feeling!" and "Depressive tendency refers to feeling depressed, sad, negative state inconsistent with normal, etc." Also, age is changed from filling in the blank to a multiple-choice question.

Main Study

The questionnaire is generated through the "questionnaire star", and then forwarded through WeChat circle of friends, WeChat group, QQ space, Weibo website, tape app, (social media application) and other channels. The guidance is displayed at the beginning of the questionnaire: "please rest assured to fill in the questionnaire, and the data will be kept confidential.", The subjects were asked to complete the questionnaire well and quickly. Provide 30 WeChat red envelopes, a total of 30 yuan. After completing the questionnaire, the researcher explained the purpose of the experiment to the subjects.

Measurements

Demographic Variable

I chose some demographic variables and measured them in my questionnaire, such as gender, education level, number of siblings, income level and so on.

Big Five Personality

The Big Five personality was measured on five

dimensions: neuroticism, extraversion, openness, agreeableness, and conscientiousness. Neuroticism reflects the individual's emotional mediation process and reflects the individual's emotional instability. Highly neurotic individuals tend to experience greater stress. They have poor emotional stability and are more likely to experience negative emotions; Individuals with low neuroticism tend to be emotionally stable, have fewer worries and have a strong ability to cope with stress. Neuroticism has six sub-dimensions, namely: anxiety, anger, depression, self-awareness, impulsivity, and vulnerability.

Extroversion is used to indicate the amount and intensity of human interaction. Highly extroverted individuals, enjoy contact with people, and are full of energy. They love adventure, challenge, excitement, and the attention of others. Individuals with low extroversion tend to be quiet and cautious. They can not be defined as shy, they just prefer to be alone, and do not need to feel too much stimulation from the outside world. Extroversion has six sub-dimensions, which are enthusiasm, group, assertiveness, vitality, thrill-seeking and positive emotions.

Openness is used to describe a person's cognitive style. Highly open individuals are curious about the world, with rich thinking and wide interests. While the individuals with low openness are more conservative and traditional, they are practical and conformist. Openness has six sub-dimensions: imagination, aesthetics, rich feeling, a new taste, speculation, and values.

Agreeableness refers to one's attitude towards others. Highly agreeable individuals are sincere, kind, and tolerant toward others. They are compassionate and see the world as full of love. Low-agreeableness individuals are cautious, suspicious, and defensive. They tend to put others in a hostile and cynical position. Agreeableness has six sub-dimensions, namely: trust, honesty, altruism, obedience, humility, and empathy.

Conscientiousness refers to the way we control, manage, and regulate our impulses. Individuals with high conscientiousness are trustworthy, reliable, and responsible; Low conscientiousness individuals are lazy and sloppy, and they tend to be perceived as untrustworthy and unreliable. Conscientiousness has six sub-dimensions: ability, organization, responsibility, the pursuit of achievement, self-discipline, and prudence.

Statistical Analysis

Analyze data with SPSSAU (<https://www.spssau.com/index.html>) and Excel 16. Excel 16 is used to preprocess data, and SPSSAU is used to analyze descriptive data and correlation degree, drawing.

Main Results

Descriptive Result

Table 1. Sociodemographic characteristics of study participants (n=50)

| Characteristics | N | % |
|--|----|-------|
| Gender | | |
| female | 35 | 70 |
| male | 15 | 30 |
| Age | | |
| 7-12 | 0 | 0 |
| 13-15 | 2 | 4.0 |
| 16-18 | 36 | 72.0 |
| 19-45 | 11 | 22.0 |
| 46-69 | 1 | 2.00 |
| 70 and older | 0 | 0 |
| Income(n=43) | | |
| <500 | 10 | 23.26 |
| 500-3000 | 15 | 34.88 |
| >3000 | 18 | 41.86 |
| Education | | |
| primary school | 0 | 0 |
| middle school | 3 | 6.0 |
| Senior high school/technical secondary school/junior college | 39 | 78.0 |
| undergraduate | 7 | 14.0 |
| postgraduate and above | 1 | 2.0 |
| Number of siblings | | |
| 0 | 24 | 48.0 |
| 1 | 19 | 38.0 |
| 2 | 4 | 8.0 |
| 3+ | 3 | 6.0 |

According to table 1, most of the female participants in this experiment are between the ages of 16-18 and 19-45, which means that most of the participants in this experiment are high school students or young adults. The overall income level is evenly distributed among the three lower income levels of high school, and most of the participants have no sibling or only one sibling.

