2020

Sample Survey Final Report

SURVEY ON SLEEP QUALITY OF SUSTECH STUDENTS

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Abstract:

Sleeping quality is related to all of us thus very important. In this study, we wanted to conclude the overall sleep quality among SUSTECH students. We did a focus group meeting which gave us some basic ideas of this problem. In addition, we referred to a study named Self-Rating Scale of Sleep to determine ones' sleep quality and used this score to calculate sample size. We used mailed questionnaire method and collected data on one hundred and thirty-six students to do the data analysis. In the first data analysis part, we summarized the score distribution among grades for Self-Rating Scale of Sleep, and then compared the SUSTECH students' cases with the nationwide average. Moreover, we did some researches for both individual questions and total scores. In the second part, we tried to search factors which affecting SRSS scores and drew the box plot along with ANOVA test to analyze.

Contents

1.Introduction

As we know, SUSTECH student always has lots of work to do. Thus, it seems reasonable that some of them stay up late and have an irregular life style. Sleeping is one of the most important things that we do every day. Having a bad sleeping condition will not only lead to a sleepy day but also affect our health. So, we want to figure out exact what proportion of those students who stay up late and how well do they sleep. Further, we are trying to discover the factors that could influence people's sleep whatever positively or negatively. This information could help us prevent bad sleep and improve our daily life.

There is no specific identification of "stay up late", so some common sense and life experience are used in our report. "late" is the most important factor in this word, that one has to sleep after some normal time. Frequency is another important factor that effect our identification, someone will not be identified as stay up late if he just has no sleep in a single day. One tricky problem is the case that someone sleep late and get up late with the same sleeping time as normal people. We decide to view this case as the "stay up late" case.

In this study, we mainly concern four aspect of sleeping condition. First is whether they stay up late, and the frequency of sleeping late (if they have). This aspect can show us the proportion of stay up late students. Second is how well they sleep, including the length and quality. Sleep late

and sleep poor can be correlate but they are not equal, some students may sleep very late but also get up late, thus they have a relatively good sleep quality. Third is the impact of not sleeping well. This aspect can show us how the impact of this problem. And the last is the factors that may influence sleep. The factors including the environment (light and noise), the medical treatment, the behavior before sleep (play computer games or play sports) and the moods (the day before final exam can make people extremely nervous).

2. Focus Group Meeting

We invited 4 SUSTECH students to our focus group meeting, including one graduate student and three undergraduate students. They have different majors and from different provinces. There are 2 males and 2 females in our focus group.

At the beginning, we discussed their own sleep condition and they shared some of their personal experience of sleeping. From the discussion, we found the stay up late issue is more broadly than we think. Most of the participants usually sleeping late, some of them even get used to it. The number of students who do not have a regular sleeping time is more than expected. It seems reasonable to ask students the range of their sleeping time instead of one specific time since they usually do not have a regular sleeping time.

The second topic is the influence factor of sleeping condition. Things that have an influence on students' sleep are:

1.Their sensitivity on sound and light.

2.Male 1 and Female 2 take Melatonin to improve their sleep condition.

3.The environment of their dormitory.

4.Male 1 and Female 1, 2 have some trouble on sleeping before final exam.

5.Male 2 found that doing some exercise helps him sleep well.

The issue that we found is that Most of the students cannot recall their sleeping time accurately, even those who do not stay up late and have a regular schedule. One of our participants, Male 1, wearing a smart wristband that can monitor his sleeping time, believes his sleeping time is 12:00 but the real time (the record he checks) is approximately 1:00. During the discussion, Male 2 gives an idea that could improve the accuracy of the survey which we think is reasonable: Based on the finding that most students have a wrong feeling on their sleeping time, it is helpful that we inform them a few weeks before the survey and let them record their sleeping time. This would lead a more precise result.

This Clovis-19 pandemic also has some influence on the sleeping. During this pandemic, most students are studying at home, which makes them sleep more regularly. Partly because their parents' monitoring. As a

contradiction, students who are in quarantine (in a hotel with no monitoring) tends to have an irregularly sleeping time.

3.Questionnaire design

3.1 SRSS

For our first objective, we want to figure out a quantitative method to judge one's sleeping situation. Therefore, we looked up several paper on this topic and decided to refer an article published on a journal of psychology [1]. The method is called SRSS, which stands for Self-Rating Scale of Sleep. To explain it briefly, it is set up by scientists to determine the severity of people's sleeping quality on ten aspects. Accordingly, each aspect has five scales to reveal the severity, ranging from one point to five points. The higher points one scores, the more severe the sleeping problem is.

