# *Night Owl vs Early Bird: Students' Study Habits, Learning Styles and Academic Performance*

Rosalie Muertigue Palaroan, Wenzhou Kean University, China
Xiangyu Li, Wenzhou Kean University, China
Jing He, Wenzhou Kean University, China
Yinjing Lin, Wenzhou Kean University, China
Yimeng Zhao, Wenzhou Kean University, China

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**Abstract**
Chronotypes refer to a specific period for people to wake up and sleep. Students with different chronotypes could have distinct learning styles and study habits. The different preferred ways of learning would also impact their academic performance. Every student's learning capacity and learning habits should be taken into consideration to be able to receive effective education. This study explores the relationship of chronotype, known as a night owl and early bird, with learning style, study habits, and academic performance among university students. A mixed-method approach using survey design has been utilized in this research. The researchers also employ the triangulation method to understand the existing phenomena more deeply and provide a better framework for the study. The study population was composed of 300 students randomly chosen from Wenzhou Kean University. The result of this study can contribute to the university by developing some policy programs suitable to the study habit and learning styles of students. This research can be helpful for teachers to adjust their learning contents and teaching pedagogies within different periods. The study findings can influence students' decision to develop their academic studies to maintain better physical and mental health while also performing well in their academic life.

Keywords: Chronotype, Study Habit, Learning Style, Teaching Pedagogies

## Introduction

Chronotypes refer to a certain period for people to sleep and wake up (Vitale & Weydahl, 2017). In China, the general pattern of studying before college is always considered as students learning under the monitor and control of their parents or teachers. Therefore, students' time to sleep and get up is determined mainly by their parents or teachers, which could be considered a stable pattern of chronotype. However, the situation changed after students entered college. In college, no certain restrictions will control students' time. Thus, changes may occur in their choice of chronotype.

Students change their chronotypes for multiple reasons. One of the main reasons is that the Chinese-specific educational pattern, as mentioned above, created the situation that students have lower self-control ability compared with other countries that allow students to manage their time themselves (Karan et al., 2021). Consequently, after breaking away from strict control, some students would act in extreme ways, changing their chronotype from earlier to later. It is also apparent that Chinese students change their chronotype after entering college because they are constantly educated that in college, it is not necessary to study hard, and it is time for students to relax. Students translate the information into playing games, hanging out with friends, and staying up late, which are activities that were not allowed before college, thus leading to the shift of their chronotype preference.

Students with different chronotypes could have distinct learning styles and study habits; the other preferred way of learning would also impact their academic performance. This study aimed to investigate differences between early bird and night owl students regarding their learning style, study habits, and the relationship between students' academic performance and chronotype.

### *Chronotype and Learning style*

Chronotypes could impact students in different aspects; it has been gaining more attention recently about their impact on students' behaviors, emotions, and cognition. All of the elements chronotype effect would have further influence on students' study in school, and there was high-quality research that indicates that students with different chronotypes tend to have other preferences of learning styles. According to the VARK questionnaire, students can perceive information through four sensory modalities: visual (pictures, graphics), auditory (listening), kinesthetics (practice personally), and reading/writing (Amran et al., 2016). Davidson and Ritchie (2016) suggested that through the research on students at the University of Guelph, who registered in Biological Concepts of Health class, there is a significant difference between different chronotypes and learning styles; early bird students revealed preferring Reading/Writing learning styles more than Auditory, Visual or Kinesthetic, while night owl students showed a preference for Kinesthetic learning style. This result also coincided with Itzek-Greulich et al. (2016) research on 473 students that, regardless of the time of the day, evening-type students show a higher interest than morning-type students in lab work, which needs practice by hand instead of listening to the lecture.

### *Chronotype and Study Habits*

Interestingly, there are significant differences between studies about students' study habits with different chronotypes (Horzum et al., 2014; Porcheret et al., 2018). Several aspects of

study habits were learnt with chronotype, and the results indicate that morning-type students are more active in the daytime, while evening-type students would become active late in the day (Horzum et al., 2014; Valladares et al., 2017).

