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ORIGINAL RESEARCH

Problematic Online Video Watching, Boredom Proneness and Loneliness Among First-Year Chinese Undergraduates: A Two-Wave Longitudinal Study

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Purpose: While previous cross-sectional studies have investigated the relationship between problematic online video watching and mental health issues, longitudinal studies exploring their bidirectional relationship remain relatively scarce. This study aimed to fill this gap by conducting a two-wave longitudinal design.

Participants and Methods: Six hundred and ninety-nine first-year undergraduates voluntarily completed two rounds of questionnaire surveys assessing problematic online video watching, boredom proneness and loneliness with an interval of 4 months. To test the research hypotheses, cross-lagged panel models were performed using AMOS 24.0.

Results: Our results revealed the that (1) Boredom proneness and problematic online video watching were mutually influenced. (2) Loneliness at T1 positively predicted the level of problematic online video watching at T2 but not vice versa. (3) Boredom proneness mediated the link between loneliness and problematic online video watching. (4) Chinese first-year undergraduates' levels of problematic online video watching and boredom proneness significantly increased during their educational transition period from high school to university.

Conclusion: The present study enhances our understanding of the dynamic relationships between problematic online video watching, boredom proneness and loneliness, highlighting the targeted prevention and interventions for first-year undergraduates.

Keywords: problematic online video watching, boredom proneness, loneliness, cross-lagged panel model

Introduction

Problematic internet use disorder or internet use disorder (IUD) has been widely investigated and discussed since the last decade of the twentieth century. Terms such as internet addiction and technology addiction were proposed in earlier studies.[1,2] Davis[3] used the term pathological internet use (PIU) to describe such phenomenon and proposed the concepts of generalized PIU and specific PIU. However, the construct of generalized internet use disorder remains debatable, which needs clearer justifications and evidence,[4] and researchers appear to prefer studying only one type of online activity rather than the internet itself.[5,6]

Furthermore, specific PIU describes the use of particular applications on the internet such as online gaming or online gambling.[3] The Interaction of Person-Affect-Cognition-Execution (I-PACE) model describes the mechanism of specific IUD.[7] It clearly indicates the bidirectional relationship between psychopathologies and addictive behaviours, especially for specific online activities. Except for the stream of internet addiction and mobile phone addiction studies, research attention was largely paid to specific IUD (eg gaming). The fifth edition of the Diagnostic and Statistical Manual of

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Mental Disorders (DSM-V) included internet gaming disorder as a future research direction in the third section of emerging measures and models.[8] The eleventh revision of the International Classification of Diseases (ICD-11) included gaming disorder as an addictive disorder.[9] Empirical studies have tried to explore the link between specific internet use and mental health, but the existence of such relationship is still under debate. Some studies concluded that specific IUD, including social networking sites addiction and gaming disorders, were associated with anxiety and depression.[10,11] On the contrary, in some contexts, social networking sites use was found not having links with well-being.[12,13] However, besides online gaming disorder and social networking sites addiction, other specific problematic online behaviours were frequently investigated and drew much research attention, for example, online video watching.[6,14,15] More importantly, quantitative longitudinal designs are needed for studying problematic online video watching behaviours and mental health since most studies on this topic used cross-sectional or qualitative designs.

Problematic Online Video Watching and Loneliness

Watching videos was one of the most popular online activities as 34.4% of 1057 internet users reported watching online videos/films was their most preferred non-work online activity.[16] According to Uses and Gratification Theory,[17] individuals preferred watching online videos for specific motivations (eg, seeking social interactions, escaping reality, seeking pleasant experiences and entertainment), which made it easier to immerse themselves. However, these motivations were found to be strongly associated with problematic use when using as a maladaptive strategy.[18] Moreover, recent studies have suggested that some unique technology design features of online video platforms (eg, powerful AI-based recommendation algorithms, infinite scrolling, etc) might easily influence users' self-control capacity, thereby amplifying their problematic/addictive use.[19,20] A recent study examining Caribbean TikTok users found that overall, 8.7% of users are problematic users.[21] Thus, given the exponential growth of online video users and the attractiveness of video clips, the problematic online video watching behaviors need to be further investigated.

