

# ***Effects on Health Information in Mainstream Media on Generation Z's Intention of Reducing Stay-up-late Behavior***

**Jundi Li<sup>1,a</sup>, Xuehan Zhang<sup>2,b</sup>, Yalin Zhao<sup>2,c,\*</sup>**

<sup>1</sup>*Department of Fashion Design, Wuhan Textile University, Wuhan, 430010, China*

<sup>2</sup>*School of Humanities, Tiangong University, Tianjin, 300387, China*

*a. ecoy1121@gmail.com, b. zhangxuehan217@163.com, c. 1911000047@tiangong.edu.cn*

*\*corresponding author*

**Abstract:** With the continuous development of Internet technology, domestic mainstream media gradually use Weibo as the main tool for health communication. Recently stay-up-late become one of the most concerning health issues among young people in China. Young people also pay attention to the related health information posted by mainstream media on Weibo. The research question of this paper was to explore the effects of health information in mainstream media on social media on Generation Z's intention of reducing stay-up-late behavior. This paper designed a conceptual framework based on The Extended Parallel Process Model and hypothesized that self-efficacy, response efficacy, perceived susceptibility and perceived severity all have an impact on Generation Z's intention of reducing stay-up-late behavior. This paper designed a questionnaire scale to collect data and conducted regression analysis using SPSS 24.0 to validate and correct the model. This study concluded that health information about staying up late posted by mainstream media positively influenced Generation Z's intention of reducing stay-up-late behavior through self-Efficacy, response efficacy and perceived severity. Unlike previous studies, the effect of perceived susceptibility was not significant. Based on these findings, this study proposes suggestions for the health communication content of mainstream media on Weibo, hoping to provide a new conclusion for other scholars who study health communication in mainstream media, and to better promote the willingness of domestic Generation Z to reduce stay-up-late behavior and to appeal to their healthy sleep and healthy life.

**Keywords:** Health communication, Mainstream media, Generation Z, Stay-up-late behavior.

## **1. Introduction**

### **1.1. Research Background**

With the development of the world economy, new generations of youth have become more conscious and proactive in pursuing healthier lifestyles. And more and more people access health information via the Internet. The new generation of youth, also called as “Generation Z” in China, refers to the generation born between 1995 and 2009, who were born in the age of the internet. They are more influenced by smartphone products and online information, and are used to sharing their lives and work through the Internet, immersing themselves in short videos and social networking. A survey in the United States showed a significant increase in “Health-related Internet Use” (HRIU) among young

people of Generation Z, with 80% of respondents looking for health information on the Internet [1]. Health communication has become increasingly important to the media in various countries, and social media platforms provide more ways for the media to disseminate health information to a broader range of users. In China, “Weibo” is one of the most influential social media platforms. According to Weibo’s financial results in 2021, Weibo had 530 million active users monthly, and most of them are Generation Z [2]. It has become an important way for the public to obtain, share and disseminate information, and the Weibo trending is the basis for determining social hot spots. “Weibo Trending”, the hot news and information posting function of the Weibo platform, represents the topics and news that the public care about most. The platform pushes a certain amount of health information every day on trending, especially those from mainstream media, such as news or science articles. Therefore, it gives Generation Z who uses Weibo a lot of opportunities to access health information posted by mainstream media and get the health knowledge they need.

However, whether these health messages published by mainstream media have an impact on the health behavior intention of Generation Z? One of the health topics with high attention on Weibo is the phenomenon of young people’s behavior of staying up late. According to the “2021 Chinese Young People Staying Up Late Report”, the behavior of staying up late which covers 94.48% of young people was defined by the World Health Organization as one of the most significant cancer-causing factors, and this behavior can also cause severe damage to the cranial nerves [3]. Fortunately, Generation Z seem to start realizing the dangers of staying up late and begin to pay attention to the health news and information tweeted on Weibo. Current research on online health communication indicates that health communication on Weibo has an impact on users, and a study of health communication on Weibo has found that health messages posted by accounts do have a positive impact on users’ perceptions and attitudes [4]. Based on this, mainstream media expects to appeal to Generation Z to understand the dangers of staying up late and change their behavior intention by posting health messages on the most popular social media platform in China ---Weibo. Therefore, this study needs to investigate how exactly the content affects it and how influential it remains.

## 1.2. Research Gap

From the current situation of domestic and foreign research, the quantitative analysis on the impact of sleep-related health information posted by mainstream media on social media platforms about Generation Z’s staying up late behavior is still in a blank stage. Most foreign studies have analyzed how to access online health information and its healthy communication effects [5]. Moreover, domestic and international studies on the effect of health communication on social media mainly focus on macro health communication issues such as the new crown epidemic and HPV, depression, etc. But there is a lack of research about the effect of staying up late behavior intention on Generation Z. In the context of the information age, mainstream media, as powerful media with strong social influence and wide coverage, are most often pushed to the users with health information about staying up late, but no research has been conducted to conclude what specific kind of content has a greater impact on Generation Z. Therefore, based on the existing research results on the effects of social media health communication, this study takes the Weibo as a representative example of social media platforms in China to investigate the following questions --- how and what factors influence the behavioral intentions of Generation Z on the health messages posted by mainstream media about staying up late?