**Learning Time.** Different chronotype students would have different preferences for time for studying. Valladares et al. (2017) after tested on 703 university students, found that morning-type students prefer learning in the morning, while evening-type students would like to learn late in the day. The result is the same with that Horzum et al. (2014) found that early bird students prefer the daytime to learn, while night owls prefer the nighttime. The finding partly coincided with the research done by Itzek-Greulich et al. (2016), indicating a difference between early bird and night owl students in their performance and motivation towards morning classes. However, no difference was wounded when comparing different chronotypes for afternoon classes.

**Instructing Method Differences.** After comparing 724 online learning students' questionnaire answers, Horzum et al. (2014) concluded that night owl students show more preference for learning online, meaning that night owl students are more likely to learn in places different from the classroom, and it is supported by Porcheret et al. (2018) suggesting that evening chronotype students spend more time outside with 6,000 university students as a participant. At the same time, the difference in individual work and group work is also found by Roeser et al. (2013) in the research included 273 students from 14 to16 years old that morning type students have the tendency to be cooperative, which could be seen as preferring working in a group, while evening type students prefer individual independence. Thus, night owls prefer to study alone and finish their work independently.

### *Chronotype and Academic Performance*

After investigating the literature about chronotypes' impact on students learning styles and study habits, the further influence on student's academic performance is considered. It is interesting to find some contradictory studies on this topic. Most studies found that early bird students' academic performance is superior to night owl students. According to Enright and Refinetti (2017), who researched 207 university students having classes at different times of the day, morning-type students perform better than evening-type students, evening-type students may be sleepier than morning-type students in the morning class, and because evening-type students have less sleep time thus also affect their performance in the afternoon. A similar finding is also learned by Zerbini and Merrow (2017), indicating that lower academic performance is observed in night owl students. At the same time, Itzek-Greulich et al. (2016) found that early-bird students are more motivated toward morning classes than night-owl students. Early bird students' performance in morning classes is also superior to night owl students. However, these differences lose significance in the afternoon classes. This change was also noticed by Martin et al. (2016), that the performance of night owl students became as well as early bird performance after adjusting school time later. Additionally, both morning-type and evening-type students have adverse effects from early school time. While many results indicate that the morning chronotype has some advantages in academic performance, Horzum et al. (2014) found no difference between different chronotypes and academic performance for online learning students. Thus, further research should clarify the relationship between chronotype and academic performance, considering instruction methods and ages.

### *Learning Style and Academic Performance*

Instructional practice is one of the critical factors that would impact students' academic performance. The present study has already explored the relationship between chronotype and learning style. A strong relationship has been found that early bird students are more like to learn with reading and writing, while night owl students prefer to learn with actual activities, for instance, lab work. It is reasonable to consider that different learning styles would affect students' academic performance. As expected, Davidson and Ritchie (2016) found that although learning style would not influence academic performance directly, due to instructional practice differences, learning style could affect academic performance indirectly. This research indicates that general instructional practice in higher education is still the lecture-style model, which fit the learning style of early bird students, thus creating an unbalance between different chronotype students with different preference for learning style. As the lecture-style model focuses more on material reading and note-taking than actual physical activities, students who prefer Read/Writing learning style tends to perform better than those who apply other learning styles.