Based on the model of six components of behavioural addiction (salience, mood modification, tolerance, withdrawal, conflict, and relapse),[22] studies have explored several types of problematic online video watching, including YouTube addiction,[23] problematic mukbang watching,[24] and Problematic Series Watching.[25] Problematic online video watching behaviours seem to be closely associated with social anxiety and loneliness.[14,15,26] For example, short-form video watching addiction was predicted by social anxiety and social isolation mediated by interpersonal attachment.[14] Problematic mukbang watching was positively correlated with loneliness.[15] More specifically, based on eye-tracking experiments, recent studies found that lonely people tended to watch online videos with bullet-screen comments (floating comments scrolling across the screen) as one of the purposes was obtaining social connections and the feeling of watching together.[27–29]

Theoretically, the I-PACE model suggests that, in the late stage of specific IUD, individuals get involved in the activities addictively for compensation rather than gratification.[7] It seems that people with higher social anxiety or loneliness are inclined to take addictive online video watching as a compensation for their inadequate interpersonal communication in the real world. In addition to online videos, studies have proven the link between loneliness and some other IUDs such as social networking sites addiction and internet addiction.[30–33] It is, therefore, reasonable to hypothesise that problematic online video watching behaviours can be positively associated with loneliness. However, most empirical studies adopted cross-sectional designs, which might be weak in proving the consistency of the link between these variables. Thus, a longitudinal design with more than one wave of data collections is needed to explore the relationship between problematic online video watching and loneliness.

Boredom Proneness and Internet Use

Boredom proneness is a type of negative emotion or experience happening in situations, which are perceived as meaningless, uninteresting or less challenging, and individuals with boredom proneness tend to change their behaviours to remediate the situations.[34] In academic contexts, boredom is described as a negative and deactivating achievement emotion, which can reduce students' learning motivation and interests.[35,36] Studies have identified a relationship between boredom proneness and IUD. For example, in a two-wave longitudinal study, mobile phone addiction and boredom proneness were found to mutually predict each other and formed a vicious circle.[37] Trait boredom positively predicted

state boredom, which was mediated by problematic Facebook use.[38] This again indicates a potential bidirectional link between boredom and IUD. Boredom proneness positively predicted smartphone addiction.[39] A study with 1635 participants, using network analysis, revealed close relationships between boredom, loneliness and gaming disorder.[40] These studies indicate that individuals with high levels of boredom proneness are more likely to use mobile phones or specific online applications problematically to cope with their boredom, and the link between boredom and IUD seems to be bidirectional. One recent cross-sectional study, with a small sample size of 96 participants, found that users' immersive feelings when using TikTok (a short-form video application) and boredom positively predicted short-form video addiction.[41] However, studies investigating boredom proneness and problematic online video watching are still scarce, though the link between boredom and internet addiction or IUD has been proven.[38] Therefore, it is necessary to explore the relationship between boredom proneness and problematic online video watching through a longitudinal design.

Longitudinal Studies of Problematic Internet Use

Several recent longitudinal studies have investigated the relationship between IUD (problematic smartphone use, gaming disorders) and mental health issues such as anxiety, depression and loneliness.[11,42–45] For example, in a three-wave longitudinal design, Zhao et al[44] reported that stressful life events in Time 1 and mental health problems in Time 2 significantly predicted problematic smartphone use in Time 3. Teng et al[11] found that anxiety and depression predicted gaming disorder with one-way directions. It seems clear that mental health issues in earlier times are significant predictors of IUD. However, in another three-wave longitudinal study, Wang et al[42] did not find significant links between loneliness and internet addiction for the first and second waves of data collections but revealed a bidirectional link in the second and third waves. Thus, the relationship between IUD and mental health remains complicated which could fluctuate over time, and further longitudinal studies are needed. To our knowledge, no study has investigated the link between problematic online video watching and mental health using a longitudinal design. As a result, it is necessary to explore whether problematic online video watching behaviours can be linked with mental health problems (eg loneliness) consistently.

