Structural Equation Model for Evaluating Factors Affecting Cyber-Violence of College Students

Yongwei Yang, and Qiqi Li

Abstract—**As the main entertainment place for human beings, the hidden problems of the Internet are becoming more and more obvious, of which cyber-violence is one of the most typical problems at present. When studying the factors that influence cyber violence, various technologies and methods are used to explain the relationships between specific variables. Unexpectedly, the structural equation model (SEM) has acquired very little concern in factors affecting cyber-violence incidents. In order to solve the limitations of this knowledge body, this study is to establish a model by using structural equation modeling to determine the key factors affecting college students' cyber-violence. In this paper, by designing a questionnaire to obtain relevant data, five potential influencing factors of cyber violence are quantified, including netizens' behavior factors, moral sentiment factors, netizens' psychological factors, social environment factors and behavior analysis factors. On the basis of excavating the multi-layer complex interactive relationship between the influencing factors of cyber violence, ten hypothetical relationships are established and compared by using a structural equation model. Through the analysis of the influencing factors of cyber-violence, it is recognized that reasonably guiding cyber groups is one of the important way to solve extreme mass incidents.**

Index Terms—**Cyber-violence, Influencing factor, Structural equation model, College student.**

I. Introduction

WITH the large-scale popularization of computers, the Internet has provided a strong support for the new development of the social models.

Around the world, there are over 5 billion Internet users, making the Internet a pivotal element in day-to-day life. Youths, particularly, are connected to the Internet 24/7, and Chinese youth are no exception, with teenagers spending over 30 hours a week online. In February, 2022, China Internet Network Information Center issued the 49th "Statistical Report on the Development of Internet in China". The report showed: "By December 2021, the number of Internet users in China had reached 1.032 billion, an increase of 42.96 million compared with December 2020, and the Internet penetration rate has reached 73.0%". From the perspective of professional structures, students account for the largest proportion among Internet users in China. Generally speaking, college students have become the main force of network platforms because of their strong ability to accept new things and high internet frequency. The report shows that the fast-growing information age determines that the Internet has a growing influence of the daily life and study of college students in China [1]. The characteristics of network public opinion, such as "suddenness, diversity, interaction, conflict and anonymity", have brought great challenges to the construction of an honest network public opinion ecology.

Generally, violence refers to the act of using force against the body, property and spirit of other people. It affects the well-being and health of societies. The perpetrator of violence experiences pleasure in violating others most of the time. In order to reduce the degree of domestic violence, Leal-Enríquez and Gutiérrez-Antúnez put forward a detailed questionnaire to determine the possible domestic violence scenarios by mathematical model [2]. Ye et al. aimed to investigate the prevalence of of childhood sexual violence among university students, and assessed their associations with depressive symptoms. They found that the prevalence of childhood sexual violence experience among university students was 4.8%, 7.3% for female students and 1.8% for male students [3]. Different from the traditional violence, cyber-violence refers to a class of words, texts, pictures, videos and other related behaviors published by users with the characteristics of "defamatory, slanderous, infringing on reputation, damaging rights and interests, and incitement" on the Internet [4]. These behaviors cause harm to the reputation, privacy, rights and interests and spirit of others. In December, 2020, the Central Committee of the Communist Party of China issued the "Implementation Outline of Building a Society Ruled by Law (2020-2025)", which made "governing cyberspace according to law" an important content of building a society ruled by law. Although the national and local governments have issued various laws and regulations to deal with cyber violence, when cyber violence occurs, it is still difficult to stop and control it in the first time. For college students in China, while enjoying the convenience of the Internet, they have also experience the influence of negative behavior of the Internet. There are some large-scale national youth surveys that have studied cyber bullying and cyber dating violence. The rate of online harassment nearly doubled in a decade, from 6% in 2000 to 11% in 2010, and the total incidence of cyber-violence among college students is 59.47% [5]. In violent cases, the exploited people are under long-term fear and pressure, which leads to discordant experience and lowers their interest in learning. Cyber-violence is not only detrimental to the cultivation of college students' social core values, but also easy to encourage college students' ideological violence tendency, cyber-violence among university students are not negligible [6].

Cyber-violence is described as online actions that assault or endanger a persons physical, psychological, or emotional well-being, whether it is a criminal offence or a non-

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criminal offence [7]. In previous studies, it can be found that many people have discussed the influencing factors of cyber-violence. Through a review of the current literature on social media use in teacher education, and a multi-disciplinary perspective on issues of cyber-violence, Nagle discussed the ethical implications for teacher educators who want to use Twitter as a pedagogical tool and offered strategies to develop critical social media literacy practices [8]. To investigate the relationship of childhood trauma with cyberbullying and cyber victimization levels, Akarsu et al. conducted a study with 350 students studying at the health sciences and medical faculty of a university in Istanbul, and they found that there is a significant positive correlation between cyber victimization and cyberbullying levels [9]. In research related to aggression, people focus on the emotional experience of anger. Zheng et al. investigated the mediating role of anger rumination in the association between online violent video games and online aggressive behavior, and the moderating role of self-control in the relationship between anger rumination and online aggressive behavior. They suggested that the improvement of self-control and the decline of anger rumination could be a practicable way to address the issue of online aggressive behavior effectively [10]. In order to provide an empirical test of the victim-offender overlap in online platforms, Choi and Lee analyzed two types of cyberinterpersonal violence: cyberharassment and cyber-impersonation. They revealed three main findings: (1) respondents who engage in risky online leisure activities are more likely to experience interpersonal violence in cyberspace, (2) poor online security management can contribute to the likelihood of being victimized by interpersonal violence on social networking sites, (3) respondents who engage in risky social networking site activities are likely to commit cyber-interpersonal violence [11]. Based on accessibility, Zhou et al. used the convenient cluster sampling technology to recruit 855 college students from five universities in mainland China, and examined the prevalence of cyberbullying and the mediating effect of moral disengagement in the relationship between big five personality traits and cyberbullying [12].