### *Study Habits and Academic Performance*

Because the education system requires students to start class early in the day, different study habits would affect students' academic performance. According to Itzek-Greulich et al. (2016), early bird students perform better than night owl students, for they are more likely to be active in the morning, thus giving them an excellent start to the day and could continue their motivation throughout the day. On the other hand, night owl students are more active at night, they are more likely to feel tired in the morning, and the early schedule also has a risk of not enough sleep, so night owl students are still in low motivation in the afternoon. Although there is a significant difference between time preference to learn and academic performance, Enright and Refinetti (2017) found that different class times did not affect the academic performance of varying time preference students in different ways. Specifically, all students tend to feel tired and sleep in the morning more than in the afternoon. Martin et al. (2016) also discovered a similar finding that early-bird students attending the morning schedule reported higher sleepiness than early-bird students attending the afternoon schedule. Additionally, with finding from Roeser et al. (2013) indicate that early bird students are more cooperative while night owl students are more independent; considering with educational system in China, it seems that students who prefer group work have more advantages over students choosing individual work, which is also one of the study habits differences that lead to academic performance difference.

### *Current Study*

The relationship between chronotype in learning style and study habits has been studied extensively. To explore the relationship between learning style and study habit in the Chinese cultural context, this study is designed to determine the learning style of early bird students and night owl students; to describe the study habits of bird students and night owl students; to document the academic performance of early bird students and night owl students.

## Methodology

### *Research Design*

With the understanding of the research problem, this study explored the relationship of university students' chronotype with learning style, study habits and academic performance. In this study, researchers used "what" questions to determine college students' chronotype and learning style, at the same time using quantitative measurement to understand students' study habits and collecting GPA (Grade Point Average). Researchers would accumulate descriptive information and quantitative answers which are directly connected to the problem that under examination.

### *Respondents and Sampling*

This study collected the essential data with the distribution of questionnaire by researchers personally to minimize time consume and to provide accurate information. Researchers distributed questionnaires randomly to Wenzhou-Kean University students, with the total number of 300 participants. According to respondents' answer, researchers divided participants into two groups: early bird students and night owl students. The main purpose of dividing participants into groups is to better understand and obtain a more comprehensive comparison of different chronotype students with their learning style and study habits.

### *Research Instrument*

The researchers utilized a modified validated questionnaire as primary method of data collection. There are four parts of the questionnaire: Part I – general information of the respondents, including year level and gender; Part II – participants' chronotype and their staying up late frequency; Part III – university students' study habits, mainly focusing on environment for learning, planning for learning, individual work versus group work, note taking, and review and preview; and Part IV – using The VARK Questionnaire (Version 7.8) to determine participants' learning style, to better construct reliability of this questionnaire, researchers deleted some of the items.

### *Data Analysis*

Both qualitative and quantitative data were collected, analyzed and interpreted. This study used SPSS to analyze respondents' answer. Inferential statistic was used in this study to explore the relationship between students' chronotype and learning style (objective 1), the relationship between students' chronotype and study habits (objective 2), and correlation between university students' chronotype and academic performance (objective 3). At the same time, Quantitative statistics including mean, sequency counts, and percentages were used to determine participants' basic information, includes age, and GPA (grand point average). All qualitative data was analysed using descriptive and thematic analysis.

## Results and Discussion

There were total number of 300 participants in this study. The distribution of participants is presented in the Table 1. The participants were randomly chosen from Wenzhou-Kean university students. The valid answers were selected by researcher independently, after

reducing the invalid answers, including no responses to questions, and disagreed with consent of the questionnaire, 296 answers were selected from 300 questionnaires.

| Categorical Variables | Frequency | Percentage |
|---|---|---|
| Wenzhou-Kean University Students | 300 | 100% |

Table 1. Distribution of the Respondents of the Study

***Respondents' Gender and Year Level***

Respondents' gender and year level are presented in the Table 2. Regarding the gender difference, most of the respondents are female (56.67%) compared with 42% male and 1.33% other genders. The distribution of year level is 50 first year students (16.67%), 102 second year students (34%), 60 third year students (20%) and 88 fourth year students (29.33%).

| Categorical Variables | Type | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 126 | 42% |
| | Female | 170 | 56.67% |
| | Other Genders | 4 | 1.33% |
| Total | | 300 | 100% |
| Year Level | 1st | 50 | 16.67% |
| | 2nd | 102 | 34% |
| | 3rd | 60 | 20% |
| | 4th | 88 | 29.33% |
| Total | | 300 | 100% |

