ORIGINAL ARTICLE

Evaluation on College Students' Anxiety and Social Media Usage during Shanghai Closure

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***Abstract**: As COVID-19 mutates, the highly infectious omicron mutants (BA. 5.2., BF. 7) tension shrouded China. Given the internet information explosion and youth social media addiction, observing the mental impact on college students during the 2022 Shanghai closure is worthwhile. A pilot survey study was conducted to explore the anxiety levels of college students during the closure. The sample size was limited to 101 second-year college students. In addition to demographics, the survey involved the Self-Rating Anxiety Scale, self-perceived COVID-19 anxiety, frequency of COVID-19 information reception, number of social media accounts, and number of electronic devices. Though 68.4% of students equipped with two electronic devices (N = 95) exceeded the students with only one electronic device, a Chi-square test showed that students with only one electronic device had the highest anxiety index (mean = 50). Further, the Kruskal-Wallis test indicated that the number of electronic devices affected the students' anxiety level (p = 0.027) while social media membership did not (p = 0.565). As a result, it was suggested that social media usage and pandemic information inputs among college students were significant concerns that required special attention from the government, schools, teachers, and families.*

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Introduction

CORONAVIRUSES pose a mental health threat to the population worldwide (Grover et al., 2020; Marques de Miranda et al., 2020). A systematic review led by Marques de Miranda et al. (2020) is an excellent manifest of this development. Through the analysis of 51 articles retrieved from four databases (PubMed, Scopus, SciELO, and Google Scholars), anxiety, depression, and post-traumatic symptoms were widespread (Marques de Miranda et al., 2020). The researchers found that individuals of different ages reacted differently to the epidemic and that certain age-groups were more susceptible to COVID-19, promoting age as a significant factor to be examined throughout the pandemic. Moreover, Liu and colleagues (2020) conducted a cross-sectional study of mental health in different age groups with Chinese university students and elementary school students during this time. In February and March 2020, Liu et al. (2020) tested 198 college students and 209 elementary school students in Sichuan Province in China, respectively, using the Somatic Self-Rating Scale (SSS). In addition to the somatic assessments of the subjects, the SSS also included assessments of anxiety, depression, and mixed anxiety-depression symptoms. The results showed that more college students (63.6%) experienced more somatic symptoms concerning COVID-19-related concerns than the dependent child group. The COVID-19 concerns included "daily life necessities, the efficacy of prevention, and control measures" (p. 3), among which "daily life necessities" was their most significant concern. Liu et al. (2020, p.3) linked these three concerns to students' anxiety and levels of depression. Thus, it can be seen that in the post-epidemic era, college students, as independent individuals, are more likely to receive negative information than children – a significant threat to college students' mental health.

At the same time, Chang et al. (2020) administered a web-based questionnaire to 3,881 college students using the Cognitive Behavior Scale, Generalized Anxiety Inventory, and Depressive Symptom Scale to explore the factors affecting college students' anxiety during the pandemic. The results showed that 69.47% of college students had high COVID-19 awareness, 26.6% were troubled by anxiety, and 21.16% of respondents had depressive tendencies. Although the risk of mild anxiety is lower in the group with higher age and higher awareness of COVID-19, improving students' protection awareness by receiving online information is still risky. Moreover, college students who received more than half of the total amount of negative messages out of all received information about the outbreak were more likely to experience mild anxiety and depression (Chang et al., 2020). Therefore, the authors highly recommend that the social media accounts authorized by universities or colleges should promote health education to guide young people in a positive way. Thus, evaluating and supervising the chan-

nels sending negative information is necessary. As for college students, screen time cannot be ignored.

Screen time has long been a threat to young people's physical and mental health worldwide. In Canada, longer screen time is associated with anxiety and depression among young people (Maras et al., 2015). In Iceland, longer screen time and shorter physical activity pose a significant threat to young people's mental health (Hrafnkelsdottir et al., 2018). While in China, the same theme has been studied. According to Feng et al. (2014), a study of first-year students at Wuhan University showed lower levels of anxiety and depression among students with high levels of physical activity and low screen time. Nevertheless, Wu et al. (2015) emphasized that low physical activities and long screen time could induce mental health risks and poorer quality sleep among Chinese college students, since poor sleep is a precursor to anxiety, which in turn is a precursor to mental health problems. Therefore, physical activities and screen time are essential factors to consider.

