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The latent profile of self-control among high school students and its relationship with gender and cyberbullying

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Abstract

Mechanisms by which self-control influences cyberbullying were unclear, it is worth to explore the latent profile of self-control among high school students and analyze the antecedents of latent self-control profiles and their impact and moderating effect on cyberbullying victimization and perpetration. 1,401 high school students ($M_{age} \pm SD = 15.5 \pm 0.57$, 60.2% were girls) were surveyed using the Dual-Mode of Self-Control Scale and Cyberbullying Questionnaire. The latent profile analysis was used to explore the latent profiles of self-control of high school students, and the multinomial logistic regression analysis of the R3STEP method was used to explore the different effects of demographic variables on the latent profiles of high school students' self-control. The BCH method was used to analyze the effect of latent profiles of self-control of high school students on the cyberbullying victimization and perpetration. (1) There are four latent profiles of self-control among high school students, namely "low-control type"(3.49%), "high-impulse type" (18.49%), "high-control type" (13.78%) and "balance type" (64.24%); (2) Female high school students are more likely to be low-control than male high school students; (3) Different profiles of self-control have a moderating effect on the impact of cyberbullying victimization on perpetration, and compared with balance type individuals, high-impulse type individuals are more likely to implement cyberbullying with the increase in the level of cyberbullying victimization. Compared to boys, girls tend to fall more into the self-control profile type which has a lower impulse system and control system, and high-impulse individuals are more likely to choose to cyberbully others after being subjected to cyberbullying. The results provide a basis for cyberbullying interventions.

Keywords Self-control · Cyberbullying · Latent profile analysis · Teenager

Introduction

The development of the Internet has provided a convenient avenue for bullying among adolescents (Jacobson et al., 2016), including outing and trickery; exclusion, cyber stalking, flaming, impersonation, and trolling (Adediran, 2020; Kowalski & Limber, 2007; Lim, 2013), also known as electronic bullying or online social abuse. Cyberbullying refers to the repeated use of the Internet and related technologies to harass, threaten or intimidate others with a deliberate, repetitive and hostile manner (Kim, 2013; Lim, 2013; Smith et al., 2008).

Adolescents are the majority of cybervictims (Bailin et al., 2014), and are also the main body of cyberperpetrators (Gül et al., 2018; Lucas-Molina et al., 2018). Becoming a cybervictim can lead to depression, suicide, stress,

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aggression, and other mental health problems (Kraft, 2006; Tözun, 2018), which also affects individual self-concept, life satisfaction, family relationships, and school involvement (Buelga et al., 2012; Cañas et al., 2019; Ortega-Barón et al., 2016). In addition, cybervictimization is significantly positively correlated with cyberbully (Cañas et al., 2019; Gonzalez-Cabrera et al., 2019), thought as a predictor of cyberperpetrator (Álvarez-García et al., 2018; Ramos Salazar, 2021), while being a cyberperpetrator increases an individual's perception of stress, loneliness and negative self-esteem (Cañas et al., 2019), and can also cause anxiety and depression (Calpbinici & Tas Arslan, 2019).

The General Aggressive Model (GAM) of cyberbullying states that individual factors (gender, personality, attitude, etc.) and environmental factors (social support, attack cues, stress, etc.) increase an individual's risk of becoming a cybervictim and cyberperpetrator. At the same time, based on the victim's assessment of internal state, if the cyberbullying experience is considered stressful and the individual does not have sufficient resources (cognitive, emotional, or other) to deal with the situation, then he or she may have an impulsive response, such as sending cyberbullying information back to the bully. Whereas, if the individual feels that there are enough resources available, he or she may make a more deliberate (i.e., controlled) behavioral response (Kowalski & Limber, 2007; Kowalski et al., 2014). Therefore, differences in evaluation strategies can lead to changes in behavioral responses. This helps explain why some people remain calm or seek help when experiencing cyberbullying, while others cope with victimization by cyberbullying (Anderson & Bushman, 2002; Kowalski et al., 2014).