With the threat of violence around the world, many literature reviews examined the influencing factors of violence behavior. Saman et al. developd the SEIR model to deal with online game addiction, identify optimal control strategies through guidance and counseling for students addicted to online games, as well as to analyze and simulate models to predict the proportion of students who manage their online game addiction and those who do not [13]. Kita et al. used the data for primary caregivers of children younger than 6 years old across Japan, and tested the moderating effects of the use of childcare services on the relationships among intimate-partner violence, children's quality of life, family function, and caregivers' depressive symptoms by the multiple-group structural equation modeling [14]. With researchers paying more and more attention to the cyber violence of college students, there are various hypotheses about the factors affecting cyber-violence. The existing literature shows that internet users' behavior factors, moral sentiment factors, internet users' psychological factors, social environment factors and behavior analysis factors can predict college students' tendency to cyber-violence. Academic circles have not systematically studied the influence of these factors on cyber-violence, and the structural equation model (SEM) has paid little attention to the influencing factors of cyber-violence. In this study, we put forward ten hypotheses, and based on the conceptual framework, we use advanced multivariate analysis method to analyze the influencing factors and test the causal relationship. By analyzing the influencing factors of cyber-violence and the relationship between cyber-violence and college students' cyber behavior, it is hoped that the ideological and political construction of college students can be improved and the harm of cyber-violence to college students can be reduced.

II. Preliminaries

The structural equation model (SEM) is a multivariate statistical analysis technique, and it is used to analyze the structural relationships or causal relationships between the observed variables and unobserved (latent) variables ([15], [16]). These variables are connected by paths that express the influence direction of these factors. According to the designed questionnaire, the variable that can directly observe the data is called the observed variables (generally represented by a rectangle in the diagram). For some concepts such as psychology, education and society, it is difficult to directly and accurately measure, the type of variables called latent variables (generally represented by an ellipse in the relationship diagram), such as learning motivation, family socio-economic status, and so on. Latent variables can only be measured indirectly by some observable indicators. Traditional statistical methods can not effectively deal with these potential variables, while the structural equation model can deal with potential variables and their indicators at the same time. The general SEM consists of two parts: a measurement model and a structure model, as shown in Figure 1. The measurement model evaluates the relationship between latent variables and measurement indicators, which is also called confirmatory factor analysis (CFA) models, while the structural model describes the relationship between latent variables, excluding measurement indicators of latent variables.

The variables in the structural equation model are classified into exogenous latent variables and endogenous latent variables. Exogenous latent variables are not affected by other variables in the model, but they can influence other variables. Endogenous latent variables are affected by other variables in the model.

The measurement model mainly reflects the relationship between latent variables and observed variables (see Figure 2). The calculation formula for the measurement model is as follows:

$$x = \Lambda_x \xi + \delta, \quad y = \Lambda_y \eta + \varepsilon,$$

where x is a vector composed of the observable variables of the exogenous latent variable, y is a vector composed of observable variables of endogenous latent variables, Λ_x is a relationship matrix between exogenous latent variables and exogenous observed variables, Λ_y is a relationship matrix between endogenous latent variables and endogenous observed variables, δ is a error value of exogenous latent variables, ε is a error value of endogenous latent variables.

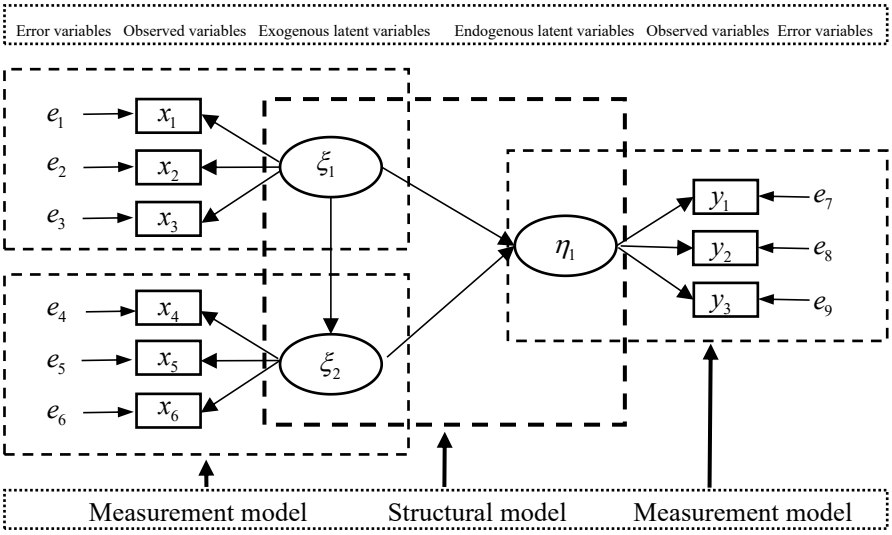

Fig. 1. Measurement model and structural model diagram

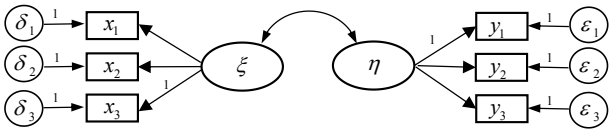

Fig. 2. The relationship between latent variables and observed variables

The structural model reflects the relationship between exogenous latent variables and endogenous latent variables, and the calculation formula for the structural model is as follows:

$$\eta = B\eta + \Gamma\xi + \zeta,$$

where B is the influence relationship between endogenous latent variables, Γ is the influence relationship between exogenous latent variables and endogenous latent variables, and ζ is the residual of endogenous latent variables.

III. Construction and Identification of the Structural Equation Model for Cyber-Violence

The following abbreviations have been used in this article.

AVE	Average Variance Extracted
CA	Cronbach's Alpha
CR	Composite Reliability
DF	Degrees of Freedom
CMIN	Chi-Square
GFI	Goodness-of-Fit Index
RMSEA	Root Mean Squared Error of Approximation
NFI	Normalised Fit Index
CFI	Comparative Fit Index
AGFI	Adjusted Goodness-of-Fit Index
PGFI	Parsimony Goodness of Fit Index
RMR	Root Mean Square Residual
SRMR	Standardized Root Mean Square Residual
MI	Modification Indices

The structural equation model is a kind of confirmatory model analysis, which analyzes the degree of difference between the covariance matrix in the sample data and the covariance matrix in the structural model. The analysis steps of the structural equation model are shown in Figure 3. In this section, we analyze the phenomenon of cyber-violence based on the structural equation model. Firstly, according to the problems in the questionnaire design, the observed variables and latent variables are found, and the path diagram of the structure model is drawn. Then, the confirmatory factor analysis of the structural model is carried out to ensure the fitting.

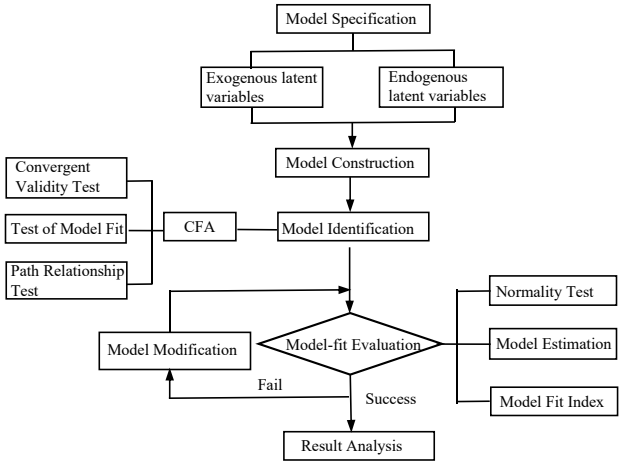

Fig. 3. Analysis steps of the SEM model

A. Preliminary list of factors and data collection

After a comprehensive and detailed literature review, the latent variables and observed variables affecting cyber-violence are depicted in Table I.

This questionnaire is designed on the platform of Questionnaire Star, and it mainly consists of two parts. The first part includes the personal information of the interviewees, and the second part includes the main part of the questionnaire.

The second part is divided into five categories according to the nature of the factors: behavior of netizens (A), moral sentiment (B), psychology of netizens (C), social environment (D) and behavior analysis (F). Most of the respondents were students from universities in Henan province, China. Finally, we received a total of 452 questionnaires, of which 448 questionnaires were valid, and the response rate of the questionnaire reached 99.1%. The basic information of

TABLE I
POTENTIAL VARIABLES AND OBSERVATIONAL VARIABLES OF CYBER-VIOLENCE

Potential Variables	Observational Variables
Behavior of Netizens A	Express negative emotions on the Internet A_1 Venting real-life grievances online A_2 When speaking online, speak freely A_3 Prefer to speak while anonymous A_4
Moral Sentiment B	Sympathy for the person involved in the cyber-violence incident B_1 Disgust with the person involved in the cyber-violence incident B_2 Respect for those who actively post in the cyber-violence incidents B_3
Psychology of Netizens C	Advocate justice for social events on the Internet C_1 Negative emotions often arise from things in life C_2 Hope to gain recognized on the Internet C_3
Social Environment D	Focus on hot social topics D_1 Difficult to judge the authenticity of network information D_2 Comment on social hot issues on the Internet D_3
Behavior Analysis F	Forwarded unconfirmed statements F_1 Made uncivilized remarks F_2 Like someone's extreme comments F_3 Have a clear position on social hot issues F_4

TABLE II
ANALYSIS OF THE RELIABILITY OF THE QUESTIONNAIRE DATA

	Cronbach's Alpha	Normalized Cronbach's Alpha
Overall Questionnaire	0.8629	0.8593
Behavior of Netizens	0.8338	0.8345
Moral Sentiment	0.6571	0.6630
Psychology of Netizens	0.6518	0.6606
Social Environment	0.6008	0.6098
Behavior Analysis	0.7766	0.7596

448 respondents was analyzed, including 30.56% males and 69.44% females.

It is necessary to test the reliability and validity of the data obtained by the questionnaire survey, so as to judge the validity and stability of the questionnaire data, and provide guarantee for the subsequent inspection process.