However, throughout the pandemic, college students' lifestyles changed to include less physical activity and a long-sedentary-screen-time lifestyle (Qin et al., 2020; Xiang et al., 2020). A pilot study was conducted during the Shanghai closure when students had almost negligible access to physical activity due to long-term home or dormitory confinement (Zhang et al., 2021). In this case, to seek the latest COVID-19 information (Zhang et al., 2021), the likelihood of students using electronic devices was significantly increased, along with the increasing possibility of receiving negative COVID-19-relevant information.

More recently, Shanghai has been infected by Omicron since March 2022, with the daily growth of infected people exceeding 2,000 cases per two consecutive days (Shanghai Coronal Virus Report, 2022). The coronavirus spread resulted in the Shanghai closure (The General Policy of "Dynamic Clearing," 2022) and an increased risk of mental problems (i.e., anxiety, panic, and PTSD). The ongoing COVID-19-related information advocated in the media has posed a significant threat to human mental health (Hamza Shuja et al., 2020; Marques de Miranda et al., 2020; Vindegaard & Benros, 2020). Then, the correlation between social media usage and college students mental health during pandemic closure is worth exploring.

College Students Pandemic Anxiety and Self-Rating Anxiety Scale

According to Chang et al. (2021), the youth's mental health is more susceptible to the external environment. Moreover, the topic of the mental health of people in the epidemic era, or post-epidemic era, has been a massive concern for scholars around the globe since the first wave of global closure in 2019

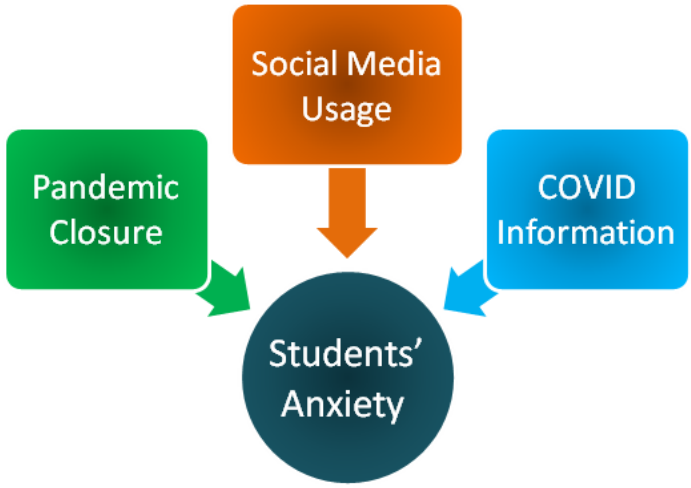

Figure 1. Source of Students' Pandemic Anxiety.

(Deng, 2021). In addition, studies on the 2019 Wuhan closure could serve as a practical guide for this study. Considering the research on college students' pandemic mental health could be a sustaining concern even in the post-epidemic era. If so, how can we spotlight people's anxiety? The **Figure 1** can be a manifest that the overusing of social media where flooded the COVID-19 information during the pandemic closure is a threat to students' anxiety level.

In China, the Self-Rating Anxiety Scale (SAS) was widely used, and the articles on "college students" and "anxiety" with the SAS ranked at the top on CNKI (Zhou, 2012). As the founder of assessing anxiety disorders, Zung (1971) provided both psychopathologists and psychological researchers with assessment tools: the Anxiety Status Inventory (ASI) and the Self-rating Anxiety Scale (SAS). Two scales can be used as measurement tools, but the former is for physician observation, and the latter is for the patient's self-assessment. Zung (1971) created the Self-Rating Anxiety Scale (SAS) by retrieving examples of anxiety symptoms from patient interviews and pairing them with the Observer Anxiety Inventory (ASI) to develop 20 congruent diagnostic criteria with a correlation of 0.74 between the two scales. According to Zung (1971), SAS uses a four-point Likert scale with twenty items ranging from: 1 = none or a little of the time, 2 = some of the time, 3 = a good part of the time, 4 = most or all of the time. Twenty items in the survey scored 1 to 4, while items 5, 9, 13, 17, and 19 were exceptions, with a reversed score of 4 to 1. Moreover, a rough pooled score of these twenty items would be multiplied by 1.25 to get a standard score ranging from 25 to 100, and the mild anxiety level fell in the range of 50-59, the moderate anxi-

ety was 60-69, while 70 or even higher signaled a severe anxiety status (Zung, 1971).