## 1.3. Fill the Gap

This research takes the health information posted by mainstream media on Weibo as the research object and analyzes whether the information impact Generation Z’s intention of staying up late

through the questionnaire survey method. In addition, this study explores the ways in which the health information affects the behavior intention of Generation Z and investigates other moderating factors that may be involved. Based on the literature related to social media health communication, this paper uses the Extended Parallel Process Model (EPPM), which is frequently used in health communication issues to analyze how the health tweets influence the behavior intention of staying up late in Generation Z. This study aims to suggest ways to improve the effectiveness of health communication in mainstream media on social media platforms to better guide Generation Z on reducing behaviors of staying up late and developing other health awareness and behaviors. It is also expected to provide some inspiration to scholars who want to explore related topics in the future.

## 2. Literature Review

### 2.1. Definition and Development

Health communication has been one of the most popular topics in academic research. Regarding the concept of health communication, Rogers, a famous American scholar, proposed in 1994 that health communication is a way to transform medical knowledge into easily acceptable health information in a popular way that aims to change people's attitudes toward health issues and their health behavior [6]. In view of the current characteristics of the Internet era and the new generation of youth (Generation Z), social media has become an important medium for health communication. There are also many studies on the health communication effect of social media platforms recently.

In the field of health communication, foreign scholars proposed many theoretical models to explain the pathways of health communication. One of the most famous models is EPPM, which is also used in this study. The following part will explain the definition and development of EPPM.

Fear is a negative emotion triggered by an individual's perception of a serious and associated threat. Accompanied by a high degree of arousal, fear is more likely to be evoked from the feeling of danger and threat, which can lead to changes in health attitudes and behaviors [7]. EPPM is essentially a communication strategy aimed at persuasion and convincing. This model uses fear as a means of persuasion to raise self-awareness of risky behaviors and potential threats by evoking fear in people's minds. EPPM generally includes two types of messages: threat messages and effectiveness messages. Threatening messages are used to drive and persuade audiences by evoking their fear. Efficacy messages provide audiences with a sense of security by telling them useful information. EPPM arose in the 20th century and was first used in AIDS prevention and control [8].

EPPM originated from Hovland's study on the effect mechanism of fear appeals in 1953. Janis summarized the "inverted U curve" in a dental care experiment—as the relationship between fear intensity and altered attitude. Then Hovland proposed the Drive Reduction Model (DRM), which was an early model of EPPM [9]. It presented that audience fears evaluate opinions of relieving fear which leads to the acceptance of opinions or the behaviors. In 1970, Leventhal proposed the Parallel Response Model (PRM) that distinguished between the cognitive and emotional dimensions of the impact of EPPM [10]. Later The PMT was proposed by Rogers in 1975, and Beck et al. further refined the PRM theory with him by proposing four core elements of fear appeals: susceptibility, severity, self-efficacy and response efficacy [11-12]. In 1992, White proposed the EPPM to fill the research gap of PMT and further pointed out that high threat and highly efficient information could persuade others better. And he also found threat elements contain both threat severity and threat susceptibility [13]. Until 2000, it found that the variables in the EPPM could have a direct effect on audience attitudes, behavioral tendencies and behaviors. Thus, the EPPM model is now widely used in health communication with the development of the Internet and the media.

## 2.2. Important Results

Many domestic and international scholars have used the EPPM theory to address some health communication issues, especially for the extension of the parallel processing model of fear appeals theory applied to the investigation of online health communication on people's attitudes and behaviors. Different scholars used EPPM to explore different health communication issues, and their findings prove that the four factors of self-efficacy, response efficacy, perceived susceptibility and perceived severity affect people's attitudes and behaviors in different situations. The pathways through which the four factors of self-efficacy, response efficacy, perceived susceptibility and perceived severity affect certain attitudes and behaviors differ.

In response to self-efficacy, some studies demonstrated that the self-efficacy of the audience brought by the health information provided by the media positively influences the audience's behavioral intentions. For example, scholar Roberto, A.J. had a study on the effect of perceived threat and efficacy on social distance behavior of college students during the COVID-19 pandemic, the results demonstrated the positive effect of self-efficacy in predicting intentions [14]. Also in a study by Yuan Jia, a domestic scholar, subjects with high self-efficacy were found to be more likely to accept health advice provided by smoking cessation PSAs [15]. Another study by Dai Songlin in China found that article titles containing “efficacy” had a significant effect on increasing the reading of cervical cancer news [16].

And for response efficacy, many scholars also pointed out that audience response efficacy to health information provided by the media tends to promote the adoption of health strategies by the users. For example, in a study on the fear appeals of traffic accident TV news to motorists, scholar Wang H.C. found that accident TV reports with effective driving advice could produce the best fear appeal effect on drivers in 2015 [17]. Chen, L. found a significant positive effect of perceived effectiveness on intention to quit smoking in a study on Chinese smokers' intention to quit smoking in 2021 [18]. Also, Yang, X. found a positive effect of media validity of fear appeal messages on behavioral intentions in a study of Chinese women's willingness to breast self-examine [19].