Cronbach's Alpha and Composite Reliability (CR) are structural reliability for internal consistency evaluation.. Nevertheless, compared to the Cronbach's Alpha, CR is considered to be a better internal consistency assessment, because it retains the standardized load of the observed variables [17]. From the analysis results in Table II, we can know that the alpha value of Cronbach's alpha value of the overall questionnaire is 0.8593, which meets the reliability standard of questionnaire. The Cronbach's alpha vlaue of each variable is greater than 0.6, which indicates that the internal stability of each variable in the questionnaire is good. It shows that the overall reliability of the questionnaire is high, and the questionnaire has passed the reliability test.

B. Research hypothesis of the SEM for cyber-violence

Based on previous literature and theoretical examination, the following reasonable hypotheses are generated, which are very vital for modeling in the SEM.

Hypothesis $H1$: Netizens' behavior is a factor that has a significant and positive effect on moral sentiment.

Hypothesis $H2$: Netizens' behavior is a factor that has a significant and positive effect on netizens' psychology.

Hypothesis $H3$: Netizens' behavior is a factor that has a significant and positive effect on social environment.

Hypothesis $H4$: Netizens' behavior is a factor that has a significant and positive effect on behavior analysis.

Hypothesis $H5$: Moral sentiment is a factor that has a significant and positive effect on netizens' psychology.

Hypothesis $H6$: Moral sentiment is a factor that has a significant and positive effect on social environment.

Hypothesis $H7$: Moral sentiment is a factor that has a significant and positive effect on behavior analysis.

Hypothesis $H8$: Netizens' psychology is a factor that has a significant and positive effect on social environment.

Hypothesis $H9$: Netizens' psychology is a factor that has a significant and positive effect on behavior analysis.

Hypothesis $H10$: Social environment is a factor that has a significant and positive effect on behavior analysis.

Based on the above assumptions, a model of influencing factors of cyber-violence is constructed (as shown in Figure 4). According to the influence of moral sentiment, netizens' psychology and social environment on netizens' behavior and behavior analysis, three external latent variables and two internal latent variables are designed.

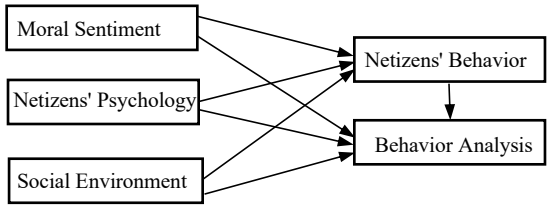

Fig. 4. Hypothetical path diagram

C. Construction of the path relation diagram

According to the questionnaire design and theoretical analysis, we consider $A_1, A_2, A_3, , F_3, F_4$ as observation variables, and A, B, C, D, F as latent variables. In the AMOS software, the path coefficient of the error of the observed variable is 1 by default, and there must be one variable in a set of observed variables whose path coefficient is 1. According to the relationship among variables, the path diagram of SEM model can be drawn in AMOS software (see Figure 5).

D. Identification of the SEM

After the model setting is completed, the model still can not be directly used for data analysis. In structural equation modeling analysis, the model identification means that there is enough known information to infer the degree of unknown values, which mainly depends on the number of parameters to be fitted and the available data.