While in 1986, the National Scale Collaborative Group in China discovered that five of the scale's items were difficult for the public to understand, which had an impact on the scale's accuracy. As a result, the Collaborative Group adjusted the scale into positive components and conducted initial tests. In this way, the reliability with Cronbach alpha of 0.931 and validity of the Chinese revision of Self-rating Anxiety Scale (SAS-CR) were achieved, and the well-translated Chinese SAS was authorized to be applied in larger populations in China (Tao & Gao, 1994). Hereinafter, the SAS-CR will be used in this pilot study.

Literature on Pandemic Anxiety

The above scale was applied by Duan et al. (2022) in their latest survey among 1,457 college students in Wuhan, implying that 62.91% of college students were deeply affected by anxiety and depression after the epidemic. Plus, a systematic review of 86 core articles presented by Deng et al. (2021) showed that 34% of college students suffered from depression and 32% from anxiety, significantly different from the pre-epidemic period.

Accordingly, problematic social media use was surveyed among 3,123 college students in Shanghai, showing that it could significantly influence their anxiety levels during the pandemic (Jiang, 2021). Though social media studies during the Wuhan closure displayed that social media could be both an accompaniment and a threat, its abuse may lead to mental issues such as depression (Zhong et al., 2021). Consequently, literature conducted after closure from May to August 2020 showed that weekly social media use surged from 17.2 to 21.4 hours compared with before COVID-19, and nearly 40% of respondents increased their social media use by more than 3.5 hours per week. Plus, 26.4% of the respondents suffered from anxiety (Luo et al., 2021). Therefore, the social media usage research on college students' stress was far-reaching for those experiencing the pandemic closure.

The same attention has been paid to global research. Vindegaard and Benros (2020) analyzed 43 studies related to the pandemic from 2002 to 2003 and revealed that people suffered higher levels of anxiety and depression than before. Much worse, after extracting and investigating 51 COVID-19 articles from four databases, Marques de Miranda et al. (2020) concluded that children and teenagers greatly suffered from anxiety, depression, and post-traumatic symptoms, and schools' role was underestimated. Likewise, when exploring the factors that influenced the post-pandemic students' stress and mental health in 63 countries via ANCOVA and Chi-square tests, Varma et al. (2021) found that the younger the participants were, the more vulner-

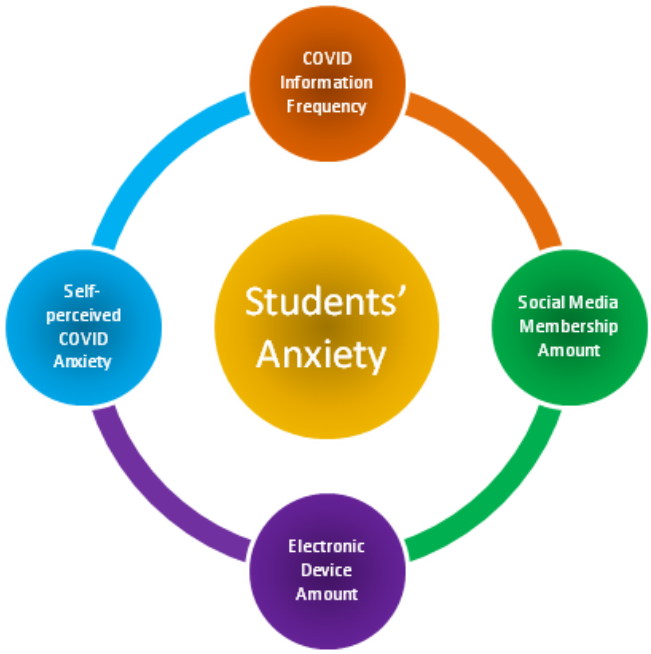

Figure 2. Factors Involved in Students' Anxiety.

able they were, and the more support they needed after. Therefore, students' anxiety during and after the pandemic is a big concern.

Still, comparison anxieties study before and after closure could be more persuasive. To investigate how SNS usage changed among college students during the pandemic, Tuck and Thompson (2021) studied 176 college students during online teaching in the United States. The questionnaire was issued twice with a one-month time interval to track their changes. With an increasing daily time-spending on social media, the students' enjoyment decreased, and their negative emotions augmented. More than that, their stress was due to their addiction to SNS and the degree they received pandemic-related content. Meanwhile, based on quantitative research among 209 students at a university in Turkey, Balaban Sali and Simsek (2014) found that social media membership was positively correlated with internet addiction and mental well-being.