The positive effect of perceived susceptibility and perceived severity on people's behavioral intentions was also discovered in a large number of scholars' studies. Yang Qun also verified the positive effect of perceived disease susceptibility on usage attitude in a study of user acceptance behavior of health-based WeChat public numbers [20]. Such a hypothesis was also demonstrated in a study by Zhu Yimei [21]. In addition to demonstrating the positive effect of perceived susceptibility, the positive effect of perceived severity on one's attitudinal intentions has also been verified. For instance, Sheri Bastien explored the effect of health communication of HIV prevention messages on young people by using the EPPM and found that young people began to take HIV prevention and control seriously because prevention messages gave them a greater perception of severity [22]. In addition, Errett, N.A et al. also concluded that severity contributed to the willingness to respond to emergencies when they analyzed medical volunteers [23]. Sarrina Li, S., & Huang, L et al. also validated such findings, concluding that a certain level of “severity” threat information is beneficial in changing the attitudes and behaviors of information recipients in 2020 [24].

The above studies by domestic scholars using EPPM to detect the influence of online health communication on people's willingness and behavior reveal that online health communication has a certain influence on users' perceptions and attitudes, and the way of influence varies for different audiences. In analogy to these research processes and findings, this study use EPPM theory to investigate the effect of mainstream media health messages on the willingness of reducing staying up late on the largest social media platform in China and to investigate the ways and factors that specific health messages affect specific groups of people.

## 2.3. Summary

By browsing the literature about health communication and EPPM, it is clear that in the process of exploring the effects of health information on people's attitudes and behavior intentions, scholars tend to classify the variables into four categories---self-efficacy, response efficacy, perceived susceptibility and perceived severity. They determined how health information affects the audience's attitude by studying these four factors. Based on current research, it is concluded that most health communication affects people's emotions and attitudes by influencing their perceived severity. However, there are different ways to influence different people and behaviors. Therefore, this study refers to the EPPM and previous research to investigate the communication effect of health information about staying up late posted by mainstream media on domestic social media platforms. This paper focuses on Generation Z and figures out whether health information will change their willingness to reduce staying up late behavior. The research also designs a conceptual framework and questionnaire regarding the EPPM to investigate the influence path.

## 3. Methodology

### 3.1. Conceptual Framework

This study is based on the EPPM theoretical model. The EPPM model contains both perceived and efficacy aspects, which include four elements, namely severity, susceptibility, self-efficacy and response efficacy [13]. Therefore, this research refers to EPPM and sets the variables as self-efficacy (X1), response efficacy (X2), perceived susceptibility (X3) and perceived severity (X4). Whilst the dependent variable is set for the willingness to reduce the behavior of staying up late in this paper.

This paper proposes a conceptual framework based on EPPM (Figure 1), which assumes that the Generation Z might be motivated by the four variables as self-efficacy, response efficacy, perceived susceptibility and perceived severity. These four elements are predicted to have a positive impact on the willingness to reduce the behavior of staying up late in Generation Z.

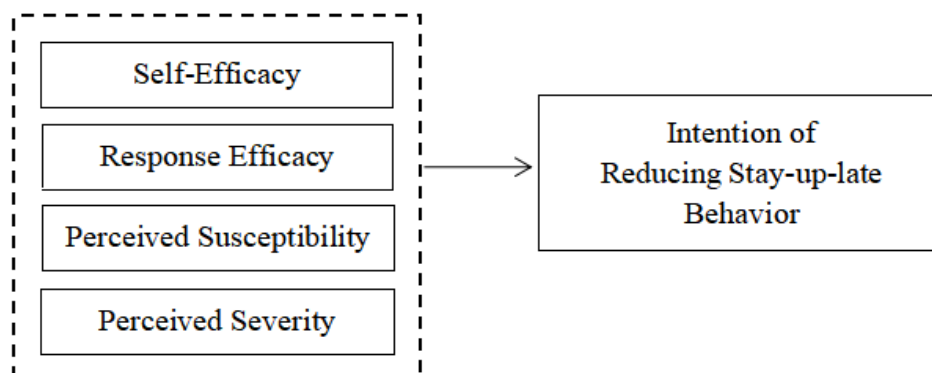


Figure 1: Conceptual framework.

### 3.2. Data Collection

This research chooses the questionnaire method for quantitative research. The questionnaire is suitable for quantitative description and analysis in the field of social sciences. This paper focuses on a relatively large group of Generation Z and the use of questionnaires allows for a clearer observation of the characteristics of health information acting on this group.

Therefore, this paper utilizes “Sojump” to design a questionnaire and focuses on the Generation Z’s intention of reducing stay-up-late behavior towards the health information released by mainstream media on Weibo.

The questionnaire is mainly measured using a 5-point Likert scale, and the questions are closely related to the health communication effects of mainstream media health communication and behavioral intentions regarding staying up late.

The first part is the description of the questionnaire, which explains the concepts of “mainstream media” and “health information about staying up late” by supporting examples so that participants can better understand them. The second part is the basic statistics of participants about their stay-up-late behavior. The third part investigates how often participants browse health information posted by mainstream media. It can reflect the dissemination and exposure of such information.

