# The influence of pessimism on adverse network behavior during COVID-19: the mediating effect of negative affect and risk perception

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## Abstract

There had been an information epidemic during the COVID-19, which led to a lot of adverse network behavior among Internet users. From the perspective of cognition and emotion, this study focused on exploring the influence mechanism of pessimism on undergraduates' adverse network behavior, and introduced the mediating variable of negative affect and risk perception. In this study, a cross-sectional questionnaire was used to evaluate pessimism, negative affect, risk perception and adverse network behavior of undergraduates to explore the characteristics of network behaviors of undergraduates during the COVID-19. 600 undergraduates from three universities in a city in China were selected as participants, among whom 312 students are female and 288 students are male. The results are as follows: (1) Pessimism is positively correlated with adverse network behavior, and pessimism has a significant positive effect on adverse network behavior. (2) Pessimism is positively correlated with negative affect, and negative affect is positively correlated with adverse network behavior. The mediating effect analysis shows that the mediating effect of negative affect on the relationship between pessimistic personality and adverse network behavior has statistical significance. (3) Pessimism is positively correlated with risk perception and risk perception is positively correlated with adverse network behavior. The mediating effect analysis shows that the mediating effect of risk perception on the relationship between pessimistic personality and adverse network behavior has statistical significance.

**Keywords** Pessimism · Negative affect · Risk perception · Adverse network behavior · Undergraduates

## Introduction

During the COVID-19 outbreak, the glut of real and fake online information has made it difficult for people to find trusted sources and reliable guidance when they need it,, which leads to people seeking information from various channels and participating in online interaction to resist pressure and cope with this epidemic (Li & Zhang, 2021; Agius et al., 2020). Major public emergencies tend to cause public panic, and the nature of information dissemination by social media will lead to adverse network behaviors such as over-sharing and shielding (Yao et al., 2020; Wu et al., 2021). University students who frequently contact social media receive too much information, resulting in serious

epidemic of information, psychological burnout, depression and other negative affects, which will cause the frequent suicide under the background of neurobiological or affective temperament factors (Qiu, Shen, Zhao, et al., 2020; Shailaja et al., 2020; Baldessarini et al., 2017; Orsolini et al., 2020).

Personality is an intrinsic and persistent trait system that promotes the consistency of individual behavior and influences explicit human behaviors (Pervin, 1993). Meanwhile, human behaviors are jointly determined by personality traits and environmental characteristics, that is, cross-situational consistency of behaviors (Wang & Cui, 2006). Affective Load Theory holds that the affective state and cognitive process of individual information behavior are determined by social value (affective) and the structure (cognitive) of the information intense environment (Nahl, 2004, 2005). Healthy individuals need optimism trait to expand their range of cognitive activity, maintaining an "affective filter" that blocks or ignores contents that is not personally relevant on the Internet (Nahl, 2010). Meanwhile, Davis (2001) proposed the cognition-behavior model for Pathological

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Internet Use, which emphasizes the maladaptive cognitive and affective influence on Internet behavior. The influence of cognition and affect on behavior may be influenced by individual personality, network environment and other aspects (Hu et al., 2003).

Although relevant researches have proposed that personality factors will affect network behaviors in the online environment, that is, there are many researches on how the personality traits of network users affect network interaction behavior or network consuming behavior, there is still no systematic discussion on the influence of personality and adverse network behavior. Therefore, from the perspective of positive personality, this paper intends to explore the influence mechanism of optimistic personality on undergraduates' adverse network behavior through model construction and empirical research, in order to enrich the theoretical system of healthy Internet behavior research and personality traits research.

## Adverse network behavior

Infodemic was coined by the World Health Organization (WHO) during a conference on COVID-19, and the Infodemic phenomenon is particularly acute on social media (Zarocostas, 2020). There are two main manifestations of information epidemic: over-sharing of epidemic information and information shielding (Wang & Zhu, 2020). Over-sharing refers to the phenomenon that users receive too much information from others or share too much information to others in social media interaction (Agger, 2015; Yang, 2019). During COVID-19, people's perceptions and patterns of using social media change when they are in a state of pain or fear. When people learn information from many sources on social media, excessive epidemic information sharing is caused, due to trust in social media news and social media's overload (Rovetta & Bhagavathula, 2020; Laato et al., 2020). Shielding refers to a behavior that users consciously ignore or avoid some certain information to improve the efficiency of information activities and enhance their sense of self-efficacy (Bright et al., 2015; Li et al., 2018). During the COVID-19, the attention of the society is focused on the progress of the epidemic, and people's Internet usage will be higher than usual. In order to reduce their cognitive processing pressure, people will block information sources and avoid the negative impact of all kinds of bad Internet phenomena on themselves (Qiu et al., 2016).