The Mediating Effect of Boredom Proneness

The above studies have proven the link between loneliness and problematic online video watching,[15] as well as the link between boredom proneness and internet addiction or problematic online video watching.[41] The I-PACE model suggests that behavioural addictions could be predicted by psychopathological variables and then individuals' biased coping styles and changed behavioural patterns (habitual behaviours in later stages).[7] Since people with boredom proneness tend to change their behaviours to get through their perceived "meaningless and uninteresting" situations,[34] it is possible to integrate boredom proneness in the process of developing habitual and addictive behaviours described in the I-PACE model. In other words, boredom proneness could bridge the link between psychopathological variables (eg, loneliness) and addictive behaviours in the I-PACE model. A few recent studies have identified the mediating role of boredom proneness between loneliness and mobile phone addiction.[46,47] Since watching online videos could be one of the addictive activities on mobile phones or the internet,[6] it is possible to hypothesise that boredom proneness also mediates loneliness and problematic online video watching (besides mobile phone addiction), based on empirical and theoretical evidence.

The Present Study

Several longitudinal studies have investigated problematic smartphone use or internet gaming disorder and mental health issues through cross-lagged models.[11,45] However, further explorations are lacked on the link between problematic online video watching behaviours and mental health issues such as loneliness. The literature reviewed above suggests that problematic online video watching can potentially be associated with loneliness and boredom proneness. Therefore, there is a need to explore whether problematic online video watching can be predicted by loneliness and boredom proneness over time and vice versa.

Previous studies suggest that it is important to investigate first-year college students' IUD, especially the Chinese first-year undergraduates who had difficulties in adapting to educational transition from high school to university.[48] Recent studies report an increase in internet gaming disorder but a decrease in problematic smartphone use among junior college students in China.[43,45] This indicates that the trend of the variation of IUD remains unclear. Therefore, the aims of the present study are (1) to investigate the variation trends of problematic online video watching, boredom proneness and loneliness over time; (2) to investigate the relationships between problematic online video watching, loneliness and boredom proneness among Chinese first-year undergraduates over time using a cross-lagged model. Several hypotheses could be proposed as below:

H1a: Problematic online video watching of the first-year undergraduates increases over time.

H1b: Boredom proneness of the first-year undergraduates increases over time.

H1c: Loneliness of the first-year undergraduates increases over time.

H2a: Loneliness positively predicts problematic online video watching over time.

H2b: Problematic online video watching positively predicts loneliness over time.

H3a: Boredom proneness positively predicts problematic online video watching over time.

H3b: Problematic online video watching positively predicts boredom proneness over time.

H4: Boredom proneness mediates the relationship between loneliness and problematic online video watching.

The hypothesized model is shown in Figure 1.

Methods

Participants and Procedure

This longitudinal study was conducted in three universities in South China and two waves of identical questionnaire surveys were distributed to the same participants. Before conducting the surveys, the sample size was calculated based on Gorsuch's criterion, that is, the sample size should be ensured that the ratio of the number of scale items to the participants is more than 1:5.[49] The researchers and several course tutors assisted in the recruitment of participants (ie, convenience sampling and snowball sampling). The inclusion criteria were being first-year university undergraduate students who volunteered to participate in this study.

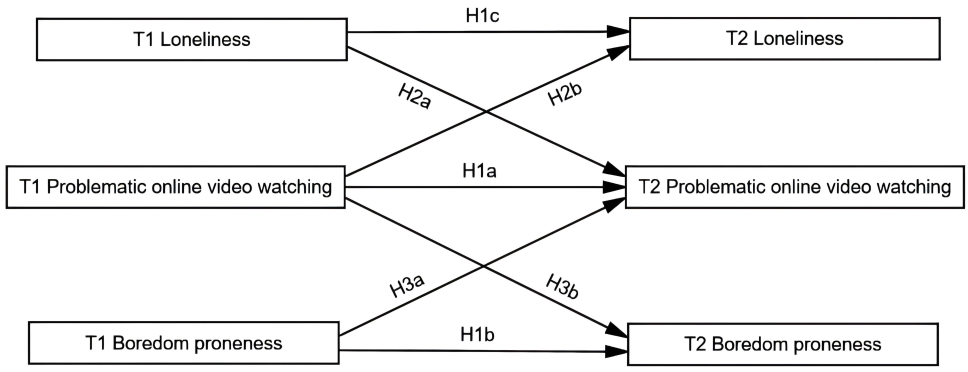

Figure 1 The hypothesized model.
Abbreviation: H, hypothesis.