The fourth and fifth parts are the communication effect survey and the behavioral intention survey. These two parts both apply scales (Table 1) for independent and dependent variables which are based on a scale of a research called “the social media ‘Dr. Ding Xiang’ health communication effect” [4]. The response options are divided into “strongly disagree”, “disagree relatively”, “agree generally”, “agree relatively” and “agree strongly”, with scores of 1, 2, 3, 4 and 5, respectively.

The questionnaire with use “Sojump” to get the QR codes and web links, and was mainly distributed online. The questionnaire was distributed to Generation Z (the generation born between 1995 and 2009). 200 questionnaires were distributed, and 189 questionnaires were actually returned. After selecting, there were 136 questionnaires were finally meet the requirements of this study.

Table 1: Measurement scale.

Variables		Questions
X1	Self-Efficacy	I can find out that the behavior of staying up late is harmful by browsing the health information posted by mainstream media about staying up late.
		After reading the health advice about sleep posted by the mainstream media, I think I can do something to reduce my stay-up-late behavior.
X2	Response Efficacy	I think the health information about staying up late posted by the mainstream media is really helpful in changing my own behavior of staying up late.
		I think the health information posted by the mainstream media can let me know when to fall asleep is healthy and what sleep habits are better.
X3	Perceived Susceptibility	By browsing mainstream media for sleep health information, it is often easy for me to gain knowledge about healthy knowledge about sleep and perceive the dangers of staying up late.
		When I interact with mainstream media on Weibo, I can often quickly gain knowledge about healthy knowledge about sleep and the dangers of staying up late through the comments or sharing by others.
X4	Perceived Severity	When I see health information posted by the mainstream media about staying up late (e.g., A man died suddenly at work because of a long time staying up late), I worry about if I will suffer the same condition in the future.
		I think the health information posted by the mainstream media would make me more alert to the dangers of staying up late and worry about the possible negative condition of my own behavior of staying up late than the relevant information published by other media.



Table 1: (continued).

Y	Intention of Reducing Stay-up-late Behavior	By reading health information posted by mainstream media about staying up late, I begin to change my attitude toward staying up late behavior.
		By reading all this health information posted by mainstream media about staying up late, I start to feel that I need to reduce on my stay-up-late behavior.
		By reading this health information posted by mainstream media about staying up late, I am willing to go to bed early every day in the future when I have no special task.
		I think the health information posted by mainstream media is more trustworthy and more capable of changing my mind than the relevant information posted by other media.
		I think health information posted by mainstream media is easier for me to realize that staying up late is health harmful than that published by other media.
		I think health information posted by mainstream media is more likely to make me willing to reduce my late-night behavior than the relevant information published by other media.

### 3.3. Data Analysis

This study plan to use SPSS 24.0 to do descriptive and statistical analyses. In this paper, the descriptive analysis will be applied to indicate the condition of Generation Z's stay-up-late behavior and how often participants browse health information posted by mainstream media. Secondly, SPSS 24.0 is offered for statistical analysis, which includes reliability analysis, correlation analysis and regression analysis.

A total of 200 copies of this questionnaire were distributed and 189 were returned. The validity of the data was based on the age range of Generation Z (1995-2009), whether they use Weibo and whether they saw health information about staying up late posted by mainstream media. After selecting, there were 136 valid questionnaires. As shown in the Table 2, there are 84 women and 52 men, and their age distribution averaged from 1995 to 2009.

Table 2: Questionnaire sample.

		Number	Percentage	Total
Gender	female	84	61.8%	136
	male	52	38.2%	
Year of birth	1995-2000	50	36.8%	
	2001-2005	47	34.6%	
	2006-2009	39	28.7%	

## 4. Results

### 4.1. Reliability Analysis

Reliability is the stability of the scale, and the Cronbach's Alpha coefficient method is applied to evaluate the internal consistency of the scale. The reliability of the questionnaire is high and has good research value if the Cronbach's Alpha coefficient is over 0.7.

In this paper, the reliability is tested by SPSS 24.0. For the scale questions of the questionnaire, the survey data are divided into five parts for variables and the reliability analysis of these variables is conducted using SPSS 24.0. As seen in Table 3, Cronbach's Alpha coefficients are all greater than 0.7. It illustrates that the reliability of the variables and collected data are good.

Table 3: Reliability analysis.

Variables	Cronbach Alpha	Number of items
X1	0.731	2
X2	0.802	2
X3	0.787	2
X4	0.741	2
Y	0.919	6

## 4.2. Descriptive Analysis

The data collected in the second part of the questionnaire is shown in Table 4. It can be found that 34.44% of Generation Z go to bed over 23:00 almost every day, and 31.79% of Generation Z go to bed before 23:00 only 1 or 2 days a week. This reveals that more than half of the young people do not have the habit of going to bed early. Meanwhile, as shown in Table 5, 37.09% of Generation Z sleep less than 7 hours and 45.03% of them sleep around 7-8 hours. For Generation Z, a sleep time of 7 hours or more is healthier. However, there are still a significant proportion of Generation Z's sleep time less than 7 hours. This suggests that staying up late has become a common phenomenon in this group.

Table 4: Number of bedtimes before 23:00 in an average week.