Toward that end, according to the **Figure 2**, this article aimed to explore whether the COVID-19-related information on social media affected college students' emotions and generated their COVID-19-related anxiety during the closure. Hence, this pilot was designed to test the interrelationship between the students' self-perceived COVID-19 anxiety, COVID-19 information frequency, and amount of social media membership with students'

anxiety. Hypothetically, students with more electronic devices and more social media membership may tend to get more COVID-19 information and be more stressed.

Therefore, the Null Hypotheses will be:

$H_0$1: The distribution of electronic devices is the same across different anxiety groups.

$H_0$2: The distribution of social media accounts is the same across different anxiety groups.

Methods

This research was piloted among second-year college students at a private vocational and technical university in Shanghai. The random sampling of 101 sophomores who majored in English were enrolled. The online questionnaire was made (https://www.wjx.cn/vj/Oj7sAwm.aspx) and distributed via the "Survey Star" system, a famous web-based software platform for data collection in China. After scanning the questionnaire's Quick Response (QR) code on their mobile phones, participants could access the questionnaire anywhere. And the data was collected from May 15, 2020, to May 25, 2022, during which the omicron concern was still pending. Moreover, the collected anonymous data was highly confidential and adequately documented. After releasing the online questionnaire, 95 (94.1%) students responded, consisting of 74 (77.9%) females and 21 (22.1%) males, who have been experiencing pandemic closure for almost two months in Shanghai. Thus, one of the significances of this pilot study is that it can be extended to foreign language students in similar universities or other comprehensive universities in China.

Besides a well-translated SAS-CR of 20 items with good reliability and validity proved by Tao and Gao (1994), the survey also contained the demographic items (i.e., gender, location, self-perceived COVID-19 anxiety, COVID-19 information frequency, electronic device amount, social media membership amount). Hypothetically, if college students were equipped with more electronic devices and social media accounts, they would have a higher possibility of receiving COVID-19 information, and the more anxious they would be. Given that, the pilot on the relationship between electronic device amounts, social media amounts and anxiety levels was conducted.

In this pilot, the dependent variables were achieved. The number of electronic devices, and the social media accounts were continuous variables, and the anxiety level was conducted from an interval Likert scale. Moreover, the random sampling was collected online during the Shanghai closure. According to the **Table 1**, three dependent variables: number of electronic devices (M = 1.96), social media accounts (M = 3.69), and anxiety levels (M = 46.35) fell into the 95% Confidence Interval yet test of normality should be followed. According to the **Table 2**, the Shapiro-Wilk of both electronic de-

Table 1. Descriptives (N = 95).

				95% Confidence Interval	
	Mean	Std. Error	Std. Deviation	Lower Bound	Upper Bound
Electronic Devices	1.96	0.073	0.713	1.81	2.10
Social Media Accounts	3.69	0.400	3.903	2.90	4.49
Anxiety Level	46.35	0.996	9.710	44.38	48.33

Table 2. Test of Normality (N = 95).

	Kolmogorov-Smirnov*			Shapiro-Wilk		
	Statistic	df	p	Statistics	df	p
Electronic Devices	0.361	95	< 0.001	0.676	95	< 0.001
Social Media Accounts	0.332	95	< 0.001	0.349	95	< 0.001
Anxiety Level	0.101	95	0.018	0.981	95	0.171