Self-control is usually defined as an individual's ability to adjust their behavior, emotions, and other responses in a timely manner to achieve certain activity goals, which is an important indicator of one's early socialization, and an important cognitive factor in regulating individual assessment and decision-making when cyberbullying occurs (Moffitt et al., 2011; Xie et al., 2014). Wills's study divided self-control into good self-control and poor control (Wills et al., 2007), then Hofmann first proposed a dual-systems model of self-control (Hofmann et al., 2009), which model argued that a complete self-control model includes impulse systems and self-control systems that provided a new perspective for addressing issues such as adolescent risky behavior bias and mental illness (Casey et al., 2008; Somerville et al., 2009; Steinberg, 2008). This theory states that adolescent behavioral problems are caused by imbalances in two major neurophysiological systems, including the subcortical socio-emotional system and the cognitive control system of the prefrontal cortex (Somerville et al., 2009; Steinberg, 2008). The former responsible for responding to emotional information, novel stimuli, and reward signals (Delgado, 2007), and latter is a key executor of impulse control and decision making (Ochsner & Gross, 2005). Therefore, whether an individual will cyber assault others after being cybervictimized depends on whether the impulse control of the cognitive control system can inhibit impulsive responses from the socio-emotional system (Huifen et al., 2020; Mottram & Fleming, 2009). What's more, individuals with stronger self-control traits are better able to cope with negative situations such as cyberbullying victimization experiences and thus respond in a controlled manner, such as seeking help (Yajun et al., 2015). Previous researches have studied family factors (Cagirkan & Bilek, 2021; Canestrari et al., 2021; Moreno-Ruiz et al., 2019), peer factors (Catone et al., 2020), and emotional factors (Guerra-Bustamante et al., 2021; Lee et al., 2020) regulate the mechanisms of action of cybervictims against others by influencing internal assessment processes (Gül et al., 2018). However, fewer studies have discussed the role that cognitive factors play in the assessment and decision-making process.

Moreover, previous studies have shown that it is more reasonable to assess self-control in terms of both control traits and impulsive traits (Wills & Stoolmiller, 2002; Wills et al., 1998, 2006). The self-control scale visible is mostly based on the resource theory of self-control (Hu et al., 2012; Tan & Guo, 2008), less likely to use research to evaluate self-control from both impulse systems and control systems. Individuals with high impulsive system scores are characterized as impulsive, easily distracted and less able to delay gratification, and may be more likely to engage in deviant behaviors during stressful events (Mottram & Fleming, 2009), while individuals with high control system scores are less likely to engage in cyberbullying after being cyberbullied because they are better problem solvers and more likely to consider future consequences (Huifen et al., 2020). Hence, strong individual control systems can help mitigate the negative effect of risk factors on the cyberbully, but researchers mainly focused on variables, that is, from different dimensions of self-control, to analyze different behavioral tendencies that may be triggered by different dimensions in the past (Yajun et al., 2015). Nevertheless, at the individual level, especially in Chinese sample, how the dimensions of self-control are combined and performs is still an urgent problem to be solved.

Latent profile analysis (LPA) is an individual-centered approach to understanding how different dimensions of self-control combine at the individual level and whether these combinations are related to individual development (Yin et al., 2020). An individual-centered research perspective helps to objectively examine the subject matter in order to more accurately and comprehensively reveal the intrinsic nature of self-control in high school students (Jieting et al., 2010). Therefore, considering the current serious situation of cyberbullying among high school

students in China (Dou et al., 2020; Wang & Ngai, 2021; Zhan et al., 2022), the present study proposes to analyze the latent structure of self-control of high school students based on the dual-system model of self-control through LPA, and to achieve accurate classification of self-control of high school students and understand the proportion of each latent profile in the whole according to their response patterns in various dimensions. Moreover, it is also important to explore the factors that influence categorization as examining latent profiles of self-control not only helps to present a more comprehensive picture of the impact of cognitive factors on cyberbullying among high school students, but also paves the way for more targeted interventions. Researches had shown that gender, being an only child or not, and location are important factors that influence individual self-control (Shuo et al., 2022; Yuanlin et al., 2018). Consequently, the present study will focus on the effects of gender, only child or not, and location on the classification of latent profiles of self-control among high school students.

In summary, this study proposes the following hypotheses as were shown in Fig. 1: (1) latent profiles of high school students' self-control may have specific distributions on impulsive and control systems, forming four types: high impulsive system type, high control system type, double high type and double low type (H1); (2) gender, only child or not and location influence the classification of latent profiles of high school students' self-control (H2); (3) the relationship between cyberbullying victimization and perpetration differs between groups of high school students at different levels of self-control, explicitly, that higher self-control can prevent high school students from developing serious cyberbullying behavior.