Apart from obtaining the overall sleeping situation of students in SUSTECH quantitively, we can also make a comparation between the average sleeping quality of Chinese citizens and SUSTECH students. According to the paper, the normal level of SRSS on Chinese citizens is twenty-three. Thereby, we are able to make a comparation by using the data we collect to calculate the average level of SRSS score in SUSTECH.

3.2 Questionnaire modification

In our previous group meetings, we exchange our own perspectives on which factors that may contribute to various sleeping quality. We set questions to achieve the second objective accordingly.

However, due to our less experienced on questions designing, we made several mistakes in the first draft and got constructive feedback from our professor and classmates. Thurs, we modified the draft in three aspects.

First of all, for the respect to the self-rating questionnaire accuracy, we used each question with little alternation. However, in professional survey aspect, some questions seemed to be inappropriate. For example, when we ask what symptoms one may have when they are lack of sleep. The answers provided below are high likely to conclude each other. Accordingly, we make a modification on the answers and solve the overlap problem.

Secondly, we did a conceptualization on one of our questions. Instead of directly asking if there is a regular sleeping pattern in your sleep, we try to conceptualize the word regular which is the time falling asleep within an hour. Therefore, we believe our respondents may answer this question more easily.

Thirdly, in the original answers, the time ranges within a month. Therefore, to make respondents getting more accurate answers, we change the time limit and narrow it down to a week. In this way, we believe the answers can be come up more easily.

4. Sampling strategy

After finalizing the questionnaire, we need to figure out the way of how we collect data and the proper sample size. For the target population is students in SUSTECH, we decided to stratify them into five groups basing on their grades, which are freshman, sophomore, junior, senior and postgraduate. We selected the SRSS score using for calculating sample size and did a pilot study on forty-one students from each group proportional to their total number. Using stratified random sampling method, we calculate the sample size is one hundred and fifteen.

In order to collect the data from each grade proportionally and randomly, we used mailed questionnaire method. This is because the mailing system in SUSTECH is transparent. We are able to mail random students based on their student ID. In a nutshell, we sent two hundred and sixty-five emails and got one hundred and thirty-six response.

5. Data Analysis

5.1 Comparison between Grades

5.1.1 For Q4 to Q13

First is the summary for each question:

TABLE 1 Score of SRSS Questions ($\overline{x} \pm s$)

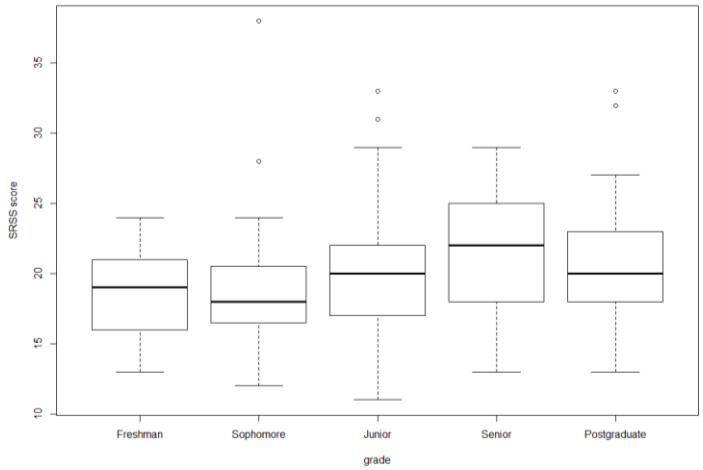
Grade	Number	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Score
Freshman	35	2.69±0.83	2.31±0.80	2.51±1.01	2.43±0.61	1.74±0.74	1.37±0.49	1.43±0.88	1.49±0.66	1.00±0.00	1.68±0.84	18.63±3.15
Sophomore	27	2.70±0.78	2.30±0.78	2.33±0.96	2.48±0.70	2.07±1.20	1.41±0.57	1.41±0.89	1.37±0.49	1.19±0.79	2.00±1.14	19.26±5.01
Junior	35	2.60±0.95	2.29±1.10	2.29±0.79	2.40±0.74	2.09±1.04	1.71±0.79	1.49±0.70	1.40±0.50	1.37±1.00	2.43±1.17	20.06±4.60
Senior	26	2.46±0.95	2.12±1.07	2.62±1.13	2.19±0.49	2.46±0.99	2.27±0.96	2.31±1.16	1.69±0.68	1.15±0.37	2.65±1.13	21.92±4.35
Postgraduate	13	2.77±1.01	2.23±0.73	2.54±1.20	2.31±0.85	2.77±1.36	1.69±0.75	1.69±1.11	1.77±0.73	1.08±0.28	2.85±1.34	21.70±6.05
ANOVA F value		0.401	0.207	0.572	0.758	3.170	6.960	4.520	1.875	1.535	4.952	2.672
ANOVA p value		0.808	0.934	0.683	0.554	0.016	<0.001	0.002	0.119	0.196	<0.001	0.035