Data were collected in October 2021 and January 2022, approximately four months apart. The baseline survey (Time 1, T1) recruited 834 first-year undergraduate students. Among them, 12 participants were excluded due to irregular responses (eg, responding with the same response for all questions). Of those who participated at T1, 699 of them (*Mage* = 19.12, *SD* = 0.92, 32.9% male) remained and completed the follow-up survey 4 months later at T2. The main study variables were compared between the retained and dropped groups, and no significant differences were found (*ps* > 0.05).

An online survey was distributed in Mandarin through the platform www.wjx.cn using a QR code. This study complied with the Declaration of Helsinki. All participants were provided with a consent form at the beginning of the survey and all of them volunteered to participate in this study. As the questionnaires were anonymous, all participants were asked to provide the last 6 digits of their phone number for the purpose of data matching. After participating in two rounds of questionnaire surveys, the participants received a reward of CNY 12 in cash.

Measures

Problematic Online Video Watching

The 6-item Bergen Social Media Addiction Scale (BSMAS) based on the addiction component model has been widely adopted to measure problematic or addictive online behaviours.[22,50] In this study, the Chinese version of the BSMAS was modified to assess the level of problematic online video watching.[51] The words "social media" were replaced with "online video" (eg, "felt an urge to watch online video more and more"). Participants were asked to respond on a 5-point Likert scale from 1 (Very Rarely) to 5 (Very Often) about their symptoms over the past 12 months. The Cronbach's alpha of the scale was 0.770 (T1) and 0.822 (T2) respectively. Confirmatory factor analysis (CFA) showed that the validity was good with acceptable model fit indices (T1: CFI = 0.990, TLI = 0.982, RMSEA = 0.040; T2: CFI = 0.999, TLI = 0.999, RMSEA = 0.001).

Loneliness

Participants completed the Chinese version of the 6-item UCLA Loneliness Scale (ULS-6),[52] which was developed from the 20-item UCLA Loneliness Scale.[53] The ULS-6 was answered using a 4-point Likert scale (1 = *never*, 4 = *always*), with higher scores indicating higher levels of loneliness. An example item is "I feel isolation from others". The Cronbach's alpha of the scale was 0.853 (T1) and 0.864 (T2) respectively. CFA showed that the validity was good with acceptable model fit indices (T1: CFI = 0.973, TLI = 0.949, RMSEA = 0.090; T2: CFI = 0.983, TLI = 0.969, RMSEA = 0.072).

Boredom Proneness

The Short Boredom Proneness Scale (SBPS) was developed by Struk et al.[34] The Chinese version revised by Peng et al was reported to have good reliability and validity in the Chinese context.[54] This scale has 8 items (eg, "Much of the time, I just sit around doing nothing") and was rated on a 7-point scale (1 = *highly disagree*, 7 = *highly agree*). A higher total score means a higher level of trait boredom. In this study, the Cronbach's alpha of the scale was 0.837 and 0.864 at T1 and T2, respectively. CFA showed that the validity was good with acceptable model fit indices (T1: CFI = 0.966, TLI = 0.949, RMSEA = 0.067; T2: CFI = 0.934, TLI = 0.903, RMSEA = 0.103).

Data Analysis

Descriptive statistics for the scales and Pearson's product-moment correlation coefficients were calculated using IBM SPSS version 23. Independent samples *t*-tests were conducted to compare the differences in the variables across time. Mediation analysis was conducted using PROCESS macro for SPSS (Model 4). Cross-lagged Panel model (CLPM) was conducted using structural equation modelling in AMOS version 24. The CLPM is useful for examining the temporal order of effects between variables in longitudinal design.[55] It allows researchers to control for correlations between variables and the autoregressive effects of each variable in time, which helps isolate the cross-lagged effects. The indices of χ^2 (chi-square test), df (degree of freedom), CFI (comparative fit index), TLI (Tucker-Lewis index), and RMSEA (root mean square error of approximation) were used to evaluate the model fit. The critical value for χ^2/df was less than 5, CFI and TLI were greater than 0.95, and RMSEA was less than 0.05.[56]

Results

Preliminary Analyses

Means, standard deviations, and correlation coefficients of major variables were shown in Table 1. As expected, the level of problematic online video watching was positively and significantly correlated with loneliness (T1: $r = 0.23$, $p < 0.001$; T2: $r = 0.31$, $p < 0.001$) and boredom proneness (T1: $r = 0.38$, $p < 0.001$; T2: $r = 0.44$, $p < 0.001$) in both waves. Moreover, paired samples t-tests indicate that the levels of problematic online video watching ($t[698] = -8.322$, $p < 0.001$) and boredom proneness ($t[698] = -6.504$, $p < 0.001$) of the first-year undergraduates increased significantly over the 4 months, which supported H1a and H1b. However, there was no significant change in loneliness, which rejected H1c.