## Pessimism and adverse network behavior

Many researchers believe that online behavior is related to personality, and personality is an important factor affecting the use of online social media (Wan, 2009; Clayton et al., 2013). Pessimism, as a relatively stable personality trait, refers to an individual's stable negative bias towards reality and future life and negative expectation of the development of things in the future (Scheier et al., 2001). During COVID-19, pessimists who have a lower sense of trust in others and the outside world, have a higher degree of fear in receiving information, a negative attention bias and negative cognitive evaluation of the epidemic information, and try to protect themselves differently than they have in the past (Galić et al., 2020; Jovančević & Milićević, 2020; Wang, 2021). Based on these findings, I hypothesize that pessimistic personality can positively predict individuals' adverse network behavior (H1).

## The Mediating Role of Risk Perception and negative affect

Future-oriented expectation includes both cognitive and affective prediction, namely the understanding of the cognitive and affective mechanisms behind behavior. Therefore, cognitive-affective process plays an important role in future orientation that can predict behaviors (Marroquín & Nolen-Hoeksema, 2015; Marroquín et al., 2016). Pessimism is a positive predictor of negative affect, which means that pessimism may exacerbate the overflow of negative affects and may experience negative affect for a sustained period of experiencing stress and individuals then use negative affect as information to influence future judgments (Jovanovic & Gavrilov-Jerkovic, 2012; Jones et al., 2017). In stressful environment, the attention of pessimistic individuals may be occupied by the negative stimuli in the environment, which reflects the trait consistency effect, that is, the relatively stable personality traits of individuals will make individuals tend to choose the stimulus information consistent with the trait (Liu, 2016). Pessimistic individuals under a negative emotional state will make a pessimistic assessment and prediction, and negative information about infectious diseases lead to irrational fear and tension, which will trigger coping response to disaster situations, that is, a man has an pessimistic incentive to take preventive actions when he is in a state of negative affect (Lu, 2013; Shi et al., 2003; Zheng et al., 2019; Min et al., 2020). Risk perception is defined as "people's subjective cognition and evaluation of potential dangers in the external environment" (Setbon et al., 2005). Pessimism is related to the mode of perception and cognition. Pessimistic individuals tend to screen and process information consistent with their own traits, which is specifically manifested as negative attention and information processing, lack of positive belief, and negative interpretation style (Hecht, 2013; Li, 2014, 2019). Risk perception affects how people take measures when faced with imminent threats. Social media users tend to engage

in behaviors related to information transmission out of the motivation to solve health problems after they perceive disease risks (Guo et al., 2020; Rana et al., 2021). People will seek information in different ways if they have a high perception of risk, which affects their willingness to share (Li & Zhang, 2021; Chisty et al., 2021). In a word, the public is affected by cognitive and affective factors in public emergencies, that is, the public combines social factors with cognitive factors to form social cognition, so that the public makes emotional responses, and then produces personal behaviors, and behavioral factors include excessive attention to relevant information or avoiding contact with information (Lee & Lemyre, 2009; Pei et al., 2021). Therefore, it can be assumed that pessimism can indirectly influence adverse network behavior through risk perception (H2), and pessimism can indirectly influence adverse network behavior through negative affect (H3).

## Implication

This paper constructs a model among pessimistic personality, cognition, emotion and adverse network behavior to enrich the research on college students' Internet behavior and provide a new perspective for the research on college students' healthy network behavior. At the same time, it is conducive to maintaining the network order, providing decision-making support for the government, universities and other entities to carry out the services of healthy network behavior, which is significant for the stability of the social environment.