The table illustrates the mean score and standard deviation of each question. We mainly focus our attention on the questions whose differences are significant (ANOVA p-value < 0.05). First let us look at Q8, 9, 10, they separately ask subjects “have difficulty falling asleep?”, “easy to wake up at sleep?” and “hard to fall asleep again?” These three questions concentrate on one aspect: difficulty in sleeping. The freshmen's scores for the three questions are generally the lowest, while senior students’ scores are overall highest. Besides, there is a steady rise in these three scores from freshman to senior. The higher the score is, the more severe the problem is. The phenomenon may be because that when we are freshmen, everything is new and interesting, and there is not so much pressure in the study and finding jobs, thus we will not think much at the bed. But with the increase of grades, the pressure is becoming much heavier, and we gradually think more and more before we fall asleep. Next is Q12, “whether you take sleeping products?”, it is interesting that no freshman looks for the help of sleeping products, but again, with the increase of grades, the students looking for help begin to exist. Finally, is Q13, “the mood after insomnia”, from what the table shows, the freshmen's scores are the lowest, which

means that their moods and life attitudes are generally the most positive.

5.1.2 For Total Scores

Figure 5.1 Box Plot for SRSS Score ~ Grades



This box plot gives information about the SRSS score differences among different grades, the ANOVA test p-value is 0.0349, smaller than 0.05, shows that the scores among grades are dramatically different, which matches the result of the previous article [2]. The high score in senior suggests their bad sleep quality, which is a little different to the previous finding [2], where the scores for senior was the lowest, for the junior was the highest. This may be because that SUSTECH is a fresh university, even after finding jobs or postgraduate school (most finish these in senior time), SUSTECH students still worry about their future and how comments of SUSTECH will affect their work or study. These worries can significantly influence sleep quality. Besides, from this plot, we can see there are several outliers, so we need to do some analysis for them. Here I take the most

severe one, whose SRSS score is 38, as an example. This guy is a sophomore student, he takes sleeping products almost every day, but still fell hard to fall asleep, easy to wake up at sleep and easily fell tired the next day. His answer shows that his sleep would not be affected by the light or noise in the dormitory as he is not a sensitive person. However, he is influenced by any coming exams, regardless of big or small exams. From these, I inferred that this is a student with a little sever sleeping problem, and his study pressure seems heavy. Despite this, I did not think he should be marked as a strange sample, because this is not so sever compared to some examples, and he answered our questionnaire very carefully (suggested by the time spent and open-ended answers). Thus, we decided not to delete the outlier. Similar analyses have been done for other outliers and we left them all.

5.2 Comparison with Nationwide

5.2.1 For Q4 to Q13

First, we define “sever” as the case that individual score for a question larger than 3 (this standard is consistent with the former study [1]), then let us compare our severity cases for each question with the nationwide average case [3].

TABLE 2 Severity Number for SRSS Questions

Question	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
# of >3 (Severe)	21	12	21	5	19	5	8	1	3	16
Percent(SUSTech, %)	15.4	8.8	15.4	3.7	14.0	3.7	5.9	0.7	2.2	11.8
Percent(Nationwide, %)	20.1	7.6	15.6	2.8	8.1	9.1	9.8	12.9	2	31.1

From the table we can see that, the sleep quality of SUSTECH students is generally better than the nationwide, except for the Q8, “have difficulty falling asleep?”. In this question SUSTECH students significantly have higher severe probability, just as we have inferred, the heavy study and job search pressure may be the critical reason for SUSTECH students in difficulty in falling asleep. We also notice that for Q11 and Q13 (“awakened by dreams?” and “mood after insomnia?”), SUSTECH students’ severity probabilities are dramatically lower than nationwide. This phenomenon, I think, is because students have better emotional states, though some are hard to fall asleep.