The number of times you go to sleep before 23:00 in an average week	Percentage
0 times	34.44%
1-2 times	31.79%
3-5 times	20.53%
Almost every day	13.35%

Table 5: Average hours of sleep per day.

Average hours of sleep per day	Percentage
Less than 7 hours	37.09%
7-8 hours	45.03%
8-9 hours	15.89%
More than 9 hours	1.99%

In the part of the survey on their reasons for staying up late (Table 6), it illustrates that besides the reasons for hard tasks such as study or work, 88% of Generation Z choose to stay up late because of watching short videos on cell phones. Other reasons that are chosen more often were watching social platforms, watching movies and TV shows, playing games, chatting with friends, etc. At the same time, there is a considerable proportion of them stay up late habitually. This indicates that most of the reasons for staying up late can be regulated and arranged by people on their own. Except for the reasons of special tasks and insomnia, many people decide to stay up late because of their subjective will, which is also what the mainstream media wants to change.



Table 6: The most frequent causes of staying up late.

Reasons	Number of people
Study or work tasks	96
Swipe mobile short video app	88
Swipe Weibo and other social media platforms	64
Chat with friends	54
Watch plays and movies	58
Play games	57
No special reason, habitually stay up late	46
Insomnia	30
Other	7

The third part of the questionnaire investigated the level of exposure of Generation Z to health information posted by mainstream media. As shown in Table 7, 31.79% of Generation Z often see related information and 47.68% occasionally look at related information. This reveals that this type of information from mainstream media is widely spread on the Weibo platform. Meanwhile, according to Table 8, 52.21% of Generation Z can find related information 1-2 times a week, and another 25.74% see 3-5 pieces of related information a week. This indicates that the frequency of this type of information is still relatively high and Generation Z have more contact with related information.

Table 7: Whether you have ever seen health information on Weibo.

Whether you have ever seen health information about staying up late posted by mainstream media on Weibo	Percentage
Very often seen	31.79%
Occasionally seen	47.68%
Rarely seen	10.60%
Never seen	9.93%

Table 8: Frequency of seeing the health information on Weibo.

Whether you have ever seen health information about staying up late posted by mainstream media on Weibo	Percentage
More than 3 tweets can be seen per day	3.68%
See 1-2 tweets per day	13.97%
See 3-5 tweets per week	25.74%
Occasionally see 1-2 tweets per week	52.21%

In this paper, the questionnaire divides the information about staying up late posted by mainstream media into three categories----news, science content and discussion. About these three categories, through the survey, Generation Z are more exposed to information related to news and scientific introduction (Figure 2). However, they rarely see discussion tweets.

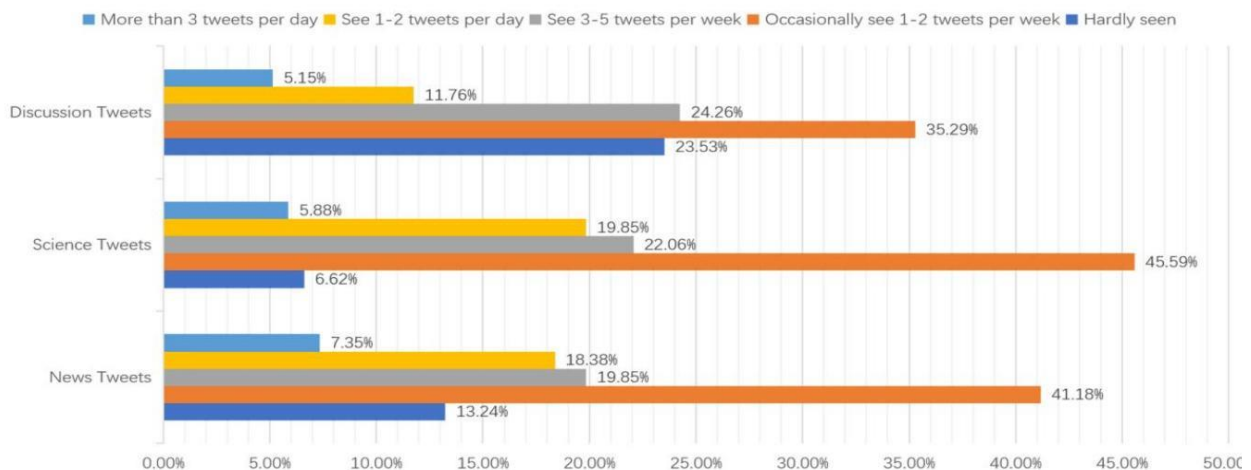


Figure 2: Frequency of seeing three types of health-related messages about staying up late.

When they were asked about which type they thought would effect their willingness more, 44.12% of them chose science content, and another 39.71% chose news content at that time(Figure 3). It is more in line with the type of information they often see and the type of information they like to see most.

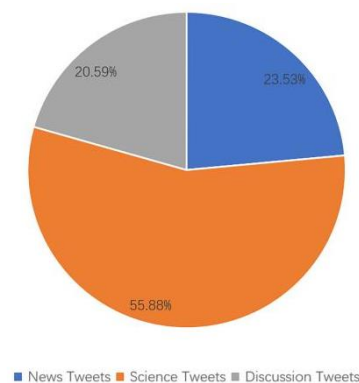


Figure 3: Which one makes you feel most like you need to reduce your late-night behavior.