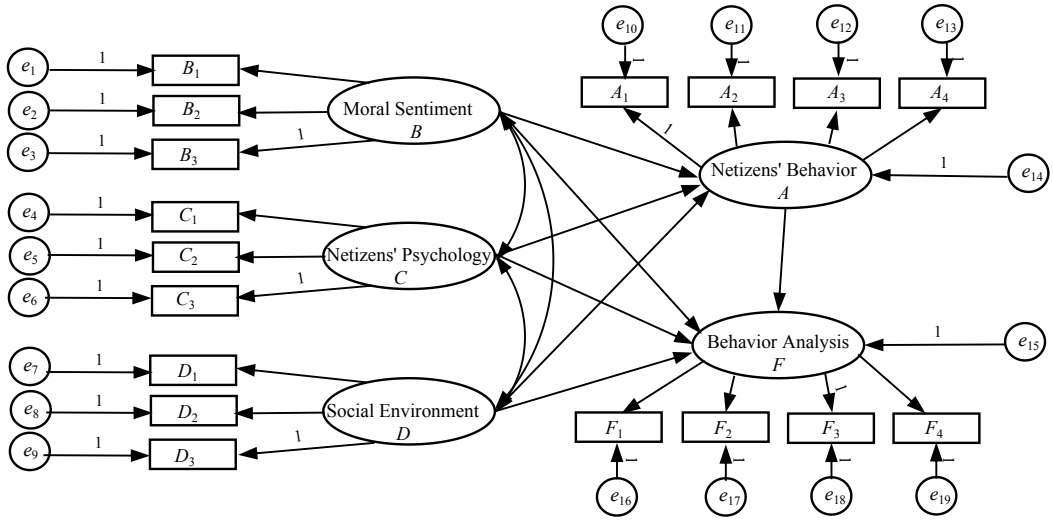

Fig. 5. The path relation diagram for cyber-violence

TABLE III
NORMALITY TEST OF THE SAMPLE DATA

Variable	Min	Max	Skewness	Kurtosis	CR
A_1	1	5	0.574	-0.213	-0.922
A_2	1	5	0.526	-0.141	-0.61
A_3	1	5	0.576	0.124	0.537
A_4	1	5	-0.232	-0.431	-1.862
B_1	1	5	-0.38	0.757	3.272
B_2	1	5	-0.112	-0.025	-0.107
B_3	1	5	-0.109	-0.368	-1.589
C_1	1	5	-0.113	0.456	1.972
C_2	1	5	0.169	-0.325	-1.404
C_3	1	5	-0.438	0.774	3.345
D_1	1	5	-0.584	0.58	2.507
D_2	1	5	-0.231	-0.312	-1.349
D_3	1	5	0.007	-0.033	-0.144
F_1	1	5	0.561	-0.535	-2.311
F_2	1	5	0.697	-0.284	-1.226
F_3	1	5	0.661	-0.294	-1.272
F_4	1	5	-0.179	0.588	2.539

TABLE IV
ESTIMATION OF THE MODEL

Computation of Degrees of Freedom		Result	
Number of Distinct Sample Moments	153	Chi-Square	342.245
Number of Distinct Parameters to be Estimated	44	Degrees of Freedom	109
Degrees of Freedom (44-153)	109	Probability Level	0.000

The maximum likelihood estimation is the most widely used parameter estimation method, which is based on the maximum likelihood principle. In the process of building a structural equation model, the maximum likelihood estimation method is selected for parameter estimation. However, the maximum likelihood estimation method requires that the collected sample data conform to the normal distribution.

All the data collected from the questionnaire on cyber violence are tested for normality by AMOS software. Table III provides a comprehensive explanation of the descriptive statistics such as min, max, kurtosis, CR, and skewness. It can be concluded that the skewness coefficients and kurtosis coefficients of these observation data are between -1 and $+1$, which shows that the normality assumption of the collected data is effective.

According to the model estimation in Table IV, the probability level values are all greater than 0.01, indicating that there are significant differences between the actual data and the hypothetical model, that is, the actual data does not support the hypothetical model. There are two reasons for this: either the assumed model is unreasonable or the analysis of AMOS software is very sensitive to the sample size. In the structural equation model, a relatively large sample size is usually required.

At this time, it is easy to produce a larger chi-square value, which is easy to lead to the rejection of the hypothetical model. Here, CMIN/DF (the ratio of Chi-square value to degree of freedom) represents the goodness of fit statistic of likelihood ratio chi-square. If the value of CMIN/DF is less than 5, it indicates that the structural model is identifiable. It can be seen that the CMIN/DF value of our model is 3.14, which is less than 5, so the structural model can be identified.

E. The goodness-of-fit degree of the SEM

The parameters are estimated by using the maximum likelihood estimation method, and the estimated variable relationship is obtained. According to the latent variables and the observed variable relationship, the SEM model path relationship diagram can be drawn (see Figure 6).

If the model can not be fitted, or the fitting degree is not high, the model needs to be reconstructed. The higher the fitting degree is, the stronger the usability of the model, and the more valuable the parameter estimates. Different goodness-of-fit indices are collected to confirm the adequacy of the SEM [18]: Chi-square (CMIN); Degree of Freedom (DF); the ratio CMIN/DF; Goodness-of-Fit Index (GFI);

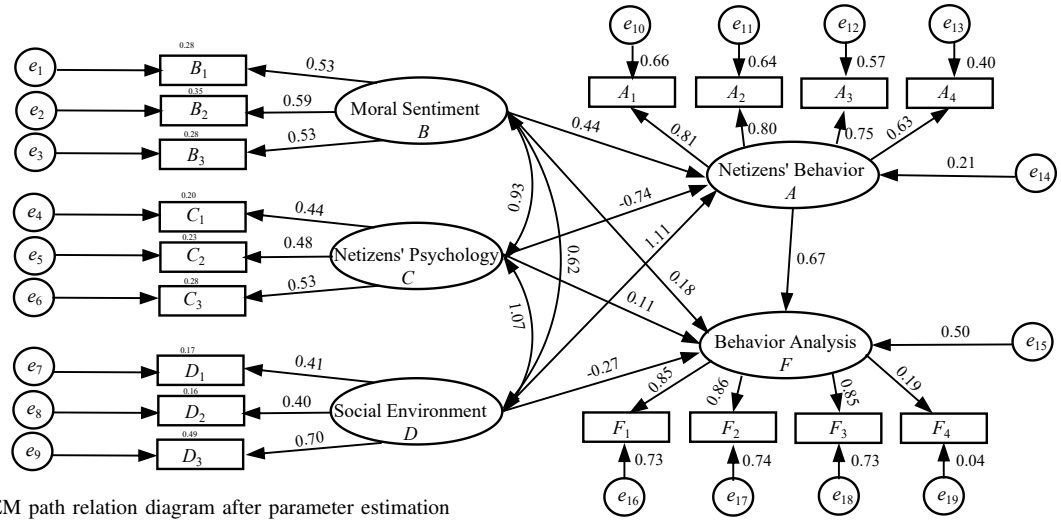

Fig. 6. The SEM path relation diagram after parameter estimation

TABLE VI
THE EVALUATION INDEX VALUES OF THE ESTIMATED MODEL

RMR	SRMR	CMIN/DF	GFI	AGFI
0.08	0.094	4.975	0.869	0.817
PGFI	NFI	NCP	CFI	RMSEA
0.619	0.816	433.245	0.846	0.094

Root Mean Squared Error of Approximation (RMSEA); normalised fit index (NFI); Comparative Fit Index (CFI); Adjusted Goodness-of-Fit Index (AGFI). The specific evaluation indicators are shown in Table V.