Table 2. Factors made you feel depressed? (n=50)

| Characteristics | N | % |
|-------------------------|----|------|
| rumination | 42 | 84.0 |
| loneliness | 35 | 70.0 |
| insomnia | 29 | 58.0 |
| listened to upset music | 26 | 52.0 |
| Physical pain | 13 | 26.0 |
| Low lights at night | 8 | 16.0 |
| hunger | 8 | 16.0 |
| other | 10 | 20.0 |

From the data collected by the questionnaire, it can be seen that 84% of the participants believe that rumination is the cause of depression. Loneliness made 70% of participants prone to depression, 58% said they would feel depressed and sad when they had insomnia, and 52% thought that after listening to some sad music, they would associate some sad things and fall into depression. 26% of people think they will have a tendency to depression when they have physical pain, which may include women's physiological period or other diseases. 16% of the participants thought that the dim light and hunger at night made them prone to depression, and 20% of the participants hung other options, including lack of spiritual resonance with people, lack of money, fatigue, and so on.

Table 3. The most serious factors affecting depression? (n=50)

| Characteristics | n | % |
|-----------------------|----|------|
| rumination | 14 | 28.0 |
| loneliness | 4 | 8.0 |
| hunger | 8 | 16.0 |
| insomnia | 5 | 10.0 |
| Low light at night | 7 | 14.0 |
| Physical pain | 4 | 8.0 |
| Listen to upset music | 5 | 10.0 |
| other | 3 | 6.0 |

According to the chart, rumination was considered the most likely cause of depression, accounting for 28 percent of all participants' choices. Loneliness is also a common cause of depression, with 8 percent saying they felt depressed when they were alone without company. 6 percent of respondents chose other

items, including reasons such as not being understood and fatigue. 16 percent said they were most likely to be depressed when they were hungry. Dim light at night and insomnia were each cited by 14 percent as their most serious causes of depression. 8 percent said they were most likely to feel depressed when they were in physical pain or ill. The remaining 10 percent thought depression was most likely to occur after listening to sad music.

Chi-square Analysis

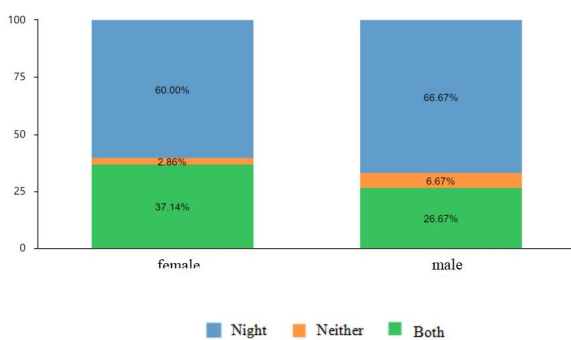


Figure 2. Correlation between gender and depression period

According to the table2, 66.67% of the male are more likely to believe they will be depressed at night, which is a significantly higher percentage than females who believed they will be depressed at night, which is 60%. Additionally, more females (37.14%) believe they will be possibly depressed all the time in a day than male subjects (26.67%). Also, 2.86% of female subjects and 6.67% of male subjects think they will not be depressed at any time (see Appendix C table X).