**. Lilliefors Significance Correction*

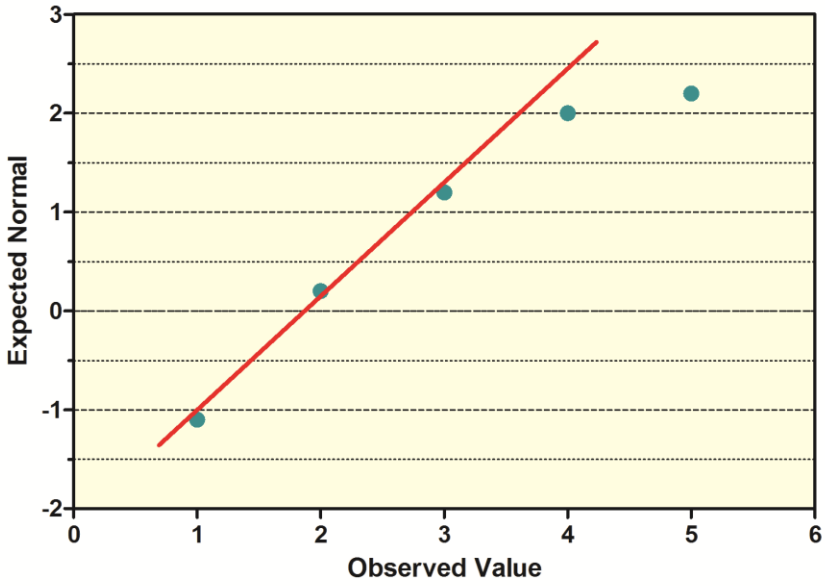

Figure 3. Q-Q Plot of Electronic Devices.

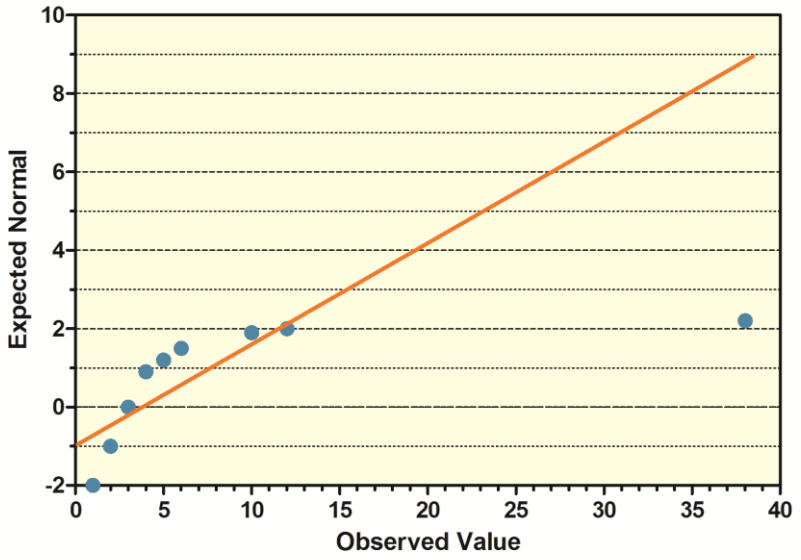

Figure 4. Q-Q Plot of Social Media Accounts.

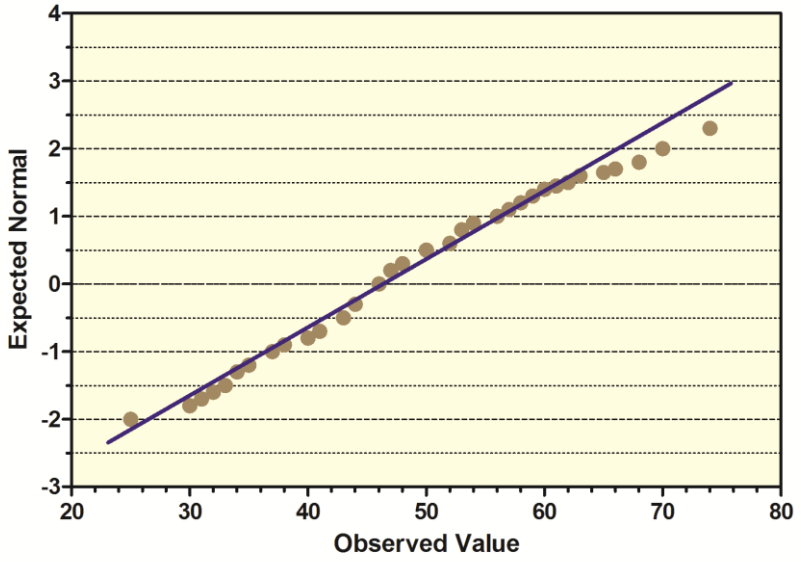

Figure 5. Q-Q Plot of Anxiety Levels.

vices and social media accounts suggested the violation of normality with the significance of 0.000, while a non-significant result of 0.171 ($p > 0.05$) in anxiety level was achieved, meaning a normal distribution (Pallant, 2020). Furthermore, since a reasonable straight line of the Q-Q Plot manifests a normal distribution (Pallant, 2020), the **Figures 3**, **4**, and **5** display the non-normality and the homogeneity of variance could not be attained. Therefore, a non-parametric hypothesis analysis, the Kruskal-Wallis test, should be applied (Pallant, 2020).