#### 4.3. Dissemination Effect of Health Information Posted by Mainstream Media

This research utilizes correlation and regression analysis, and set self-efficacy, response efficacy, perceived susceptibility and perceived severity as independent variables and also set Generation Z's intention of reducing stay-up-late behavior as dependent variable. The research examined whether the effects of the independent variables on the dependent variables reached significance and which independent variables had greater predictive power on the dependent variables in this part.

Correlation analysis is used to test whether there is a correlation between the independent and dependent variables before conducting a regression analysis. If the correlation is found to exist after the analysis, the exact relationship between the variables needs to be further verified by regression analysis. Generally, when the value of significance  $p < 0.05$  between the variables, it means that there is a correlation between the variables.

The results of the correlation analysis of X1, X2, X3, X4 and Y are shown in Table 9. As shown in the table, the value of significance  $p$  for each variable is less than 0.01, which indicates that the correlation between four independent variables and dependent variable is very significant. And it can

be seen that the correlation coefficients are all greater than 0. It shows that the four variables are positively correlated with the dependent variable.

Table 9: Correlation.

		X1	X2	X3	X4	Y
Y	Pearson Correlation	.773**	.816**	.747**	.565**	1
	Significance p (two-tailed)	.000	.000	.000	.000	
	Number of cases	136	136	136	136	136

\*\*. Significant correlation at the 0.01 level (two-tailed).

Linear regression is a common analysis method used in research to analyze whether there is a correlation between two or more variables and the direction and strength of the correlation. In this study, linear regression is applied to verify the correlation of the data. Firstly, the R-squared represents the explanatory power of the independent variable for the dependent variable. If the  $R^2$  is close to 1, it represents presentation model fits well. Then if the significance is less than 0.05, it means that the regression equation is significant. Next, it can be shown in the coefficient table, where if the value of significance is less than 0.05, it indicates that the independent variable has a significant effect on the dependent variable. Lastly, the coefficient of each independent variable in the regression equation represents the the extent of the impact between independent variable and dependent variable. It can also be used to judge the positivity or negativity of that influence.

The collected data were subjected to regression analysis using SPSS 24.0, and the results are presented in Table 10, Table 11 and Table 12.

Table 10: Model Summary.

Models	R	$R^2$	Adjusted R-squared
1	.856 <sup>a</sup>	.733	.725

a. Predictor variables: (constant), X4, X1, X3, X2

Table 11: ANOVA<sup>a</sup>.

Models	Square and	Degree of freedom	Mean Square	F	Significance
Return to Residuals	1.087	4	.272	90.131	.000 <sup>b</sup>
	.395	131	.003		
Total	1.483	135			

a. Dependent variable: Y

b. Predictor variables: (constant), X4, X1, X3, X2

Table 12: Coefficient<sup>a</sup>.

Models	Unstandardized coefficient		Standardization factor	t	Significance
	B	Standard Error	Beta		
(Constant)	.380	.225		1.690	.093
X1	.374	.146	.317	2.560	.012
X2	.336	.154	.284	2.181	.031
X3	.151	.114	.126	1.317	.190
X4	.046	.009	.288	5.305	.000

a. Dependent variable: Y

From Table 10, the  $R^2$  is 0.733 and the adjusted  $R^2$  is 0.725, which suggests that the model is stable and fits well. As can be seen in Table 11, it can be found that the value of significance is less than 0.05 and it reveals that the regression equation is significant. Next, observing the coefficient in Table 12, it is obvious that the values of significance of X1, X2, and X4 are less than 0.05. It shows that the effect of X1, X2 and X4 on Y is significant. However, the significant value of X3 is 0.19 over than 0.05, which indicates that the effect of this variable on Y is not significant.

Through observing the coefficient in Table 7, the value of coefficient of X1, X2, X4 are greater than 0. This means that these three variables have a positive effect on Y.

## 5. Discussion

The conceptual framework of this study anticipates that self-efficacy, response efficacy, perceived susceptibility and perceived severity have an positive impact on the Generation Z's intention of reducing stay-up-late behavior. The results of the data analysis prove that the effect of self-efficacy, response efficacy and perceived severity on the intention of reducing stay-up-late behavior is significant, and these factors promote the willingness of Generation Z to reduce the behavior of staying up late. However, it formulates that perceived susceptibility is not significantly associated with Generation Z's intention of reducing stay-up-late behavior. The results suggest that the willingness to reduce their stay-up-late behaviors will increase when they are more aware of the severity of the fear appeal messages and the beliefs about the effectiveness of the recommended suggestions posted by mainstream media. In addition, when they are more aware of the usefulness of these health messages, they will be more likely to think about sleeping early. According to the results in the regression, this study observes that self-efficacy has the greatest effect on the dependent variable, followed by response efficacy. It indicates that the health advice provided by the media needs to be able to stimulate the self-efficacy of Generation Z and make them feel that the advice is reliable and they are capable of taking action, to be more likely to promote their willingness of reducing the behavior of staying up late.