Mediation Analysis

To test the effects of loneliness and boredom proneness on problematic online video watching, mediation models with gender and age as control variables were tested in T1 and T2. As shown in Table 2, in T1, loneliness positively predicted problematic online video watching ($\beta = 0.23$, $p < 0.001$) and boredom proneness ($\beta = 0.48$, $p < 0.001$). In the mediation model, problematic online video watching was only positively and significantly predicted by boredom proneness ($\beta = 0.35$, $p < 0.001$). A bootstrapping analysis with 5000 bootstrap samples showed that the mediating effect of boredom proneness was significant (effect = 0.19, 95% CI [0.14, 0.23]). These results indicate that boredom proneness could fully mediate the relationship between loneliness and problematic online video watching. Similarly, in T2 (see Table 3), loneliness positively predicted problematic online video watching ($\beta = 0.31$, $p < 0.001$) and boredom

Table 1 Descriptive Statistics and Correlations (N = 699)

Variables	1	2	3	4	5	6	7
1. Problematic online video watching (T1)	–						
2. Loneliness (T1)	0.23***	–					
3. Boredom Proneness (T1)	0.38***	0.48***	–				
4. Problematic online video watching (T2)	0.55***	0.24***	0.32***	–			
5. Loneliness (T2)	0.23***	0.58***	0.41***	0.31***	–		
6. Boredom Proneness (T2)	0.30***	0.32***	0.64***	0.44***	0.50***	–	
7. Age (T1)	0.06	−0.01	0.06	0.01	0.01	0.04	–
Mean	15.74	13.20	25.52	16.99	13.22	27.53	19.12
Standard Deviation	4.10	3.73	9.65	4.30	3.81	9.66	0.92

Note: ***$p < 0.001$ (2-tailed).

Table 2 The Mediating Effect of Boredom Proneness Between Loneliness and Problematic Online Video Watching in T1

Predictors	Model 1 (Problematic Online Video Watching)		Model 2 (Boredom Proneness)		Model 3 (Problematic Online Video Watching)	
	β	t	*β*	t	*β*	t
Gender	−0.01	−0.21	0.05	1.55	−0.02	−0.73
Age	0.07	1.78	0.05	1.43	0.05	1.39
Loneliness	0.23	6.28***	0.48	14.49***	0.06	1.55
Boredom proneness					0.35	8.83***
R^2	0.06		0.24		0.15	
F	14.29***		71.26***		31.38***	
Indirect effect					effect=0.19, 95% CI[0.14, 0.23]	

Note: ***$p < 0.001$.
Abbreviation: 95% CI, 95% confidence interval.

Table 3 The Mediating Effect of Boredom Proneness Between Loneliness and Problematic Online Video Watching in T2

Predictors	Model 1 (Problematic Online Video Watching)		Model 2 (Boredom proneness)		Model 3 (Problematic Online Video Watching)	
	β	t	*β*	t	*β*	t
Gender	−0.09	−2.39* (*p*=0.017)	0.01	0.19	−0.09	−2.62** (*p*=0.009)
Age	0.03	0.91	0.03	0.89	0.02	0.64
Loneliness	0.31	8.58***	0.50	15.38***	0.12	2.96** (*p*=0.003)
Boredom proneness					0.38	9.81***
R^2	0.11		0.26		0.21	
F	27.44***		79.42***		47.49***	
Indirect effect					effect=0.22, 95% CI[0.16, 0.27]	

Notes: *p<0.05, **p<0.01, ***p<0.001.
Abbreviation: 95% CI, 95% confidence interval.

proneness (β = 0.50, p < 0.001). In the mediation model, problematic online video watching was positively and significantly predicted by loneliness (β = 0.12, p < 0.01) and boredom proneness (β = 0.38, p < 0.001). The mediating effect of boredom proneness was also significant in T2 (effect = 0.22, 95% CI [0.16, 0.27]). Thus, boredom proneness could partially mediate the relationship between loneliness and problematic online video watching in T2.