AMOS software is used to analyze the result data, and the numerical values of each evaluation index in Table VI are obtained. According to the standard analysis of evaluation indicators in Table V, it can be seen that the values of CMIN/DF and PGFI are within the standard range, but a considerable number of indicators still do not meet the requirements, so it is difficult to make an accurate conclusions about the model. Therefore, it is necessary to further modify the model by using AMOS software.

IV. HYPOTHESIS VERIFICATION ANALYSIS OF THE CAUSES OF CYBER-VIOLENCE

Confirmatory factor analysis is a method to test the consistency and reliability of variables in structural equation models. It is mainly used to determine whether the correlation between observed variables and potential variables is consistent with the sample data. The observed variables and potential variables in the measurement model are connected with double arrows in the AMOS software, and the path factor loading of each factor is further estimated by structural equation model analysis (see Figure 7).

In the process of analyzing data with the structural equation model, it is necessary to evaluate the effect of the model according to the results, and the process of "adjustment and evaluation" should be repeated until the results are satisfactory. The specific test steps are as follows.

The reliability of single observed variable describes the variance of observed individuals compared with unobserved variable by evaluating the standardized external load of the observed variables [19]. To verify the convergent validity

TABLE VII
FACTOR LOADINGS BETWEEN LATENT AND OBSERVED VARIABLES

	Factor Loading	Reliability Coefficient	Measurement Error	CR	AVE
A_1 <-- A	0.81	0.65	0.35	0.84	0.56
A_2 <-- A	0.81	0.65	0.35		
A_3 <-- A	0.76	0.57	0.43		
A_4 <-- A	0.62	0.38	0.62		
B_1 <-- B	0.64	0.41	0.59	0.75	0.50
B_2 <-- B	0.73	0.54	0.46		
B_3 <-- B	0.75	0.57	0.43		
C_1 <-- C	0.73	0.54	0.46	0.80	0.57
C_2 <-- C	0.85	0.72	0.28		
C_3 <-- C	0.67	0.44	0.56		
D_1 <-- D	0.61	0.38	0.62	0.76	0.51
D_2 <-- D	0.68	0.46	0.54		
D_3 <-- D	0.84	0.70	0.30		
F_1 <-- F	0.85	0.73	0.27	0.87	0.64
F_2 <-- F	0.86	0.74	0.26		
F_3 <-- F	0.85	0.73	0.27		
F_4 <-- F	0.59	0.35	0.65		

of the variables, the value of each latent variable's Average Variance Extracted (AVE) is calculated. The lowest 50% of the variance from the observed variable should be taken by the latent constructs in the model. Therefore, it shows that the AVE value for all structures should be higher than 0.5. Factor loadings and Composite Reliability (CR) are also used as better assessments for the convergent validity of the observed variables. The values of two indicators should be higher than 0.5, and 0.6, respectively. If all three index exceed the minimum threshold level, it shows that the model has good convergence validity. The convergence validity is tested by AMOS software, and the test results are shown in Table VII.

As can be seen from Table VII, the load values of the 17 factor factor loadings in the scale are all higher than 0.5, which means that all 17 questions are valid. The comprehensive reliability values of the five dimensions of the scale are all higher than 0.6, and the AVE values of the five dimensions are all higher than 0.5, indicating that the five dimensions have good convergence validity. These results

TABLE V
EVALUATION INDICATORS OF THE MODEL FITTING

	Name and Code of Indicators	Meaning of Indicators	Accepted Standards
Residual Analysis	Root Mean Square Residual, RMR	Overall residuals for the unstandardized hypothetical model	< 0.05
	Standardized RMR, SRMR	Overall residuals of the standardized hypothetical model	< 0.08
Indicators of Absolute Fitting Effects	CMIN/DF	The ratio of chi-square values to degrees of freedom	< 5.00
	Goodness of Fit Index, GFI	Reveal the ratio of variance to covariance of the observed data	> 0.90
	Adjusted GFI, AGFI	GFI adjusted with degrees of freedom and number of parameters	> 0.90
	Parsimony GFI, PGFI	GFI adjusted with degrees of freedom and number of parameters	> 0.50
Indicators of Relative Fitting Effects	Normed Fit Index, NFI	Chi-square difference between hypothetical and independent models	> 0.90
Alternative Indicators	Non-centrality Parameter, NCP	The distance of the chi-square value from the central chi-square value of the hypothetical model	The smaller, the better
	Comparative Fit Index, CFI	Non-central differences between hypothetical and independent models	> 0.95
	Root Mean Square Error of Approximation, RMSEA	Comparing the gap between theoretical and saturated models	< 0.05