5.2.2 For Total Scores

Table 3 SRSS Scores Distribution Comparison

Score	Percent(Nationwide, %)	Percent(SUSTech, %)
<=22	54.40	73.53
23-29	35.60	22.79
30-39	9.60	3.68
>=40	0.40	0.00

The table gives the information for the comparison in the SRSS scores, the nationwide source is from a previous article [1]. We can see that the scores of SUSTECH students have more probability to fall in the lower interval, which means they generally have better sleep than the nationwide case, this is contradicting to a previous study [2]. After considering two research's details, we thought this may be because that our group only focused the sleep case in April 2020, when most of us had to stay at home with our parents for the virus reason, while the previous study paid attention to the weeks just before final exams. When we were under the observation of parents, our sleep may be much more regular and healthier than the case in school, but when we are facing the final exams, the sleep quality may not be attached great importance as usual. Thus, under the effect of two aspects, our result is different from the previous one.

5.3 Searching factors affecting SRSS scores

For the second part of our data analysis, we will search for the factors that might affect the SRSS scores which is sleeping condition in our study. There are 7 factors in our study.

- **Major**

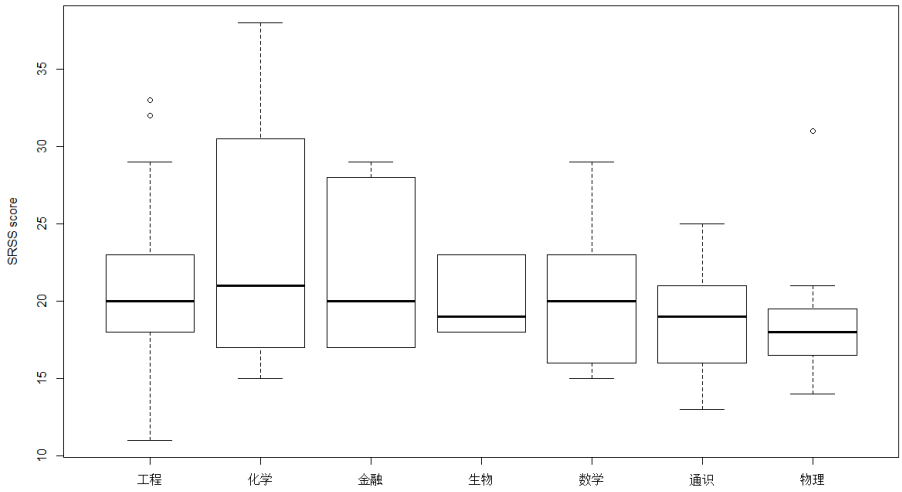


Figure 5.2 Box Plot for SRSS scores ~ Major

First the major. In our study, we divided the major into several basic majors including mathematics, physics, chemistry, and biology. In addition, since there is no division of majors among the students in grade 1&2, they are classified as general studies majors. With the exception of these basic majors, the rest are all classified as engineering majors. It's not hard to see from the graph that there is a wide range of SRSS scores for engineering and chemistry majors' students. We speculate that the possible reason is that these majors have to do a lot of experiments resulting in poor sleeping quality. ANOVA test shows that *p*-value is 0.212 which is bigger than 0.05. So, in general, SRSS scores differed little across majors.

- **Regulatory**

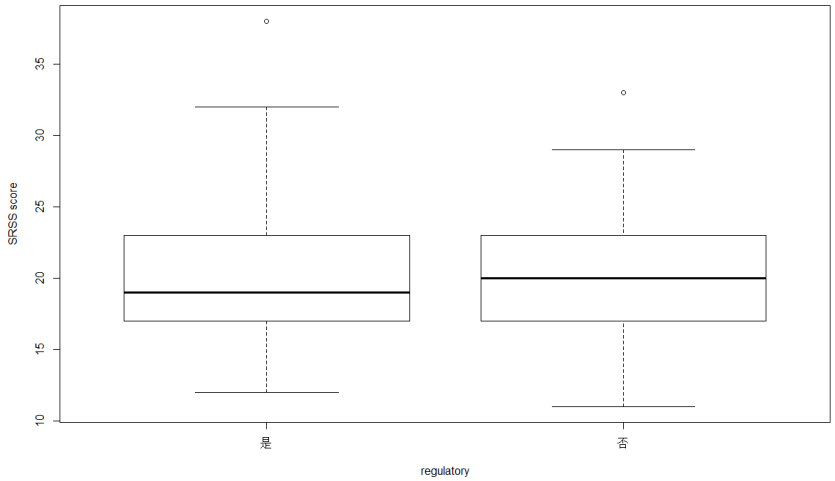


Figure 5.3 Box Plot for SRSS scores ~ Regulatory

We next explore whether regularly going to the bed has an effect on SRSS scores. In our study, the regulatory we defined is a difference of no more than one hour between the points at which you sleep each day. Surprisingly, there was no significant difference in the sleep score as shown in the graph. This is also confirmed by the ANOVA test where *p*-value is $0.592 > 0.05$.