The study was performed using SPSS 26. Firstly, the Chi-square would testify to the possibility between COVID-19 information frequency on social media and self-perceived anxiety. Consequently, the Kruskal-Wallis ANOVA (Kruskal-Wallis Test - An Overview, n.d.) tests would assess the differences among electronic devices, the number of social media accounts, and anxiety levels.

Results

According to the survey, 68 ($N = 95$) students were in their dormitory when the closure was initiated. The descriptive analysis demonstrated that 90.53% have constantly received COVID-19 information via social media, while only 45.26% perceived their concern. Then, a Chi-square test was conducted to compare two groups: the self-perceived COVID-19 information anxiety (yes and no) and highly COVID-19 information receiving (yes and no), which said that out of all 86 subjects that frequently get COVID-19 information, 50% were anxious, and 50% did not feel anxious ($p = 0.004$, $\alpha = 0.05$. The 68.4% of students equipped with two electronic devices ($N = 95$) exceeded the other groups with one device and three or more devices, respectively, among which 54 out of 65 were female. The Kruskal-Wallis test offered that students with only one electronic device had the highest anxiety level, with an anxiety median of 50. Though the p-value was 0.096, we could say that it was marginally significant. Due to its marginal significance ($p = 0.096$, $\alpha = 0.1$), there would be at least one of the groups with a different anxiety level (**Figure 6**).

Besides, the number of social media accounts was analyzed. The students with three social media accounts ranked at the top with 35.1%, followed by the two account owners with 26.6%. After referring to the independent-samples Kruskal-Wallis test, we found that the group with only one social media account got the highest median of 50. However, it was not statistically significant, with a p-value of 0.608 ($p > 0.05$; Pallant, 2020) (**Figure 7**).

In addition, given the anxiety classification presented by Zung (1971), the self-rating anxiety data could be divided into three groups: 1 = less anxious students (63.2%), 2 = mildly anxious (26.3%), and 3 = moderate and

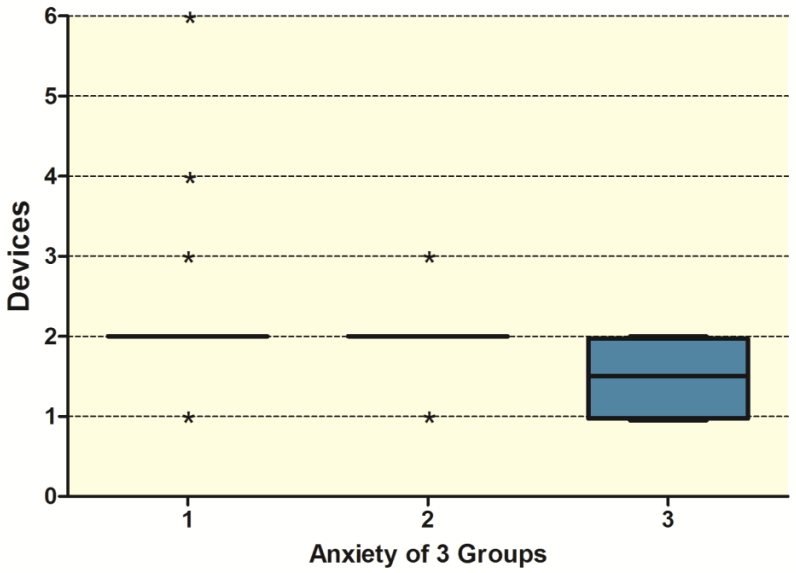

Figure 4. Kruskal-Wallis Test of Electronic Devices and Anxiety Groups.