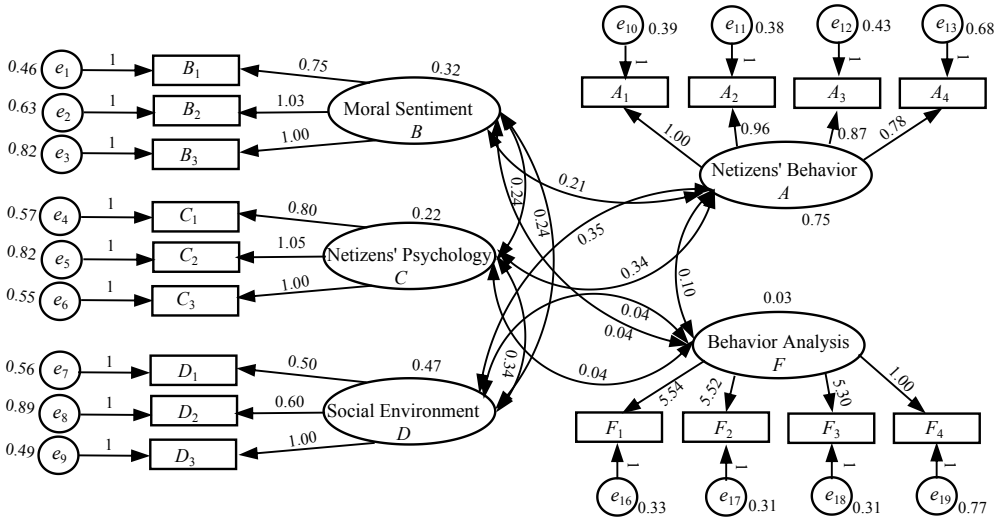

Fig. 7. The path relation diagram of the factor analysis

TABLE VIII
THE EVALUATION INDEX VALUES OF THE ESTIMATED MODEL

RMR	SRMR	CMIN/DF	GFI	AGFI
0.08	0.094	4.975	0.926	0.907
PGFI	NFI	NCP	CFI	RMSEA
0.619	0.816	433.245	0.846	0.094

confirm the convergent validity and good internal consistency of the measurement model.

The goodness-of-fit of the SEM is usually measured by the parameter CMIN/DF. If CMIN/DF is lower than 5, it can be considered as passing the model fitting test. And the other parameter is the RMSEA. If the RMSEA value is lower than 0.08, the model can be considered as having a high degree of fitting. Table VIII presents the model fitting indicators obtained from the AMOS analysis.

According to Table VIII and Table V, most of the fitting data are good, but some moderate index values are still outside the standard range. The RMSEA value is 0.094, which is higher than 0.08, indicating that there are some problems in the assumed model, and the model still needs to be revised. When the fitting value of the model does not meet the standard, we need to observe the path coefficient between variables according to the results of the model test. Generally, it is required that the path coefficient is greater than 0.50. According to Table IX, each path coefficient of our model is higher than 0.5, and the correlation between the indicators is very good.

V. MODIFICATION AND RESULT ANALYSIS OF THE SEM FOR CYBER-VIOLENCE

When it is assumed that the model cann't adapt to the sample data, it can be modified according to the theory, such as adding or deleting paths in the model, or canceling fixed parameters, so as to improve the overall fitting degree of the model. According to the error items analyzed by AMOS software and the data between the error items and the latent variables, the modification indices (MI) values between some error items are relatively large, so the chi-square value may decrease after the relative connection is established, and it is hoped that it will decrease even more. During the process of model modification, there is no relative relationship between the error term and the latent variable, as well as the error

TABLE IX
NORMALITY TEST OF THE SAMPLE DATA

Variable	Unstandardized Coefficients	Standardized Coefficients	SE	CR
A_1	1.000	0.811	0.000	0.000
A_2	0.959	0.801	0.054	17.849
A_3	0.874	0.754	0.052	16.666
A_4	0.776	0.632	0.057	13.523
B_1	0.752	0.530	0.106	7.108
B_2	1.033	0.593	0.138	7.489
B_3	1.000	0.529	0.000	0.000
C_1	0.800	0.723	0.096	8.315
C_2	1.050	0.616	0.120	8.789
C_3	1.000	0.531	0.000	0.000
D_1	0.498	0.606	0.071	7.008
D_2	0.603	0.508	0.088	6.816
D_3	1.000	0.699	0.000	0.000
F_1	5.537	0.854	1.441	3.842
F_2	5.517	0.858	1.435	3.843
F_3	5.304	0.852	1.381	3.842
F_4	1.000	0.502	0.000	0.000

TABLE X
NORMALITY TEST OF THE SAMPLE DATA

Path	M.I.	Par Change
$e_7 \leftrightarrow e_{19}$	10.376	0.103
$e_5 \leftrightarrow e_7$	35.294	0.186
$e_5 \leftrightarrow e_{10}$	27.132	0.158
$e_5 \leftrightarrow e_4$	17.394	-0.134
$e_7 \leftrightarrow e_9$	32.01	0.169
$e_1 \leftrightarrow e_{19}$	18.364	0.13
$e_1 \leftrightarrow e_{13}$	14.806	0.114
$e_1 \leftrightarrow e_{10}$	17.885	-0.104
$e_1 \leftrightarrow e_7$	12.336	0.093
$e_2 \leftrightarrow e_4$	66.056	0.21

term and the residual term, because it does not meet the basic assumptions of the structural equation model. Therefore, only the connection between the error term and the error term can be established to reduce the size of the chi-square value, so as to achieve the modification of the SEM.

One of the basic principle in the process of the SEM modification is to correct the maximum MI Value between the error terms, and only one path can be corrected at a time. Then, the maximum MI value between the correction error terms of the model is repeatedly corrected, but no more than 3 times. After more than 3 times, the model should be reconstructed.