- **Whether take a nap at noon**

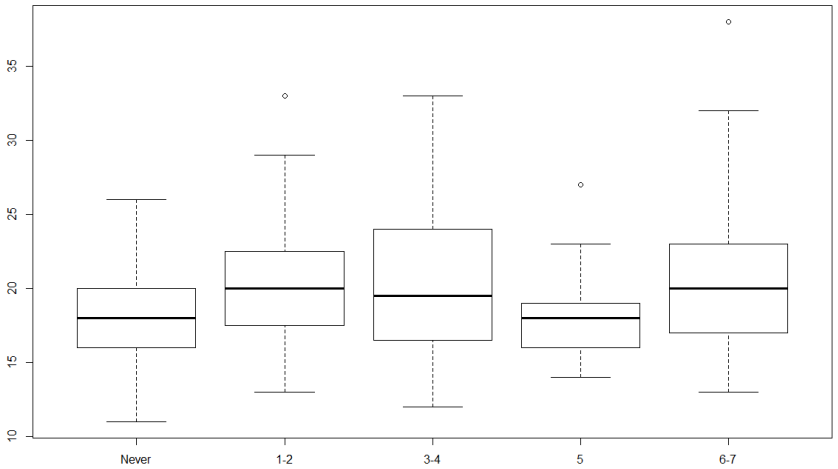


Figure 5.4 Box Plot for SRSS scores ~ Nap

Next is whether or not to take a nap. Here we give the results directly.

The ANOVA test indicates that p-value equals $0.253 > 0.05$. So whether you take a nap is not an important factor.

- **Light/Noise in dorm**

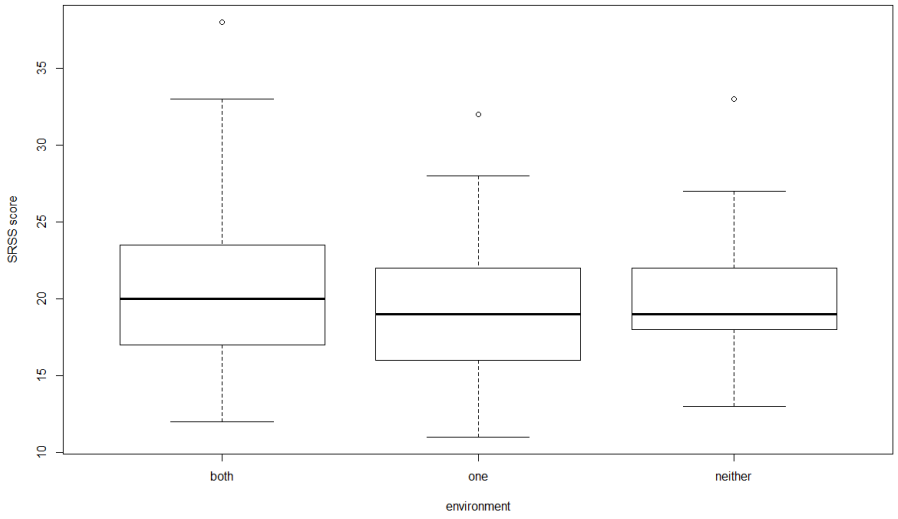


Figure 5.5 Box Plot for SRSS scores ~ dorm environment

Then we consider the environment of the dormitory. There are two factors, light and noise, considered in our study. For the x-axis labels, "Both" means there exist both of the light and noise when you go to sleep. "One" means just one of them. "Neither" means none of them exists. The ANOVA test shows that the environment also does not have a strong impact on sleeping quality where p-value $= 0.14 > 0.05$.