## Hypothesis

There is little discussion of the effect of pessimism on adverse network behavior and the mechanism of its influence is unclear. Exploring the influence mechanism of pessimism on adverse network behavior and exploring the process factors between them may be an important point to block adverse network behavior and provide theoretical basis for the prevention of adverse network behavior in a new field. From the comprehensive perspective of cognition and affect, this study adds the prediction mechanism of pessimism on adverse network behavior through the mediating variables of risk perception and negative affect, enhancing people's attention to the mental health of university students during the pandemic. This study will explore the impact of pessimism on adverse network behavior -- the mediating roles of risk perception and negative affect.

## Method

### Participants

Due to a small COVID-19 outbreak in a certain city in China in October, 2021, a questionnaire survey was conducted among undergraduates of three universities in a city in China. Questionnaires were made on the online questionnaire platform, distributed by online wechat group or teachers through convenient sampling method, and undergraduates were invited. The formal survey lasted for 5 days from October 15 to October 19, 2021, and 650 questionnaires were received. According to answer time and demographic background information, invalid questionnaires were eliminated, and 600 valid questionnaires were finally received, with a valid questionnaire recovery rate of 92.31%. The average age of the participants was $(19.96 \pm 1.43)$ years. Among them, 312 students are females, accounting for 52%, while 288 students are males, accounting for 48%.

### Tools

#### The Pessimism Scale

This scale selected the pessimistic dimension of the life Orientation Test which was compiled in 1985 and revised in 1994 (Scheier et al., 1994). The scale included 3 items using a 5-point Likert score. The higher the score is, the higher the pessimistic tendency is. The α coefficient of this study is 0.8.

#### The adverse Network Behavior Scale

The adverse network behavior is divided into two dimensions, one is information oversharing, the other is information shielding. The scale referred to the research of Qiu et al. (2016) and Tan and Wang (2020). The dimension of shielding includes three itmes: "During this period, I do not want to see the information about the epidemic pushed to me on social media." "During this period, I will block some information about the epidemic forwarded by my friends or moments." "" During this period, I'd like to ignore information about the outbreak posted on government platforms." The dimension of oversharing includes three items: "During this period, I will forward screenshots, short videos, chat records and other relevant information about the epidemic to people around me or post them in moments." "During this period, I have forwarded more information about the epidemic than I normally do." "During this period,, I have forwarded information about the epidemic without knowing whether it is true or fake." The scale consists of 2 dimensions and 6 items, which are scored by 3 points. After sum

**Table 1** Discriminant Validity Test Results of Research Variables(N = 600)

| Model | $X^2$ | df | $X^2/df$ | RMSEA | CFI | TLI |
| --- | --- | --- | --- | --- | --- | --- |
| Four Factors | 158.695 | 46 | 3.45 | 0.064 | 0.951 | 0.93 |
| Three Factors | 412.417 | 49 | 8.417 | 0.111 | 0.842 | 0.788 |
| Two Factors | 452.407 | 51 | 8.871 | 0.115 | 0.826 | 0.775 |
| One Factor | 914.611 | 52 | - | 0.166 | 0.626 | 0.525 |

One Factor: all variables are combined into one factor

Two Factors: risk perception + negative affect + adverse network behavior, pessimism

Three Factors: risk perception + negative affect, adverse network behavior, pessimism

up, the mean value is taken to obtain the variable of "adverse network behavior". The α coefficients of each dimension of the scale are 0.739 and 0.724 respectively.

### The negative affect scale

The Chinese version of the Positive and Negative Affect Schedule (PNAS) revised by Qiu et al. (2008) was applied, with a total of 10 questions on a Likert scale from 1 (completely no) to 5 (completely yes). The α coefficient in this study was 0.901.

### The risk perception Scale

The measurement of risk perception refers to the studies of Crane and Martin (2004) and Poortvliet and Lokhorst (2016). The scale consists of five items: "I do not know whether I have contact with asymptomatic or confirmed patients", "I'm not sure the vaccines works", "Once I the symptoms of fever, sore throat, I suspect I was will be coronavirus infection", "if I have been to the high risk areas, there's a chance that I could get the virus", "I can't predict when will the outbreak be over". The scale has five questions and is scored with five points. After summing up, the mean value is taken to obtain the variable of "risk perception". The α coefficient of this study is 0.739.