According to Table X, the path $e_2 \leftrightarrow e_4$ with the largest index value is selected for correction, and the residual variables e_2 and e_4 are released, where e_2 is the error variable of the measurable variable B_2 of the latent variable B, and e_4 is the error variable of the measurement variable C_1 of the latent variable C .

As the development of emotional ability affects personal social communication, life satisfaction and academic achievement and other aspects, However, some netizens will seek justice for the victims and safeguard their psychological safety when they see events that make them dissatisfied on the internet. Therefore, it is possible to establish a certain

TABLE XI
THE EVALUATION INDEX VALUES OF THE CORRECTED MODEL

RMR	SRMR	CMIN/DF	GFI	AGFI
0.048	0.076	3.088	0.909	0.981
PGFI	NFI	NCP	CFI	RMSEA
0.619	0.915	0.962	0.952	0.904

relationship between e_5 and e_7. If this path is selected for release, the chi-square value will decrease by 48.563. There must be a correlation between residual variables belonging to the same latent variable, so the path between the residual variables e_7 and e_9 of D can be released, and the chi-square value decreases by 47.768. The residual variables e_{10} and e_{11} of A are released, and the chi-square value is reduced by 2.971. These two residual variables are connected with a double arrows, and then the model is tested again. The revised model is shown in Figure 8.

AMOS software is used to establish the connection between the error items. After correcting the structural model, it is also necessary to see whether the fit degree of each index meets the basic requirements. If the fitting degree is not up to standard, it is necessary to adjust the index variables of the questionnaire or modify the related questions of the questionnaire. It may also be that there is a problem in the selection of indicators or some deviation in the data.

According to the fitted data of each index in Table XI, compared with the fitting data in Table V, all the revised indexes are within the range of standard requirements, and the fitting degree is good, which shows that the results of the revised structural equation model are acceptable.

It can be seen from Figure 8 of the revised model path relationship that the coupling degree of each latent variable: moral sentiment, netizens' psychology, social environment and netizens' behavior, and behavior analysis has reached more than 0.50, so the structural equation model we established passed the hypothesis test, which also shows that there is a significant relationship between the latent variables.

The coupling degrees of moral emotion to netizens' behavior, and netizens' psychology to behavior analysis are 0.87 and 0.86, respectively, and the numerical values are both greater than 0.80. It can be considered that the phenomenon of cyber-violence often comes from the accumulation of netizens' negative moral emotion and psychological energy.

Some netizens vented their inappropriate emotions in the name of morality, which makes the victims suffer greatly. From the psychological point of view of netizens, people always needs to find an outlet to vent their accumulated psychological energy, so as to get emotional liberation. Because the conventional channels of public opinion expression are not smooth, the traditional media can't give full play to the reporting function in time. As a result, many problems are exposed in the form of network hot events.

VI. CONCLUSION

Cyber-violence is not only unhelpful to maintain simple moral feelings, but also arouses the public's panic about online morality and personal privacy security. Based on the structural equation model, this research model verifies the factors that affect college students' cyber-violence. The current research promotes the expansion of research in the field

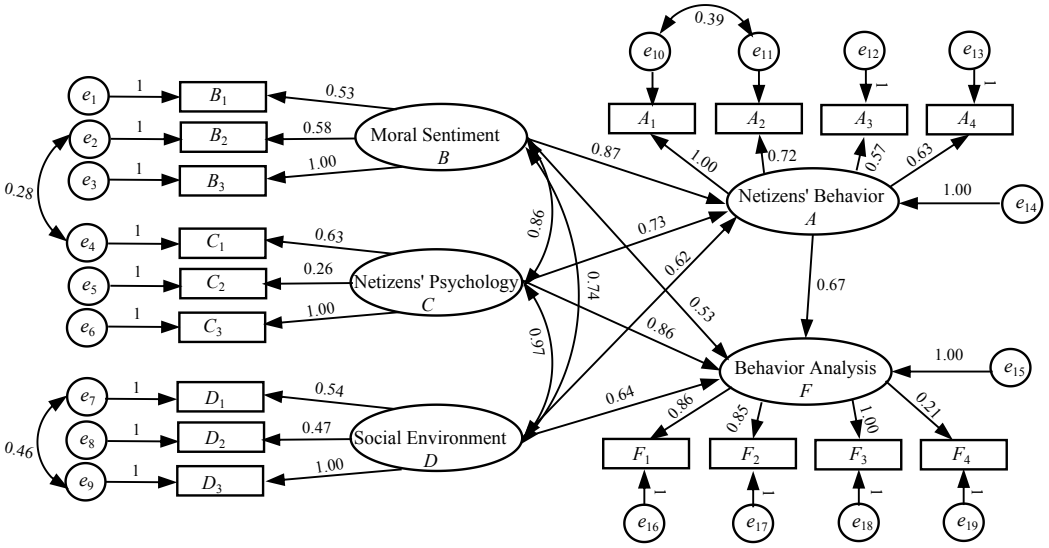

Fig. 8. The path relation diagram of the factor analysis

of cyber violence and helps to better understand the factors in cyber-violence. By analyzing the influencing factors of cyber violence, it is realized that reasonable guidance to cyber groups is an important way to solve extreme group incidents. The research results can provide decision support for governments to solve the problem of cyber-violence, so as to achieve the purpose of scientific and effective governance of cyber-violence in colleges and universities.

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