Table 2. Respondent's' Gender and Year Level Distribution

***Chronotype***

This study divided chronotype into two categories: early bird and night owl. The distribution of chronotype of respondents is presented in Table 3. The results reveal that there are 144 students been defined as early bird students in this research, rest of 156 participants are night owl. Our results revealed an almost equal distribution of early bird and night owl, which is different with previous studies pointing out that adolescent from 14 to 19 would like to develop night owl chronotype more than early bird, the later would become main trend after adolescent (Karan et al., 2021).

| Chronotype | Frequency | Percentage |
|---|---|---|
| Early Bird | 144 | 48% |
| Night Owl | 156 | 52% |

Table 3. Respondents' Chronotype Distribution

***Early Bird and Night Owl Students' Learning Style***

This study aims at comparing early bird students and night owl students about their learning style. The detail of early bird students and night owl learning style distribution is presented in Table 4.

| Chronotype | Learning style | Frequency | Percent | Cumulative Percent |
|---|---|---|---|---|
| Early Bird | Visual | 19 | 13.4 | 13.4 |
| | Aural | 36 | 25.4 | 38.7 |
| | Read/Write | 31 | 21.8 | 60.6 |
| | Kinaesthetic | 56 | 39.4 | 100.0 |
| | Total | 142 | 100.0 | |
| Night Owl | Visual | 16 | 12.3 | 12.3 |
| | Aural | 60 | 39.0 | 51.3 |
| | Read/Write | 24 | 15.6 | 66.9 |
| | Kinaesthetic | 51 | 33.1 | 100.0 |
| | Total | 154 | 100.00 | |

Table 4. Respondents' Learning Style Distribution

**Early Bird Students' Learning Style.** It can be gleaned from Table 4 that 36 early bird students were found to be aural preferring learner (25.4%), and 31 out of 142 early bird students prefer reading and writing learning style, with 39.4% of the early bird students learn in kinesthetic way. The least learning style preferred by early bird students is visual learning style with only 19 students (13.4%).

**Night Owl Students' Learning Style.** With the total number of 154-night owl students, different with early bird students, the most preferred learning style for night owl students is aural learning style (39%). Night owl students also prefer kinesthetic learning style, with 51 students (33.1%). Reading and writing learning style is preferred by 15.6% of night owl students in this study. The least preferred learning style for night owl students is visual learning style (12.3%).

The result of the comparison of learning style between early bird and night owl students is different with the previous finding from Davidson and Ritchie (2016), which indicated that early bird student and night owl students have significant different preference on learning style, while early bird university students prefer reading and writing learning style, night owl students prefer kinesthetic learning style. This study's results revealed different information, the early bird students prefer kinesthetic learning style while the night owl students prefer aural learning style. The attribution for the difference could be differences in culture, Davidson and Ritchie (2016) did the research in western culture background, while this study researched in China, different culture could lead to difference in education system, thus resulting the difference of learning style preference.

***Early Bird and Night Owl Students' Study Habits Comparison***

This study also explored the differences of study habits between early bird students and night owl students. Study habits are divided into five categories: preference for environment, preference for time to study, and preference for individual work or group work, note taking, and review and preview.

Table 5 is the analysis of 5-liker scale questions about respondents' study habits, with the comparison on early bird and night owl students. The results revealed that early bird students and night owl students have similar study habits. For environment, both early bird and night

owl prefer to study in quite place and believe it is effective learning quietly. The rest of the categories of study habits, both early bird and night owl students show neutral attitude. It is suggested by the result that early bird students and night owl students do not have the specific preference for time choice for learning, early bird students score averagely 3.13 for the time choice, considering night owl students' average score is 2.83, it is possible to infer that night owl students are more likely to choose night time to study compared with early bird students, even night owl students are not rigid to the specific time period. Our results are similar with previous research results indicating that early bird students prefer the daytime to learn, while night owls prefer studying at night (Horzum et al., 2014). Both early bird students and night owl students stand neutral to individual work versus group work, the slight difference is that early bird students score (3.93) higher than night owl students (3.66), thus it could infer that both chronotype students shows they prefer learning individually, with early bird shows more significant tendency. In addition, both early bird and night owl take note, while early birds show slight disagreement with taking notes using electronic device (2.70). Early birds show slight agreement about review after class (3.31), while night owl shows slight disagreement about preview (2.41).