Cross-Lagged Analysis

The cross-lagged panel model was used to examine the causal links between loneliness, boredom proneness and problematic online video watching. The initial hypothesized model did not fit the data well, χ^2/df = 63.422, *CFI*= 0.652, *TLI*= 0.348, *RMSEA*= 0.299. According to the modification indices provided by AMOS, the three variables at T1 and the standard errors at T2 (e1 and e2; e2 and e3) were correlated, and an additional path was added from T2 boredom proneness to T2 loneliness. The model fit of the modified model 1 was good: χ^2/df = 2.543, *CFI*= 0.998, *TLI*= 0.984, *RMSEA*= 0.047. As shown in Figure 2, all the variables at T1 significantly predicted their corresponding variables after 4 months (p< 0.001). More importantly, problematic online video watching at T1 significantly predicted boredom proneness at T2 (β= 0.06, p< 0.05), and boredom proneness at T1 could also predict the level of problematic online video watching at T2 (β= 0.09, p< 0.05), which supported hypotheses 3a and 3b. Loneliness at T1 significantly predicted problematic online video watching at T2 (β= 0.07, p< 0.05) but not vice versa (p > 0.05). Thus, H2a was supported and H2b was rejected. Besides, a mediation relationship from T1 boredom proneness to T2 loneliness through T2 boredom proneness was identified, with significant indirect effect (effect = 0.22, p = 0.001). The indirect

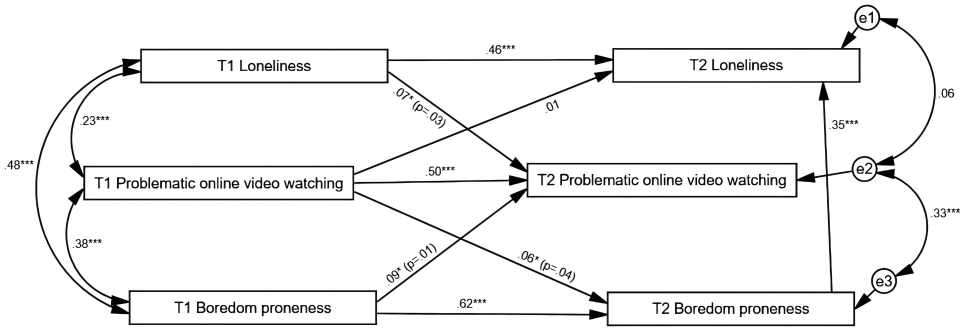

Figure 2 The modified cross-lagged panel model 1.
Notes: *p<0.05, ***p<0.001 (2-tailed).
Abbreviation: e, error.

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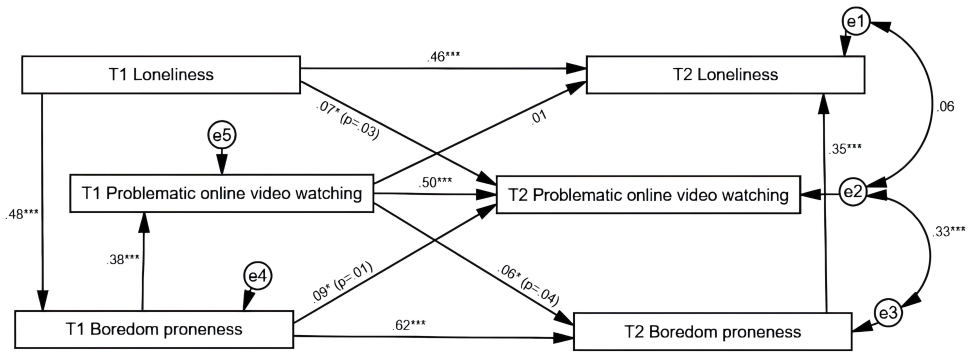

Figure 3 The modified cross-lagged panel model 2.
Notes: *p<0.05, ***p<0.001 (2-tailed).
Abbreviation: e, error.

effect from T1 problematic online video watching to T2 loneliness through T2 boredom proneness was marginal significant (effect = 0.02, p = 0.056).