- **Students' sensitivity to the light/noise**

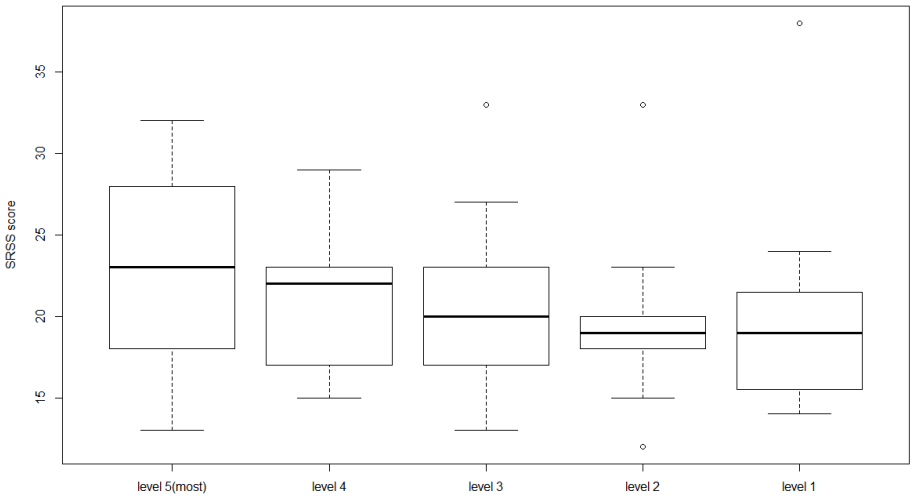


Figure 5.6 Box Plot for SRSS scores ~ Sensitivity level

Further, we explored whether people's sensitivity to the environment affects the quality of sleep. We divided the sensitivity level into five. Level 5 means students are the most sensitive to the environment. Although for Level 5 students the general sleep scores are a little higher, but in overall there is little difference in the quality of sleep among students of different sensitivity levels.

- **Activities before sleep**

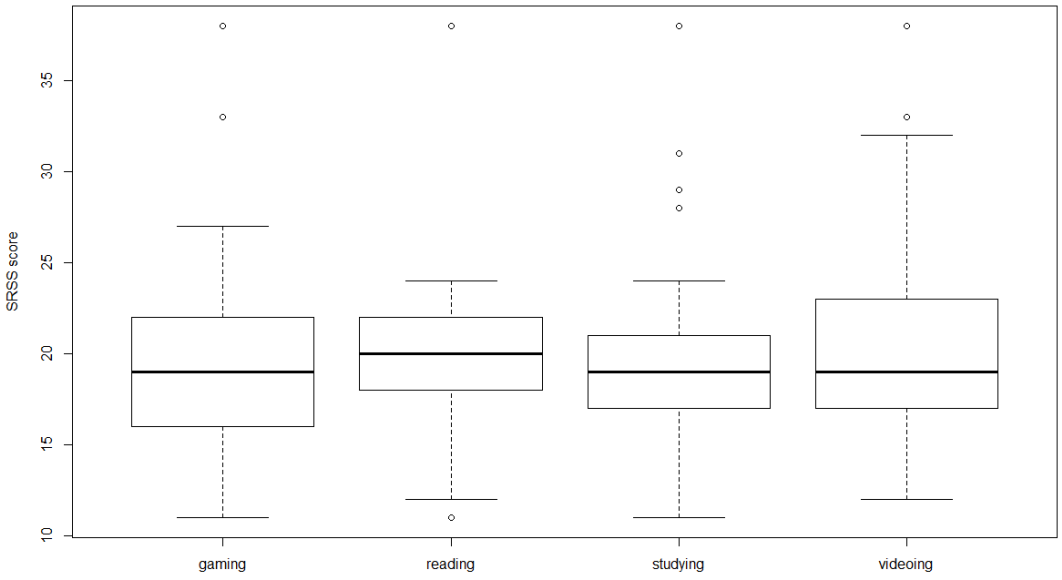


Figure 5.7 Box Plot for SRSS scores ~ activities before sleep

We are also curious about the students' activities before sleeping like gaming、reading、studying and videoing. Still, this is not an important factor where p-value $= 0.779 > 0.05$.