However, the results of this study differ slightly from previous studies. In the article "Research on the effect of social media 'Dr. Ding Xiang' health communication", scholar Guo Qi concluded that "perceived severity" was related to the respondent's attitude and there was a correlation between perceived severity and respondents' attitude and willingness [4]. It overlaps with the findings of this study. Another researcher in China, Ren Zhe, took the study of "People's Daily" and concluded that a certain degree of "severity" and "self-efficacy" would affect people's acceptance of various health maintenance methods [25]. However, as mentioned in the previous section, the different survey respondents and platforms may lead to differences in the influence mechanism. In this paper, the

findings are different for the stay-up-late behavior of Generation Z on Weibo. In addition to concluding that self-efficacy and severity have a significant positive effect on the willingness of Generation Z to reduce their behavior of staying up late, this study also formulates that response efficacy is positively related to Generation Z's intention of reducing stay-up-late behavior.

Besides, according to the results of descriptive analysis, Generation Z, who use Weibo more often, pay more attention to health information released by mainstream media. In terms of the types of information content, the types of information that Generation Z are exposed to are more often in the categories of news and science content. Among them, they argue that science content promotes their willingness to reduce staying up late, which is consistent with the type of information they are most access to.

Based on the above analysis, the mainstream media can draw the attention of Generation Z to the possible disease risks by appropriately highlighting the health hazards of staying up late. At the same time, the media should provide more feasible and effective prevention strategies to avoid the disease threat caused by staying up late, as well as sleep science and health knowledge to promote the attitude and willingness of Generation Z to reduce stay-up-late behavior. Therefore, due to the development of new media, mainstream media can use social media platforms to enhance the number of health messages and increase the frequency of sleep health topics on social media platforms to promote more attention from the audience.

## 6. Conclusion

### 6.1. Conclusions and Suggestions

With the development of Internet technology, social media platforms represented by Weibo are gradually replacing traditional media. Mainstream media are taking advantage of their speed of communication and interactivity to disseminate health information such as sleep-related information. Generation Z refer to the generation born between 1995 and 2009, whose distinctive feature is that they were born in the internet age. Based on this, this study investigates the effect of health information posted by mainstream media on social media platforms on the willingness of Generation Z to reduce their stay-up-late behavior. This study applies questionnaires to explore the pathways of influence and draw conclusions.

This study utilizes the EPPM for research model design. The four elements of the EPPM, self-efficacy, response efficacy, perceived susceptibility and perceived severity, are applied as the four independent variables in this study. The hypothesis is assumed that Generation Z's intention of reducing stay-up-late behavior would be affected by these four elements and this paper designs a questionnaire scale and collected data for correlation analysis and regression analysis. The analysis of the data reveals that self-efficacy, response efficacy, and perceived severity have a significant positive effect on the willingness of Generation Z to reduce their stay-up-late behavior, which is in line with part of the hypothesis put forward in this paper. It can be seen that self-efficacy has the greatest effect on behavioral intentions, followed by response efficacy and perceived severity. The findings show that perceived susceptibility has no significant effect on the behavior intention, which is different from previous studies' conclusions.

There is a difference in the types of health information that Generation Z are exposed to, mainly news and popular content. At the same time, Generation Z have a more positive attitude towards scientific information and asserts that such information has the most significant impact on their willingness to reduce stay-up-late behavior. Therefore, there are some suggestions that can be provided for health communication on social media platforms and mainstream media through the survey results of this research. For mainstream media, they can highlight the health risks of stay-up-late behavior and provide more feasible prevention strategies for Generation Z to avoid the disease

hazards caused by staying up late. As for social media, they can also push news and science content posted by the mainstream media through trending and increase the frequency of those topics on social media platforms to promote more attention from Generation Z.

This paper has certain theoretical and practical implications. In terms of theoretical significance, although domestic scholars currently have some research base on health communication on the Weibo platform, there is no research on mainstream media's impact on staying up late behavior intention. This study explores another research perspective on social media health communication and also identifies differences in the effects of self-efficacy, response efficacy, perceived susceptibility and perceived severity on the willingness of Generation Z to reduce stay-up-late behavior. And the findings of this study will help mainstream media to communicate more effectively in terms of health communication related to stay-up-late behavior intention. This paper also suggests that this health communication could reduce their stay-up-late behavior efficiently and develop a healthier lifestyle.

## 6.2. Limitations and Prospects

Due to time constraints, this study only considers the effect of health information posted by mainstream media on the willingness of Generation Z to reduce their stay-up-late behavior by applying the EPPM model. This study also doesn't address the effect of health information on their actual behavior. In addition, only the mainstream and the largest social media platforms in China are surveyed. This study has some implications for the studies about the health communication of mainstream media on other platforms. However, the exact model of influence needs to be further studied and the reasons for the lack of significant correlation between perceived susceptibility and behavioral intention in this study also need to be further investigated. It is hoped that this study will be useful for scholars to study the dissemination of health information on Weibo in the future.