| Study Habits Questions | Chronotype | Mean | Interpretation |
|---|---|---|---|
| I prefer study in quite place instead of place with background sounds. | Early Bird | 3.95 | Neutral |
| | Night Owl | 3.79 | Neutral |
| I prefer to learn in daytime instead of at night. | Early Bird | 3.60 | Neutral |
| | Night Owl | 2.35 | Partly Disagree |
| I prefer to study alone instead of learning in group. | Early Bird | 3.92 | Neutral |
| | Night Owl | 3.57 | Neutral |
| I will take notes when learning. | Early Bird | 3.99 | Neutral |
| | Night Owl | 3.66 | Neutral |
| I prefer using electronic device to take note instead of notebook. | Early Bird | 2.72 | Neutral |
| | Night Owl | 2.97 | Neutral |
| I will review my book after lessons. | Early Bird | 3.33 | Neutral |
| | Night Owl | 2.73 | Neutral |
| I will preview my book before class. | Early Bird | 2.78 | Neutral |
| | Night Owl | 2.31 | Partly Disagree |

Table 5. Early Bird and Night Owl study Habits Comparison

**Conclusion**

This study was conducted mainly for determining the learning style of early bird students and night owl students, describing the study habits of bird students and night owl students, and documenting the academic performance of early bird students and night owl students.

With the exploration of the questions, conclusions could be drawn as below. Under Chinese culture background, early birds show more preference on kinesthetic learning style, while night owl prefer auditory learning style. Visual learning style is the least preferred learning style among all the participants. Regarding study habits, both early bird students and night owl students enjoy quiet study places and think that studying in quiet environment is

effective. Although both chronotype students show no preference on having fixed time for learning, early bird students show a little preference for learning in daytime while night owl shows slight preference learning at night. Students who are night owls or early birds basically have neutral attitudes to individual work versus group work. Both early birds and night owls take notes, however the former are slightly less keen on utilizing electronic device. Early birds show slight agreement about review after class, while night owl shows slight disagreement about preview. The study failed to find significant differences on GPA between early bird and night owl, and there is no significant correlation between chronotype and student's academic performance.

***Recommendation***

Based on the conclusions, the following are recommended:

Government could adjust the policy connected to school class schedule, as a force to help students of different chronotypes have more appropriate learning time. It is essential for the school to provide students with a quiet learning environment, which can be achieved by building a self-study room with good sound insulation effect and standardizing students to keep quiet in the self-study room. Schools should also make students aware of their own chronotype through valid tests.

The conclusion of the study could apply to teachers in the school as well, with better understanding of chronotype and its impact on students' preference of time to learn, teachers are able to change their teaching contents as more important and less important combining with different period. In addition, teachers could have more communication with students to improve their learning experience. It could be effective if teacher add operable activities or interactions for early bird students, while giving night owl students with auditory materials.

Students could shift their time schedule according to their chronotypes, helping themselves to maintain better physical and mental health, while also perform well in their academic life.

***Limitation of the Study***

With the processing of the study, it is possible to observe few limitations in different aspect. This study focused on university students, specifically, Wenzhou-Kean university students, thus it is clear that the result of this study could not present the whole population and it could be found differently under western culture situation. There is possibility that the result is be biased due to different definition of chronotype division, and this study only focused on two main chronotype excluding chronotype that does not belong to early bird and night owl.

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**Contact email:** rpalaroa@kean.edu