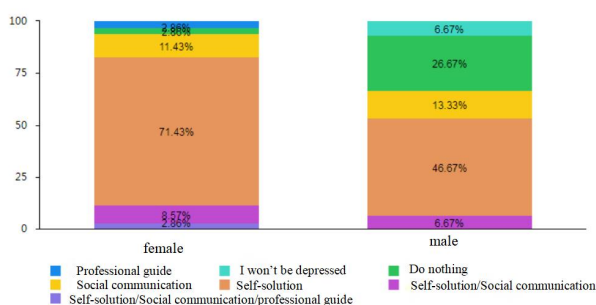


Figure 3. Correlation between gender and solution of depression

As can be seen from Figure 3, 71.43% of women choose a self-solution. When they feel depressed, they are significantly more than men who choose the self-solution (46.67%). It is worth noting that although the proportion of men choosing a self-solution is smaller than that of women, the proportion of men doing nothing in depression (26.67%) is significantly higher than that of women (2.86%), and women choose one of three ways to regulate depression to improve their psychological status. Moreover, the proportion of men claiming that they will not have depression (6.67%) is also higher than that of women (0%).

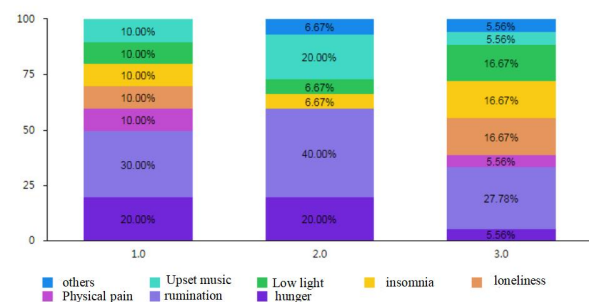


Figure 4. Correlation between income level and causes of depression

It can be seen from Figure 4 that rumination is the main cause of depression among participants at three income levels, accounting for 30%, 40%, and 27.78% respectively. Middle-income people are more likely to be infected by sad music. There is a significant difference between low-income (10%) and high-income (5.56%). The depression rate caused by hunger in high-income people (5.56%) is significantly lower than that in low-income people (20%) and middle-income people (20%).

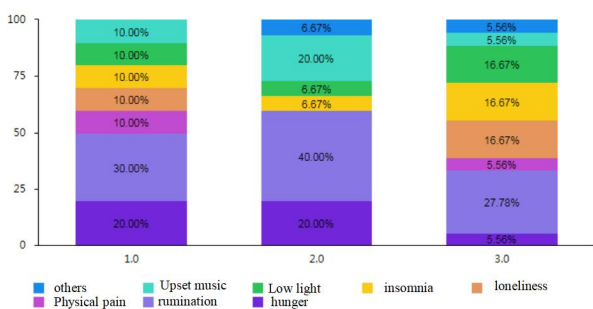


Figure 5. Correlation between gender and causes of depression

It can be seen from Figure 5 that the proportion of men with depression tendency due to rumination (33.33%) is higher than that of women (25.71%), and men are more likely to be depressed due to loneliness (13.33%), compared with the proportion of women with depression due to loneliness (5.71%).

Discussion

The purpose of this experiment is to obtain data through literature research and questionnaire, to know the factors that are easy to lead to people's depression and the relationship between these factors and people's characteristics and period, to avoid depression as much as possible. From the experimental results, it can be seen that rumination, loneliness, hunger, weak light at night, and other factors may lead to depression. In addition, most participants agree that night is the time of high incidence of depression. These data have achieved the purpose of this experiment.

The Deep Meaning Behind the Results

According to the results, men thought they were more likely to be depressed at night, this may be because of fewer males in the international schools, may have fewer same sexual company, and they are more likely to play video games at night after school, a lack of companionship that may make them more prone to depression.

It can be seen from the results, women were more likely to believe they were likely to be depressed throughout the day. One of the most repeated findings in epidemiology is that the proportion of women in the prevalence of depression is higher than that of men, especially when women are giving birth (S Grigoriadis, 2007) Possibly since they are more sensitive than men, are more open to their feelings and feelings, and are more likely to empathize with the experiences of others, leading to their depressive tendencies.

According to the results of the experiment, men were more likely than women to choose to self-regulate their emotions when they were depressed. This may be because men tend to see themselves as more rational than women and are reluctant to let others see them as negative or weak. They may prefer to be seen as a strong person to rely on.