Methods

Participants

A cluster sampling method was adopted, and high school students from two public middle schools in Yunnan Province of the People's Republic of China were selected and measured on paper quality scale by class in 27th -31th October, 2021 after authorization was obtained from the head teacher of both high schools and parents. 1,450 participants were issued, excluding participants that were too short to answer (less than 2 s per question on average) (Zhong et al., 2021), too many missed answers, and regular responses (Liu et al., 2020), and 1,401 valid participants were recovered. Among them, 558 were boys ($M = 15.52$ years, $SD = 0.565$ years), and 843 were girls (60.2%, $M = 15.48$ years, $SD = 0.57$ years). There were 371 urban and 1,030 rural areas; 287 "only child" and 1,114 "non-only child". The average age of participants was 15.5 years, $SD = 0.57$ years.

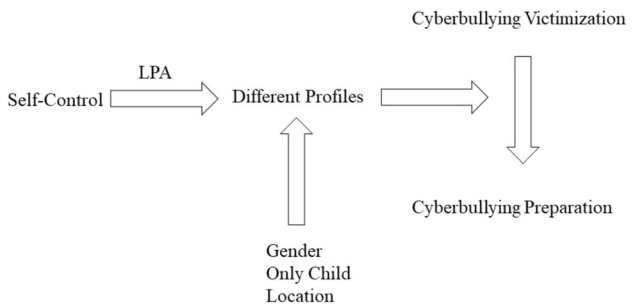

Fig. 1 Conceptualization of The Concepts

Measures

General information questionnaire

Demographic variables collected information on participants' age, gender (1 = Female, 2 = Male), only child or not (1 = only child, 2 = have other brother or sister) and location (1 = City, 2 = Village).

Self-control dual-system scale

The Dual-Mode of Self-Control Scale (DMSC-S) was compiled by Dvorak and revised by Xie (Dvorak & Simons, 2009; Xie et al., 2014). The scale consists of 21 items, divided into two sub-tables of impulse systems and control systems. The impulse system includes three dimensions of impulsivity (reflects that the tendency for individuals to react quickly and unplanned to internal or external stimuli, without regard to the negative consequences for themselves or others the negative consequences for oneself or others, e.g. "Do you mostly speak before thinking things out?"), distractibility (reflects that difficulty concentrating for long periods of time, e.g. "I am easily distracted from my school work.") and poor delay of gratification (reflects that a choice orientation that is unwilling to give up immediate gratification for a more valuable long-term outcome, e.g. "When I really want something, I cannot keep my mind off it."); the control system includes two dimensions of problem solving (reflects that the act of defining a problem; determining the cause of the problem; identifying, prioritizing, and selecting alternatives for a solution; and implementing a solution, e.g. "I do something to try to solve the problem.") and future time perspective (reflects that the cognitive, emotional and behavioral dispositions that individuals display when anticipating, planning and constructing their future social and self-development possibilities, e.g. "Thinking about the future is pleasant to me."). Using a 5-point scale (1 = completely disagree, 5 = completely agree), the items are summed up to get a total score, with the higher the score representing the higher level of self-control. In this

study, the confirmatory factor analysis showed that the three-factor model fits the data well (χ^2 (179, $N = 1{,}401$) = 1,093. 369, $CFI = 0.922$, $TLI = 0.908$, $SRMR = 0.046$, $RMSEA = 0.06$, $90\%CI = [0.057, 0.064]$). The Cronbach's α coefficients of impulse system and control system were 0.895 and 0.876, and six dimensions of impulsivity, distractibility, poor delay of gratification, problem solving, and future time perspective were 0.876, 0.9, 0.78, 0.668 and 0.875, respectively, and the Cronbach's α coefficient of the total scale was 0.939.

Cyberbullying questionnaire

This scale was revised based on the European Cyberbullying Intervention Project Questionnaire (https://doi.org/10.1016/j.chb.2015.03.065), which consists of 14 items containing two subscales that measures cyberbullying victimization and the cyberbullying perpetration (Zhu et al., 2021). Using a 5-point scale (0 = never, 4 = almost every day), items are added to obtain a total score, with higher scores indicating higher levels of individual cyberbullying victimization and perpetration. In this study, the confirmatory factor analysis showed that the three-factor model fits the data well (χ^2 (76, $N = 1{,}401$) = 230.012, $CFI = 0.848$, $TLI = 0.818$, $SRMR = 0.055$, $RMSEA = 0.038$, $90\%CI = [0.032, 0.044]$). The Cronbach's α coefficient for the cyberbullying victimization scale was 0.78, and the Cronbach's α coefficient for the cyberbullying perpetration scale was 0.77.