Based on the mediation hypothesis, two paths from T1 loneliness to T1 boredom proneness to T1 problematic online video watching were added to model 1 and model 2 was obtained (see Figure 3). The model fit was good, χ^2/df = 2.515, *CFI*= 0.997, *TLI*= 0.984, *RMSEA*= 0.047. The indirect effect from T1 loneliness to T1 problematic online video watching through T1 boredom proneness was significant (effect = 0.18, p < 0.001). Over time, the indirect effect from T1 loneliness to T2 problematic online video watching through T1 boredom proneness was also significant (effect = 0.14, p < 0.001). Thus, H4 was supported.

Discussion

The current research is a pioneering longitudinal study which explored the bidirectional relationships between problematic online video watching, boredom proneness and loneliness among Chinese first-year undergraduates.

Relationships Between Boredom Proneness and Problematic Online Video Watching

In line with previous cross-sectional studies about internet use and boredom proneness,[37,38] the results indicate a strong relationship between boredom proneness and problematic online video watching. Firstly, the results indicate that individuals with high boredom traits are more likely to alleviate their boredom by watching online videos frequently. Given that individuals who tend to feel bored prefer more challenging and higher arousal stimuli, the various Chinese online video platforms (eg, TikTok, Bilibili) with rich and varied contents exactly meet their entertainment needs. This leads to excessive use of online video apps. Secondly, the findings suggest that the level of problematic online video watching can positively predict boredom proneness over time, which indicated a bidirectional relationship between these two variables. One possible explanation is that the excessive online watching behaviours might change individuals' rewarding system and make people more likely to feel bored in other offline activities.[57] The first-year undergraduates might easily be involved in a vicious loop where boredom leads to more video watching, which then leads to increased boredom. It is important to note that the above-mentioned studies explored mobile phone addiction and problematic Facebook use,[37,38] which are different from problematic online video watching in the current study. Our findings contribute to a better comprehension of the correlation between IUD and boredom, highlighting the necessity of directing research efforts towards particular online applications such as online videos.

The updated I-PACE model describes addictive behaviours in early and later stages, in which gratification could gradually shift to compensation in addictive behaviours.[7] The results of the current study indicate that the more bored one becomes, the more likely they are to develop video addiction, which in turn leads to even greater boredom. It can be explained by the updated I-PACE model that the participants were bored with their existing lives and needed compensation for their increasing desires for pleasure. Watching online videos becomes more addictive as their levels of boredom increase.

Relationships Between Loneliness and Problematic Online Video Watching

The current study found that loneliness positively predicted subsequent problematic online video watching, which indicates that people with high loneliness watched online videos problematically as a compensation for their insufficient social connections in the real world. However, the reversed path was not supported in the present study. Baseline problematic online video watching did not significantly predict follow-up loneliness in this longitudinal study, which indicates that this link might to be single directional. This is in line with Teng et al's[11] longitudinal study about internet gaming disorder and mental health issues. They found that depression and anxiety significantly predicted subsequent internet gaming disorder, but not reversely.[11] The present study and Teng et al's[11] study seem to support the hypothesis in the I-PACE theoretical framework that personal characteristics such as psychopathology variables can act as the predictors of addictive behaviours.[7] However, the I-PACE model also suggests that addictive behaviours can in turn intensify the predisposing variables such as psychopathological issues, which was not identified in the present study. Therefore, more investigations are needed to further explore the potential bidirectional relationship between problematic online behaviours and mental health issues. A three-wave longitudinal study found that the link between IUD and loneliness was not significant over the first and second waves of studies, but it was bidirectionally significant over the second and third waves.[42] Such results were different from our study, in which earlier loneliness significantly predicted subsequent problematic online video watching. It seems that the link between loneliness and problematic online video watching could vary at different times of the academic year, and the direction of such a link needs further investigation.

The Mediating Effect of Boredom Proneness

This study identified that boredom proneness mediated the relationship between loneliness and problematic online video watching. This is similar to previous studies which found the mediating effect of boredom proneness between loneliness and mobile phone addiction.[46,47] Our findings also indicate the possibility to integrate boredom proneness to the mechanism of addictive behaviours in the I-PACE model. It is interesting that such mediation association was significant in both waves and over time. Earlier loneliness predicted subsequent problematic online video watching through boredom proneness. It suggests that problematic online video watching is not solely predicted by loneliness but also by the boredom proneness that is heightened by loneliness. This finding could be helpful for the potential interventions designs for problematic online video watching or online video watching addiction. Preventions could focus on the coping strategies towards boredom proneness among individuals besides loneliness.