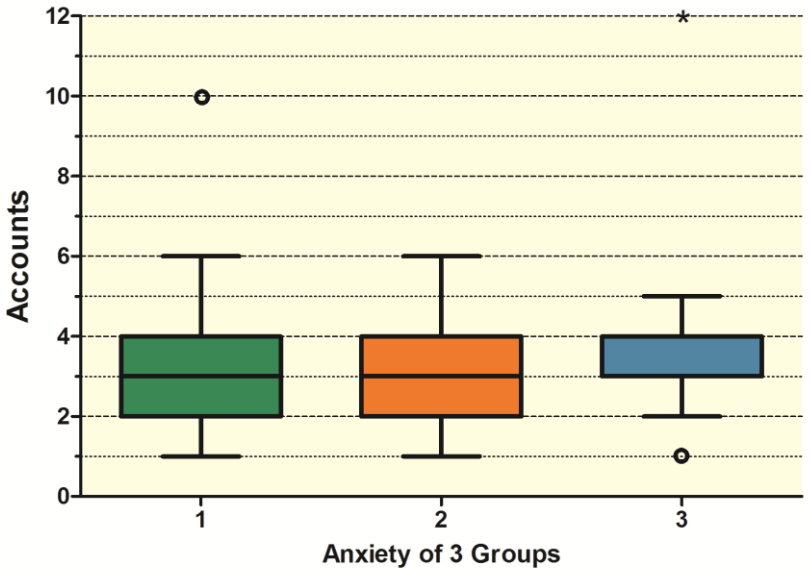

Figure 7. Kruskal-Wallis Test of Social Accounts and Anxiety Groups.

Table 3. Hypothesis Test.

Null Hypothesis	Test	Sig.	Decision
The distribution of electronic devices is the same across categories of anxiety groups.	Independent-Samples Kruskal-Wallis Test	0.027	Reject
The distribution of social media accounts is the same across categories of anxiety groups.	Independent-Samples Kruskal-Wallis Test	0.565	Retain

Asymptotic significances are displayed. The significance level is 0.05.

Table 4. Independent-Sample Kruskal-Wallis Test.

Total N	95
Test Statistics	7.255*
Degree of Freedom	2
Asymptotic Sig. (2-tailed test)	0.027

**: The test statistic is adjusted for ties.*

Table 5. Pair Wise Comparisons of Anxiety Groups.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.*
3.00-2.00	15.360	8.449	1.818	0.069	0.207
3.00-1.00	20.517	7.713	2.660	0.008	0.023
2.00-1.00	5.157	5.375	0.959	0.337	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is 0.05.
**: Significance values have been adjusted by the Bonferroni correction for multiple tests.*

Table 6. Independent-Samples Kruskal-Wallis Test Summary of Social Media Accounts.

Total N	94 (one outlier was eliminated) (N = 95)
Test Statistic	1.142*,†
Degree of Freedom	2
Asymptotic Sig.(2-sided test)	0.565

**: The test statistic is adjusted for ties.*
†: Multiple comparisons are not performed because the overall test does not show significant differences across samples.

Table 7. Devices * Anxiety Cross Tabulation.

			Anxiety				Total
			Less	Mild	Moderate	Severe	
Devices	1	Count	24	5	1	2	32
		% Within Anxiety	34.8%	25.0%	33.3%	50.0%	33.3%
	2	Count	36	12	2	2	52
		% Within Anxiety	52.2%	56.0%	66.7%	50.0%	54.2%
	3	Count	8	2	0	0	10
		% Within Anxiety	11.6%	10%	0%	0%	10.4%
	Others	Count	1	1	0	0	2
		% Wihin Anxiety	1.4%	5.0%	0%	0%	2.1%
Total		Count	69	20	3	4	96
		% Within Anxiety	100%	100%	100%	100%	100%

Table 8: Accounts * Anxiety Cross Tabulation.

			Anxiety				Total
			Less	Mild	Moderate	Severe	
Accounts	1-2	Count	22	5	1	0	28
		% Within Anxiety	31.9%	25.0%	33.3%	0%	29.2%
	3-4	Count	31	11	0	2	44
		% Within Anxiety	44.9%	55.0%	0%	50.0%	45.8%
	5-6	Count	11	3	2	1	17
		% Within Anxiety	15.9%	15.0%	66.7%	25.0%	17.7%
	Others	Count	5	1	0	1	7
		% Wihin Anxiety	7.2%	5.0%	0%	25.0%	7.3%
Total		Count	69	20	3	4	96
		% Within Anxiety	100%	100%	100%	100%	100%

severe tense students (10.5%). Non-parametric tests were applied to determine whether the amounts of students' electronic devices and social media accounts would be different among the three anxiety groups.

The Kruskal-Wallis test revealed that a statistically significant difference in device distribution across three different anxiety groups (Group 1, n = 60: less anxiety, Group 2, n = 25: mild anxiety, Group 3, n = 10: moderate and severe anxiety) (**Figure 6**), χ^2 (df = 2, n = 95) = 7.26, with a p-value of 0.027 ($p < 0.05$); while the social media distribution among anxiety groups was not ($p = 0.565 > 0.05$; Pallant, 2020). According to **Table 3**, the first

null hypothesis will be rejected ($p = 0.027$) while the second one will be retained ($p = 0.565$). Thus, electronic device numbers have an impact on students' anxiety levels.