### Procedure and Data Analysis

The online questionnaire platform was used to conduct the survey and collect data. The questionnaire processing took about 10 min. The questionnaire was anonymous, and all participants read and received informed Consent prior to the questionnaire. The whole process of data collection and analysis complied with the principle of confidentiality. SPSS26.0 was used for common method bias analysis, descriptive statistics and correlation analysis. Amos23.0 was used for confirmatory factor analysis and to test the mediating effect of risk perception and negative affect on pessimism and adverse network behavior.

## Method

### Confirmatory factor analysis

In this study, confirmatory factor analysis was used to evaluate the discriminant validity among variables and the suggested items parceling strategy of Wu and Wen (2011) was adopted. To be specific, multi-dimensional scale is packaged according to dimension, and single-dimensional scale adopted the strategy of balanced packaging. The fitting indexes of the four-factor model and other competing models are shown in Table 1. It can be seen that compared with the fitting indexes of other competing models, the four-factor model has the best fitting, which verifies the discriminant validity between the variables (Wen et al., 2018).

Generally speaking, as long as there are 3 fitting indexes above 0.9, it indicates that the questionnaire fitting index is ideal and the fitting degree reaches the standard. It can be seen from Table 1 that all indicators of the four-factor model are close to the standard of good fitting degree, and the study compares the fitting degree of other models, and all of them are in a relatively good state.

### Factor analysis of adverse network behavior

Exploratory factor analysis was carried out on adverse network behavior. Principal component analysis was used to extract the factors and maximum variance method was used to estimate the factor load. Factor analysis was carried out on the principle of characteristic root greater than 1, and two main factors were extracted. The cumulative variance contribution rate was 68.576, which was greater than 60%, indicating that the questionnaire had good structural validity. Therefore, this study divides adverse network behavior into two dimensions: shielding and over-sharing. It is calculated by the arithmetic square root of the corresponding items. See Table 2 for details.

### The statistical analysis results of each variable

As shown in Table 3, pessimism and risk perception has a significant positive correlation (r = 0.277, p < 0.05);

**Table 2** Factor analysis of adverse network behavior

|  | Component | |
|---|---|---|
|  | 1 | 2 |
| Shielding 1 | 0.832 | |
| Shielding 2 | 0.87 | |
| Shielding 3 | 0.677 | |
| Over-sharing 1 | | 0.927 |
| Over-sharing 2 | | 0.896 |
| Over-sharing 3 | | 0.538 |
| Characteristic Value | 2.172 | 1.943 |
| Cumulative Variance Contribution Rate | 36.194 | 68.576 |

pessimism and negative affect has a significant positive correlation ($r = 0.39$, $p < 0.05$); pessimism and adverse network behavior has a significant positive correlation ($r = 0.301$, $p < 0.05$); risk perception and negative affect has a significant positive correlation ($r = 0.405$, $p < 0.05$); risk perception and adverse network behavior has a significant positive correlation ($r = 0.451$, $p < 0.05$); negative affect and adverse network behavior has a significant positive correlation ($r = 0.358$, $p < 0.05$). Correlation analysis shows that pessimism, risk perception, negative affect and adverse network behavior are significantly positively correlated. There was no correlation with gender and age.

## Mediating effect test

It can be seen from the Table 4 that the model fitting index data all meet the requirements. $\chi2/DF = 3.857 < 5$, RMSEA $= 0.069 < 0.08$; GFI $= 0.948$, AGFI $= 0.914$, NFI $= 0.923$, CFI $= 0.941$, TLI $= 0.918$, all were all greater than 0.9, indicating that the model fit was good. Therefore, the fitting index of the structural equation is ideal and the fitting degree is good.

From the calculation result of path coefficient of structural equation, it can be found that the path coefficient of pessimism on risk perception is 0.538, $p < 0.001$, indicating that there is a significant positive effect. The path coefficient of pessimism on negative affect is 0.511, $p < 0.001$, indicating that there is a significant positive effect. The path coefficient of pessimism on adverse network behavior is 0.122, $p < 0.001$, indicating that there is a significant positive effect. The path coefficient of risk perception on adverse network behavior is 0.133, $p < 0.001$, indicating that there is a significant positive effect. The path coefficient of negative affect on adverse network behavior is 0.06, $p < 0.001$, indicating that there is a significant positive effect.