■ **Sensitivity for exam**

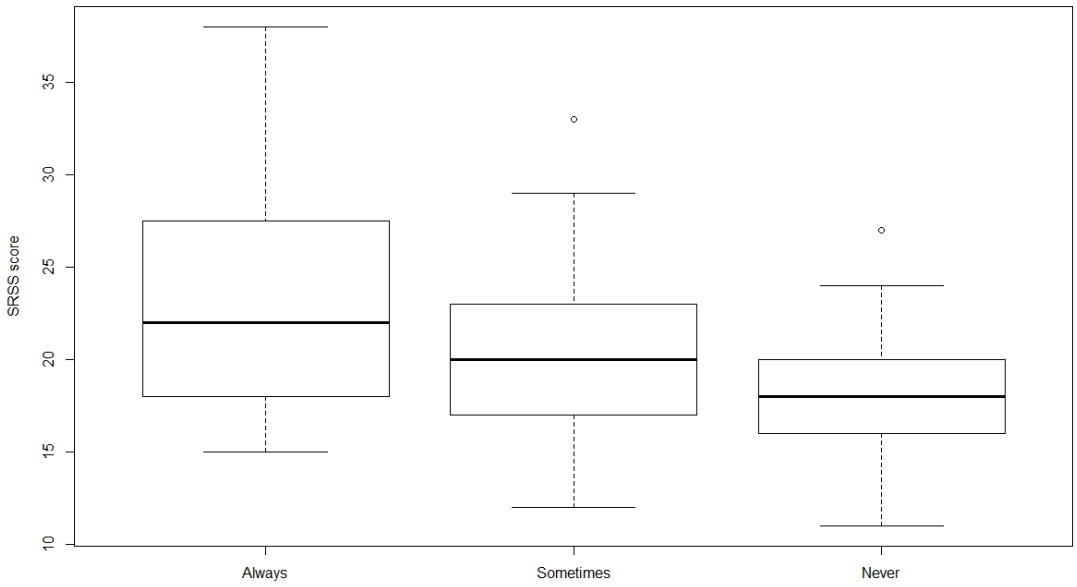


Figure 5.8 Box Plot for SRSS scores ~ Sensitivity for exam

The last factor we explored is sensitivity to the exam. If there is an exam the next day, whether the students' sleeping quality is affected. Finally, the answer is yes. The p-value here is extremely small which is 9.57×10^{-5}. Here, "always" means students are always nervous about the exams next day. "Sometimes" means students only sometimes get nervous about the exam. "Never" means they don't care about any of exams.

■ **MANOVA test for above 7 factors**

Finally, we perform the MANOVA test. Since we use a stratified method to sampling from all grades, a natural question is whether these factors above are related to grade level. The p-value is $0.331 > 0.05$. So, no much

difference between different grade levels. This can be convenient for us because the following conclusions and suggestions can be applied to all students in the school, not just one specific grade.

5.4 Behavioral study of students with insomnia

At the same time, we also collected data of 45 students with insomnia problems. We analyzed their behavioral activity after insomnia. The result is shown below. As you can see, in SUSTECH, almost half of the students would play the phone if they can't fall into sleep. 25% of students would force themselves to keep sleeping. 15% of students would study like doing homework or reading. 10% of students would do some sports like jogging or running.

Table 4 behaviors of students with insomnia

Activities	Percent (in SUSTech, %)
Play the phone (including games or videos)	50
Force themselves to **keep sleeping**	25
Study like doing homework or read paper or books	15
Do some **sports** like jogging or running	10

6.conclusion

Our group has three major findings in the 10 SRSS questions. First, the

sleep quality of SUSTECH students are generally better than the nationwide average case, though this may be because that most of us are stay at home with parents. Second is that the major problem of our students is falling asleep, which may be resulted from heavy study or job search pressure. The last finding is that the difficulty in falling asleep becomes worse in students with higher grades, which should be taken great attention.

For the first six factors, like major, light/noise in the dorm, students' activities before sleeping, statistical tests show that none of them are significant. That means the quality of your sleep doesn't have much to do with what major you studied or what you did before sleeping or the dormitory environment. That is external factors may not be very important. The only significant factor in our study is how sensitive you are to the exam. If you are sensitive to the next day's exam, you may have slept poorly the night before. So, for the sleep quality, the internal mental condition have a huge impact.

7. Limitations of study

Some of the concepts may not be defined clearly. For example, in which time can be considered sleeping late. Also, in the analysis of effect of regulatory to SRSS scores, the insufficient significance may be a result of how we define regulatory in our questionnaire.

We only find one significant factor related to sleeping condition which

is not satisfactory. In a common sense way, sleeping condition cannot be correlate only to the mental condition. Further, we need to deeply explore the influence of external environmental factors on sleep quality.

For the sample, the female sample size is too small.

Our survey only focuses on one month sleeping condition during the epidemic period. Students basically stay at home, and their sleeping conditions may be a little different from those in school.

8. Reference

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2. 戚东桂, 刘荣, 吴晓茜, 庞静, 邓江波, & 王爱国. (2007). 大学生睡眠质量及其影响因素调查 (Doctoral dissertation).
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9.Appendix

Questionnaire

南方科技大学学生夜间睡眠状况调查

您好，我们正在做一次调查问卷以便了解南方科技大学同学们的夜间睡眠情况。本次调查一共二十四个问题，采取不记名调查的方式。我们会对问卷所得信息保密，并且在完成调查后对问卷进行销毁。请您根据您的实际情况填写，谢谢您的支持与配合，谢谢!