To further explore the significance of this study, the Bonferroni adjustment was conducted, and the result showed that the anxiety levels among different amounts of social media accounts and electronic devices do not differ significantly from each other at the 0.05 level (**Tables 4-6**).

Nonetheless, considering a small sample size of this pilot study, sample size estimation is a necessity for future research in this regard. According to the one-way ANOVA between two groups (the device amounts and anxiety groups), the devices in the less anxious group ($M = 2.07$, $n = 60$), mild anxiety ($M = 1.88$, $n = 25$), and moderate and severe anxiety ($M = 1.50$, $n = 10$), $F (2, 92) = 3.03$, $p = 0.05$ (**Tables 7** and **8**). Thus, to reach an adequate power of 80% (three groups, $\alpha = 0.05$), G*Power (Faul et al., 2007) was conducted, suggesting that the sample size of future research should be at least 159, with around 53 participants in each group (eta squared = 0.25, N = 159).

Discussion and Conclusion

This pilot study exposed the social media impacts on students' COVID-19 anxiety. Hypothetically, students with more electronic devices could be more anxious than others. However, considering the presented result, the students with only one electronic device had the highest anxiety level, which ran counter to the development proposed by Balaban Sali and Simsek (2014), holding that the more electronic devices owned resulted in higher anxiety. The reason for this reverse result could be correlated to the closure, where students were isolated in situ, most of whom lived in a quadruple room of around 28 square meters, where they were confined in a room with lower access to physical activities and higher access more electronic devices (Qin et al., 2020; Xiang et al., 2020; Zhang et al., 2021). Therefore, the findings provided valuable insights into the correlation between students' social media usage and their anxiety during the closure, when they were isolated and received floods of negative COVID-19-related information (Balaban Sali & Simsek, 2014; Luo et al., 2021; Tuck & Thompson, 2021; Zhong et al., 2021). In the future, the relationship between the number of devices and the level of addiction could be figured out when the Bergen Social Media Addiction Scale (BSMAS) is used to assess students' social media addiction levels (Luo et al., 2021), given that there is a negative relationship between social media addiction and college students' mental health and academic efficiency (Hou et al., 2019).

Considering the special life scenarios caused by the epidemic closure, the possibility of physical activity was significantly reduced (Qin et al., 2020;

Xiang et al., 2020). Accordingly, it is reasonable to assume the physical activity as a control variable due to the pandemic. Thus, the consequent longer screen time and more access to social media for negative information have become the main factors of psychological anxiety and depression among college students (Change et al., 2020; Maras et al., 2015; Hrafnkelsdottir et al., 2018; Liu et al., 2021; Zhang et al., 2021).

Thus, this pilot study can pinpoint whether the number of electronic devices and the number of social media accounts are associated with the level of anxiety among college students during sequestration, providing a reasonable basis for future research in this area. The results showed that compared with the social media accounts, the electronic devices could influence students' anxiety. Also, students with only one electronic device during the pandemic may have a tendency to be more easily addicted to social media and more anxious than others. Therefore, in the future, social media platforms and accounts should promote positive outbreak-related messages to guide young people to face the epidemic properly and positively (Change et al., 2020). Additionally, the research on supports for stressed college students (Varma et al., 2021) and immediate psychological interventions are necessary (Change et al., 2020). Besides, the latest study by Jiang (2021) suggested that psychological capital and academic burnout could moderate college students' problematic social media usage and anxiety during the pandemic, which could be a future orientation.

As for the limitation of this study, it was unknown whether students were already suffering from severe anxiety or other psychological problems before the closure of Shanghai and to what extent COVID-19 anxiety took up the general stress. However, the students have been experiencing continuous closure throughout this study. This long-term closure could provide relatively accurate and realistic psychological data, preparing for future research on social media addiction and anxiety during and post-epidemic comparison. Although this pilot study included a small sample size ($n = 95$), it provided a link between anxiety and device usage during the recent closure. Future studies looking to generalize these results to a larger population of undergraduate students in Shanghai, should consider a minimum sample size will be 159, with around 53 participants in each group (eta squared = 0.25, $N = 159$) to achieve an adequate power of 80% ($\alpha = 0.05$). More than that, a comparative study is suggested for future work, conducted using collected samples from different demographic characteristics (e.g., majors and university type).

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