After sampling 2000 times using the bootstrap method to calculate a 95% confidence interval, it can be seen that the total effect effect value is 0.224, and the interval does not include 0, so the total effect is significant. The direct effect effect value is 0.122, and the interval does not include 0, so the direct effect is significant.

The effect value of indirect effect (pessimism → negative affect → adverse network behavior) is 0.031, the interval does not contain 0, and the indirect effect is significant. The mediating effect of a total contribution rate is 13.84%. Therefore, the mediating effect is valid and partially mediating.

The effect value of indirect effect (pessimism → risk perception → adverse network behavior) is 0.072, the interval does not contain 0, and the indirect effect is significant. The mediating effect of a total contribution rate is 32.14%. Therefore, the mediating effect is valid and partially mediating.

The total mediating effect is 45.54%, which indicates that pessimism can predict adverse network behavior through negative affect with the mediating effect is 13.84% while pessimism can predict adverse network behavior through risk perception, and the mediating effect is 32.14%.

**Table 3** Mean, standard deviation and correlation of variables

|  | M | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1 Gender | 1.66 | 0.47 | 1 | | | | | |
| 2 Age | 19.96 | 1.43 | -0.035 | 1 | | | | |
| 3 Pessimism | 2.40 | 0.88 | 0.007 | 0.012 | 1 | | | |
| 4 Risk perception | 2.79 | 0.90 | -0.02 | 0 | 0.277** | 1 | | |
| 5 Negative Affect | 2.50 | 0.75 | 0.008 | -0.009 | 0.390** | 0.405** | 1 | |
| 6 Adverse Network Behavior | 1.56 | 0.33 | -0.04 | 0.028 | 0.301** | 0.451** | 0.358** | 1 |

Note: * means $p < 0.05$, ** means $p < 0.01$

**Table 4** Mediating effect of Bootstrap test

| Path | Estimate | SE | Bias-corrected | | | Percentage |
|---|---|---|---|---|---|---|
|  |  |  | Lower | Upper | p |  |
| pessimism → risk perception → adverse network behavior | 0.072 | 0.015 | 0.046 | 0.109 | 0.0001 | 32.14% |
| pessimism → adverse network behavior | 0.122 | 0.041 | 0.053 | 0.213 | 0.001 | 54.46% |
| pessimism → negative affect → adverse network behavior | 0.031 | 0.014 | 0.007 | 0.063 | 0.011 | 13.84% |
| Total Mediating Effect | 0.102 | 0.02 | 0.067 | 0.145 | 0.001 | 45.54% |
| Total Effect | 0.224 | 0.048 | 0.137 | 0.323 | 0.001 | |

**Table 5** Mediating effect of Bootstrap test

| Path | Estimate | SE | Bias-corrected | | | Label |
|---|---|---|---|---|---|---|
| | | | Lower | Upper | p | |
| pessimism→risk perception→shielding | 0.048 | 0.017 | 0.019 | 0.088 | 0.001 | valid |
| pessimism→negative affect→shielding | 0.035 | 0.02 | -0.006 | 0.073 | 0.089 | invalid |
| pessimism→risk perception→oversharing | 0.164 | 0.038 | 0.097 | 0.245 | 0.001 | valid |
| pessimism→negative affect→oversharing | -0.002 | 0.035 | -0.073 | 0.066 | 0.99 | invalid |