1. 性别 ①男 ②女
2. 年级 ①大一 ②大二 ③大三 ④大四 ⑤研究生 ⑥博士 ⑦其他
3. 专业_____

问题 4-问题 17 请您根据近**一个月**内的情况回答

4. 您觉得平时睡眠足够吗?

① 睡眠过多 ② 睡眠正好 ③ 睡眠缺一点 ④ 睡眠不够

⑤ 睡眠时间远远不够

5. 您在睡眠后是否觉得已经得到充分休息?

① 觉得充分休息过了 ②觉得休息过了 ③觉得休息了一点 ④不觉得休息过了 ⑤ 觉得一点儿也没休息

6. 您晚上已经睡过觉 ,白天是否打瞌睡?

① 从来没有 ②很少(每周 1-2 天) ③有时(每周 3-4 天) ④经常(每周 5 天) ⑤ 总是(每周 6-7 天)

7. 您平时每个晚上大约能入睡几小时?

① 不低于 9 小时 ② [7，9）小时 ③ [5，7）小时 ④ [3，5）小时

⑤ [0，3）小时

8. 您是否有入睡困难?

① 从来没有 ②很少(每周 1-2 天) ③有时(每周 3-4 天) ④经常(每周 5 天) ⑤总是(每周 6-7 天)

9. 您入睡后在没有打扰的情况下中间是否易醒?

① 从来没有 ②很少(每周 1-2 天) ③有时(每周 3-4 天) ④经常(每周 5 天) ⑤总是(每周 6-7 天)

10. 您醒后是否难于再入睡? (9 题若回答从来没有，则无需作答)

① 从来没有 ②很少(每周 1-2 天) ③有时(每周 3-4 天) ④经常(每周 5 天)

⑤总是(每周 6-7 天)

11. 您是否有过被噩梦惊醒?

① 从来没有 ②很少(每周 1-2 天) ③有时(每周 3-4 天) ④经常(每周 5 天)

⑤总是(每周 6-7 天)

12. 为了睡眠 ,您是否吃助眠产品（如褪黑素）?

① 从来没有 ②很少(每周 1-2 天) ③有时(每周 3-4 天) ④经常(每周 5 天)

⑤总是(每周 6-7 天)

13. 您失眠后的第二天心境如何?（没有失眠经历则无需作答）

①无不适 ②无所谓 ③有时感到不适

④经常感到不适 ⑤总是感到不适

14. 您失眠后通常做些什么活动?（没有失眠经历则无需作答）_____
15. 您睡眠是否规律（每天开始入睡时间点相差不超过 1 小时）?

① 是 ② 否

16. 您午睡的次数?

① 从来没有 ②很少(每周 1-2 天) ③有时(每周 3-4 天) ④经常(每周 5 天)

⑤总是(每周 6-7 天)

17. 您通常临睡前做什么活动?（多选）

① 玩游戏 ② 阅读课外书籍 ③ 学习 ④ 看视频，刷微博等娱乐活动

⑤ 其它_____

问题 18-问题 22 请根据您在学校的情况回答

18. 您的宿舍夜间会出现光亮吗?

① 会 ② 不会

19. 如果出现光亮通常会对您的睡眠有影响吗（不会出现光亮则无需作答）？

① 所有光线都能影响 ② 有时候，部分光线才能影响 ③ 完全不影响

20. 您的宿舍夜间会出现声响吗？

① 会 ② 不会

21. 如果出现声响通常会对您的睡眠有影响吗？（不会出现声响则无需作答）

① 所有声音都能影响 ② 有时候，部分声响才能影响 ③ 完全不影响

22. 第二天有考试通常会对您的睡眠质量有影响吗？

① 所有考试都能影响 ② 有时候，部分考试才能影响 ③ 完全不影响

23. 您觉得以下行为会对您的睡眠质量有正面影响的（多选）

① 白天适度锻炼 ② 临睡前喝牛奶 ③ 使用薰衣草精油 ④ 聆听舒缓音乐入睡 ⑤ 每天多吃水果蔬菜 ⑥ 以上行为都没有正面影响

24. 您还有其他方式来提高睡眠质量吗？_____

注：问卷在我们完成调查后会进行销毁处理。感谢您的支持和配合，谢谢。