The First-year Undergraduate Students' Transition to University

The first-year undergraduates in the present study reported increased levels of problematic online video watching and boredom proneness over time. This trend seems to reflect their difficulties in adapting to university life after high school. Previous studies reported that Chinese students were prone to use smartphones problematically because they experienced stressful high school lives under strict school management and had difficulty in getting used to a more flexible university life.[48] In line with this, the present study again indicates the huge gap between high school and university lives of the Chinese students in educational transition. The present study identified a vicious loop between problematic online video watching and boredom, which might be one of their difficulties in adapting to this huge transitional gap. Thus, in order to help the first-year university students in such educational transition, further studies are needed to explore the potential mediators or moderators in the research model and intervention approaches to break such vicious loops. However, the effects of this gap remain unclear since studies have different findings. In previous longitudinal studies, Chinese university students were found to have increased suicidal ideation,[44] increased gaming disorder,[43] but also decreased problematic smartphone use or unchanged boredom proneness over time during university study.[37,44,45] Therefore, further longitudinal investigations are needed for Chinese undergraduate students' educational transition problems and mental health issues in different contexts.

Limitations and Future Directions

The present study has some limitations. The self-reported questionnaires in this study might receive socially desirable answers which could not reflect the participants' real situations. This study only collected quantitative data in the surveys and the participants could not describe their situations besides the scores. The sample in the present study were all Chinese first-year college students which might not represent students in the other countries. Thus, the results can only reflect the situation in the Chinese context. The present study only collected two waves of data which only covered a part of the undergraduates' first year and more waves of surveys can be done in future research. Moreover, the cross-lagged panel model in this study examined the hypothesis from traditional latent-variable perspectives, which only used a summation of individual item scores to assess levels of symptoms. However, according to the network theory of psychopathology, a mental disorder is the presentation of complex interactions between various symptoms and a symptom in one disorder could also activate symptoms in another one.[58] Thus, future studies could use cross-lagged panel network analysis to identify central and bridge symptoms of problematic online video watching, as well as dynamic interactions between symptoms of loneliness, boredom proneness, and problematic online video watching in longitudinal study.

Future studies can be designed with longitudinal mixed-methods and combing questionnaire surveys and interviews. Thus, the Chinese first undergraduate students' educational transition can be explored in depth with both quantitative and qualitative data. Furthermore, cross-cultural studies are needed for this topic. Since the transition gap from high school to university can be different between China and the other countries,[48] it is important to explore whether problematic online video watching is linked with loneliness and boredom proneness in different countries or culture backgrounds.

Practical Implications

The findings of this study have important implications for educational settings. First, educational programs urgently need to inform first-year undergraduates about the risks of watching online videos excessively to alleviate state of boredom and loneliness, which is a maladaptive coping strategy and may lead to a potential vicious cycle. Second, educational policies should encourage environments with more healthy offline social interactions and activities, which may help students better alleviate loneliness and boredom. Third, educators should pay attention to problematic users of online videos and provide necessary interventions (ie, Cognitive Behavioral Therapy and Mindfulness-based Therapy).

Conclusion

The relationship between these variables was examined by Cross-lagged panel model. The results showed that earlier loneliness (T1) could predict subsequent problematic online video watching (T2), but not vice versa. The link between problematic online video watching and boredom proneness was found to be bidirectional across time. Boredom proneness mediated the relationship between loneliness and problematic online video watching in both waves and over time. The first-year undergraduates' levels of problematic online video watching and boredom proneness significantly increased during their educational transition period in university. These findings provide new insights into the antecedents and consequences of problematic online video watching, highlighting the targeted prevention and interventions for first-year undergraduates.

Data Sharing Statement

Data available on request due to privacy/ethical reasons.

Ethical Statement

This study has been approved by the Ethics Committee of the Department of Psychology, School of Education, Soochow University.

Consent to Participate

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

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Disclosure

The authors declare no conflict of interest.

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