The experiment shows that the proportion of depression caused by hunger in high-income people is much lower than that in middle-income people and low-income people. According to my opinion, high-income people have more disposable income, so they can get food in various ways when they are hungry, such as ordering takeout or going to restaurants, so hunger rarely occurs to them, Therefore, the proportion of depression caused by hunger is naturally small.

We can know from the experimental results that the proportion of depression caused by insomnia in high-income people is higher than that in low-income people and middle-income people. Generally, the prevalence of insomnia will increase with age, but there is little correlation between sleep satisfaction and age. According to the phenomenon of Chinese society, the general age of high-income people will be older than that of low-income people.

Therefore, high-income people will have a greater probability of insomnia symptoms due to their physical condition, social pressure, and various risks, so they will be more likely to have some negative emotions due to insomnia.

More high-income people believe that weak light at night is also one of the factors leading to depression. In the comparison of depressive symptoms to income and sociodemographic variables, there is a very obvious relationship between income and depressive tendency (FJ Zimmerman, 2005) From the situation of my peers around me, most of them are not very clear that weak light at night can lead to depression. I learned about this factor only after writing this paper. For our ordinary high school students, it may not be easy to detect the relationship between weak light at night and depression. High-income people may generally prefer reading, so they may better understand the link between this factor and depression.

Limitations and Future Directions

First of all, the number of subjects in this experiment is relatively small, with only 50 participants, and most of them are concentrated in the age group of high school students, mostly female subjects. This will make my experimental data not very representative because my data can not represent the depressive tendency factors of people of other ages and some solutions. For example, older adults may choose more professional guidance and talk to others, because they will have more disposable income than high school students, so their solutions may be different from those of high school students in this experiment. Moreover, the factors leading to the depression tendency of adults and high school students will also be different. Adults enter society and face more life challenges, while the most common problems in the life of high school students are learning and family troubles. Because I am also

a high school student. Compared with the extensive social life of adults, I don't have so many friends or contacts to help me fill in my experimental questionnaire. Moreover, the schoolwork of high school students is relatively heavy, and many people don't have time to fill in. In the future, the number of my participants may increase to enhance the reliability of my experiment.

Second, from the perspective of developmental psychology, high school students of different ages in different regions will have different physiological and psychological characteristics. For example, in European and American countries, family relations may be better, because parents generally encourage their children to express their emotions and are willing to have more emotional exchanges with their children. In some Asian countries, parents may make their children study hard but ignore the importance of communication, so Asian children may be more silent to their parents. This may lead to the fact that European and American high school students are more willing to talk to others when they are prone to depression, while Chinese high school students may be more willing to solve their negative emotions by themselves. In this experiment, for the convenience of sampling, I only conducted a sampling survey in the surrounding population, so the data are mainly from southern China. This makes my experiment exist with cultural bias, because the data can not represent the depression of high school students in other regions. In the future experiment, I will choose to conduct a sampling survey in more regions to ensure that the experiment can be more generalized to the depression of people in more regions and more ages.

Third, this experiment adopts the experimental method of a questionnaire survey, but I can't control the external factors when the

participants complete the questionnaire, such as light, environmental noise, weather, etc. these external environmental factors may affect the participants' mood when filling in the questionnaire and the results of the final questionnaire data. For example, they will be happier when listening to their favorite music, which will make them happier in the questionnaire. This experiment may also be affected by social desirability. Some participants tend to perform better when filling in the questionnaire. For example, they will say in the big five personality section of the questionnaire that they are more helpful and gentle. In future experiments, I will choose laboratory research, because laboratory research can better control extraneous variables so my experiment has higher validity.

Conclusion

The purpose of this experiment is to study why people are more prone to depression at night, and the relationship between period and depressive factors, and participant characteristics. To better understand and prevent the generation of depressive tendencies. Through the experimental results, we can know that people are indeed more likely to have depression at night. However, some participants said that they may have depression all day or they never had depression. Moreover, the factors leading to depression mentioned in the experiment are not comprehensive, including gender, living habits, external environment, and hobbies. Generally speaking, women are more likely to have depression. The relationship here needs to be further studied in the follow-up experiment.

Conflict of Interests: the author has claimed that no conflict of interests exists.

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