**Fig. 1** Mediating model of Negative Affect and Risk Perception
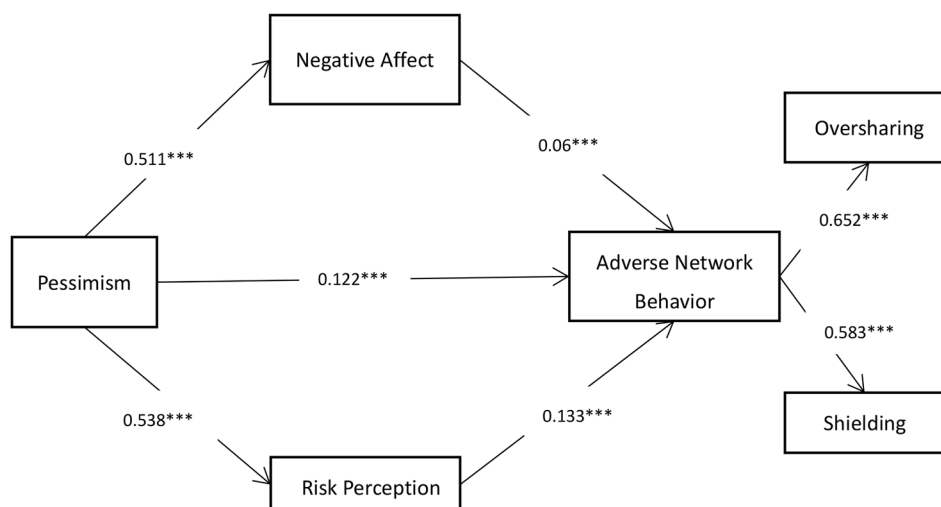


This study further investigated the mediating effects of risk perception and negative affect on shielding and oversharing (Table 5; Fig. 1).

The effect value of indirect effect (pessimism → risk perception → shielding) is 0.048, the interval does not contain 0, and the indirect effect is significant. Therefore, the mediation effect is established and partially mediated. In other words, risk perception plays a mediating role in the influence of pessimism on shielding.

The effect value of indirect effect (pessimism → negative affet → shielding) is 0.035, the interval contains 0, so the mediating effect is not valid. That is, pessimism has no mediating effect on shielding.

The effect value of indirect effect (pessimism → risk perception → oversharing) is 0.164, the interval does not contain 0, and the indirect effect is significant. Therefore, the mediation effect is established and partially mediated. In other words, risk perception plays a mediating role in the influence of pessimism on oversharing.

The effect value of indirect effect (pessimism → negative affect → oversharing) is -0.002, the interval contains 0, so the mediating effect is not valid. That is, pessimism has no mediating effect on shielding.

# Disccusion

Media is seen as key to solve the public crisis in modern society (Seo, 2019), but during the outbreak, social media often push the related information, and the quality of information varies, Internet users need to do a lot of screening work, which may cause burnout, negative emotions, and the like (Islam et al., 2021; Liu et al., 2021). Therefore, it is necessary to study the adverse network behavior of undergraduates during the COVID-19, understand the harmful situation and its influencing factors, and provide scientific basis for timely adjustment of intervention measures for the adverse network behavior.

## The direct influence of pessimism on adverse network behavior

Online Internet behavior shows personality (Kosinski et al., 2013). For example, extraversion is positively correlated with frequency of Internet use, the degree of website participation and the numbers of online friends (Ross et al., 2009; Gosling et al., 2011). For example, neuroticism can significantly positively predict the intensity of Internet use (Basak et al., 2018; Cai et al., 2020). The results of this study show that pessimism is positively correlated with adverse network behavior, that is, the higher the level of pessimism, the more serious the adverse network behavior. Furthermore, it

is found that pessimism can predict adverse network behavior, which is consistent with previous studies. Pessimism is a negative anticipation of the future. Pessimists believe that bad outcomes are inevitable, that things will go in an unfavorable direction, and that it is unlikely to go well (Rezaei et al., 2015). Certain personality characteristics may promote the development of all kinds of adverse network behavior, and pessimistic individuals will show symptoms such as excessive information search (Bajcar & Babiak, 2020).

## Pessimism indirectly affects adverse network behavior through negative affect and risk perception

Future orientation (expectation) depends on the complex relationship between cognitive and affective process. Understanding the cognition and affect mechanism of future orientation is important because behavior can be predicted (Mellers & McGraw, 2001). Individuals with different personalities have differences in negative affect situations. Negative affect as information guides individual behaviors, and personality depends on emotional states (Marroquín & Nolen-Hoeksema, 2015). This study further found that negative affect have a mediating effect between pessimism and adverse network behavior with the mediating effect of 13.84%, indicating that pessimism plays a role in adverse network behavior through negative affect, that is, pessimistic individuals influence the bad characteristics of subsequent Internet behaviors because of their negative emotional state. A personality trait will produce the corresponding emotional state. Pessimism is a negative personality trait, which is related to the current emotional state and reflects the emotional consistency effect. In the context of negative affect, individuals may have a tendency to make pessimistic predictions about the future, which affects subsequent maladaptive functions and behaviors (Marroquín et al., 2016).