## References

- [1] Calixte, R., Rivera, A., Oridota, O., Beauchamp, W., & Camacho-Rivera, M. (2020). Social and demographic patterns of health-related Internet use among adults in the United States: a secondary data analysis of the health information national trends survey. *International Journal of Environmental Research and Public Health*, 17(18), 6856.
- [2] Tang, Y. F. (2021). On the operation mechanism and improvement path of hot microblogging search. *Media* (24), 51-53.
- [3] Ai J., Zhang B.F., Huang W.X.n, Zou M.X, Lu Z. L. & Huang Y.X. (2021). The relationship between retaliatory is staying up late and cell phone addiction and time management among young students. *Journal of Hebei Youth Management Cadre College* (02), 15-18.
- [4] Guo Q. (2020). Research on the effect of social media on "Dr. Ding Xiang" health communication (Master's thesis, Dalian University of Technology). Retrieved from <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202101&filename=1020303087.nh>
- [5] Finney R., Blake, K.D., Greenberg-Worisek, A.J., Allen, S.V., Moser, R.P., & Hesse, B.W. (2019). Online Health Information Seeking Among US Adults: Measuring Progress Toward a Healthy People 2020 Objective. *Public Health Reports*, 134, 617 - 625.
- [6] Rogers EverettM. (1994). The Field of Health Communication Today. *American Behavioral Scientist*: 208-214.
- [7] Dillard, J. P., & Anderson, J. W. (2004). The role of fear in persuasion. *Psychology & Marketing*, 21(11), 909-926.
- [8] Stanton, B., Black, M., Feigelman, S., Ricardo, I., Galbraith, J., Li, X., ... & Nesbitt, R. (1995). Development of a culturally, theoretically and developmentally based survey instrument for assessing risk behaviors among African-American early adolescents living in urban low-income neighborhoods. *AIDS Education and Prevention*.
- [9] Hovland, C. I., Janis, I. L., & Kelley, H. H. (1953). *Communication and persuasion*. Leventhal, H. (1970). Findings and theory in the study of fear communications. *Advances in experimental social psychology*, 5, 119-186.
- [10] Leventhal, H. (1970). Findings and theory in the study of fear communications. *Advances in experimental social psychology*, 5, 119-186.
- [11] Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change1. *The journal of psychology*, 91(1), 93-114.



- [12] Beck, K. H., & Lund, A. K. (1981). *The effects of health threat seriousness and personal efficacy upon intentions and behavior I. Journal of Applied Social Psychology*, 11(5), 401-415.
- [13] Witte, K. (1992). *Putting the fear back into fear appeals: The extended parallel process model. Communications Monographs*, 59(4), 329-349.
- [14] Roberto, A.J., Zhou, X., & Lu, A.H. (2021). *The Effects of Perceived Threat and Efficacy on College Students' Social Distancing Behavior during the COVID-19 Pandemic. journal of Health Communication*, 26, 264 - 271.
- [15] Yuan, J. (2013). *The influence of fear appeal mode on the communication effect of tobacco control PSAs. Master's thesis, Ningbo University. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201402&filename=1014030463.nh*
- [16] Dai S.L., Yang M.Y.. (2021). *Content analysis of cervical cancer news on WeChat public websites based on the new parallel process model: the example of "Health Times"and "Life Times". New Media Research*, 11, 14-19.
- [17] Wang, H.C. (2015). *Research on the effect of traffic accident TV news on motorists' fearappeal. Master's thesis, Chengdu University of Technology. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201601&filename=1015312531.nh*
- [18] Chen, M., & Chen, L. (2021). *Promoting Smoking Cessation in China: Using an Expansion of the EPPM with Other-oriented Threat. Journal of Health Communication*, 26, 174 -183.
- [19] Chen, L., & Yang, X. (2018). *Using EPPM to Evaluate the Effectiveness of Fear Appeal Messages Across Different Media Outlets to Increase the Intention of Breast Self-Examination Among Chinese Women. Health Communication*, 34, 1369 - 1376.
- [20] Yang Q. (2017). *An empirical study on user acceptance behavior of health WeChat public websites.Master's thesis, Jinan University. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201801&filename=1017866260.nh*
- [21] Zhu Y.M. (2019). *Research on factors influencing college students' willingness to use health apps consistently.Master's thesis, Zhengzhou University. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201902&filename=1019128847.nh*
- [22] Sheri B. (2011). *Fear appeals in HIV-prevention messages: young people's perceptions in northern Tanzania. African Journal of AIDS Research*, 435-399.
- [23] Errett, N.A., Barnett, D., Thompson, C.B., Tosatto, R., Austin, B., Schaffzin, S., Ansari, A., Semon, N.L., Balicer, R.D., & Links, J.M. (2013). *Assessment of medical reserve corps volunteers' emergency response willingness using a threat- and efficacy-based model. biosecurity and bioterrorism: biodefense strategy, practice, and science*, 11 1, 29-40.
- [24] Sarrina Li, S., & Huang, L. (2020). *Fear appeals, information processing, and behavioralintentions toward climate change. Asian Journal of Communication*, 30, 242 - 260.
- [25] Ren Z. (2017). *Research on health communication from the perspective of fear appeal theory - taking the column of "Nutrition Sense Hall" of People's Daily Online as an example. New Media Research (14)*, 22-23.