Emotion and cognition complement each other. In different personality groups, emotion and cognition are presented in the way of emotion-cognition congruency (Gohm, 2003). Future-oriented cognition is influenced by individual differences in traits, that is, the cognitive part of the cognitive and affective mechanisms (Wilson & Gilbert, 2003). This study further found that risk perception has a mediating effect between pessimism and adverse network behavior with the mediating effect of 32.14%, indicating that pessimism plays a role in adverse network behavior through risk perception, that is, pessimistic individuals have perception of risk, which leads to adverse network behavior. From a public health perspective, people need not only to be aware of the seriousness of the health risks, but also to feel that they are personally at risk (Renner & Schupp, 2011). Pessimistic

individuals have negative attention bias to information, that is, pessimistic people tend to have negative cognitive processing to uncertain information (Isaacowitz & Seligman, 2001). According to cognitive models of psychological adjustment in adult populations, negative cognition tends to aggravate or worsen the impact of stress on psychological adjustment. Individuals with pessimistic style are more likely to have negative cognition, thus weakening the subsequent buffer to stress and subsequent psychological adjustment (Chang, 2002). Therefore, individual emotion and cognition will affect the use of the Internet. When people are in a negative mood and their cognition of risks is uncertain, individuals will have adverse network behavior.

It is worth noting that negative affect cannot be used as an intermediary to influence pessimism on the two dimensions of adverse network behavior (shielding and oversharing), which is inconsistent with previous studies (Wang & Zhu, 2020). On the other hand, risk perception can be used as an intermediary. It may be that during the outbreak of epidemic information, people need more cognitive factors to identify, perceive and process online information, and pessimistic personality, as a judgment of the future, can play a more cognitive role in behavior.

## Limitations

There are some limitations in this study. Due to the impact of COVID-19, this study did not completely adopt the stratified sampling method to randomly sample universities. The research objects of this study are undergraduates from three universities in the same city, and there may be differences in different risk areas. This study takes college students as the research object and does not study other user groups in the society, which has certain limitations. Finally, this study is a cross-sectional questionnaire survey after a small outbreak in a city in China, lacking dynamic observation of longitudinal samples. Subsequent studies can expand variables to explore the development mechanism of Internet use in the context of COVID-19.

## Conclusion

Through the establishment of multiple mediating model, this study explores the influence of pessimism on undergraduates' adverse network behavior, and finds that negative affect and risk perception play multiple mediating roles between pessimistic personality and adverse network behavior. This study has theoretical and practical significance. In theory, the multi-intermediary model further enriches the research on undergraduates' pessimism and adverse

network behavior, inspires researchers to consider the mediating effects of cognition and affect when studying adverse network behaviors, and broadens the research scope of the influence mechanism of personality on network behaviors. In practice, during the COVID-19 pandemic, the phenomenon of information epidemic is particularly serious on social media. This study provides a good idea for effective prevention and intervention of undergraduates' adverse network behaviors, which can focus on their personality, cognition, affect and behaviour, and carry out specific intervention in the field of network behavior according to their characteristics. In this study, questionnaire survey, structural equation modeling and mediation analysis were used to study the influencing factors and mechanisms of undergraduates' adverse network behaviors. The results show that :(1) Pessimism has a direct positive predictive effect on undergraduates' adverse network behavior. (2) Negative affect plays a mediating role in the relationship between undergraduates' pessimism and adverse network behavior. (3) Risk perception plays a mediating role in the relationship between undergraduates' pessimism and adverse network behavior.

**Supplementary Information** The online version contains supplementary material available at https://doi.org/10.1007/s12144-022-03584-z.

**Data availability** All data, models, or code generated or used during the study are available from the corresponding author on reasonable request.

## Declarations

**Disclosure of conflict of interest** The authors declare that there are no conflicts of interest regarding the publication of this research.

**Ethical statement** Ethics Committee approval was obtained from the Institutional Ethics Committee of School of Psychology, South China Normal University to the commencement of the study. This article does not contain any studies with animals performed by any of the authors.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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