Research procedures

The questionnaire and methodology for this study was approved by the Human Research Ethics committee of the Kunming Medical University (Ethics approval number: 2021kmykdx6f66). The present study adopted the cluster sampling, which was conducted in a class unit. Each class was equipped with 2 postgraduates who have received operation training as the main test. Before the test, the main tester read out the instructions, explained the meaning of the survey in the instructions, and emphasized that the survey was anonymous and that there were no right or wrong answers, and the participators were required to answer independently according to their actual situation. It took about 20 min for the participators to complete all the questionnaires.

Statistical processing

In the present study, SPSS 26.0 was used for data entry and descriptive statistical analysis of related variables, Mplus8.0 was used for latent profile analysis of self-control, and investigating the relationship between different profiles of self-control and other variables. Specifically, data analysis consists of four parts, the first part, Harman one-factor test was used to examinate possible common method deviations.

In the second part, the latent profile analysis of self-control was conducted to seek a model that fits the optimal index (Nylund-Gibson et al., 2007). LPA enumeration indexes include information criteria, classification criteria, and likelihood ratio test derivatives (Peugh & Fan, 2013). Commonly used information criteria include *LL* (the model-based log-likelihood statistic), *AIC* (Akaike Information Criteria), *BIC* (Bayesian Information Criteria), and *aBIC* (Sample-Size Adjusted BIC); the commonly used classification criteria is *Entropy*, a standardized index for determining the accuracy of a model classification, with values between 0 and 1; the likelihood ratio test derivatives is used to compare two nested models (*k* profile models and *k-1* profile models) commonly used metrics include *LMR* (Lo-Mendell Rubin Likelihood Ratio Test), *BLRT* (Bootstrap Likelihood Ratio Test) (Nylund-Gibson et al., 2007; Tofighi & Enders, 2008).

Based on the analysis results of the above statistical indicators, according to the scoring pattern of the participants in the five dimensions of self-control, the types of self-control of high school students were divided into 1—5 categories in turn for latent profile model fitting. The optimal model was generally judged by the following indicators: (1) The smaller the value of *LL*, *AIC*, *BIC, BIC*, *aBIC*, the better the model fit. (2) The larger the *Entropy* value of the classification criteria indicator, the better the model fit. When $Entropy < 0.60$, it is equivalent to more than 20% of individuals with classification errors. When $Entropy \geq 0.80$, it means that the classification accuracy rate exceeds 90%, so it is generally required to be greater than 0.7 (Nagin, 2009; Stanley et al., 2016); (3) *LMR* and *BLRT* is significant ($p < 0.05$), which shows that adding a profile significantly improves the fitness of the model.

The R3STEP command conducts a series of multinomial logistic regressions that are used to assess whether an increase in an antecedent would result in a higher probability that a person belongs to one class over another class. In the third part, using the latent profile results obtained from the first part as the dependent variable, polynomial logistic regression (R3STEP command) was conducted to explore the effect of demographic variables (gender, location, only children or not) on the different profile of self-control (Asparouhov & Muthén, 2014a).

The BCH command is used for continuous distal outcome variables and uses a weighted multiple group analysis to test for differences in outcome variables across class membership. In the fourth part, using the results of the self-control profile obtained in the first step as an independent variable, the BCH command was conducted to analyze the difference and the moderating effect on different outcome variables

(cyberbullying victimization and perpetration) of the latent profile of self-control (Asparouhov & Muthén, 2014b).

Results

Common method deviation test

All the items in this research were put together for exploratory factor analysis, and the variation of the first principal component interpretation obtained without rotation was 20.68%, which was less than the critical value of 40% (Zhou & Long, 2004), indicating that there was no serious common method deviation problem in this study.

Descriptive statistical analysis

The mean, standard deviation, and correlation coefficients of variables are shown in Table 1. Among them, the dimensions of the self-control control system were significantly negatively correlated with the various dimensions of the impulse system, cyberbullying victimization and perpetration (from r=-0.29, $p<0.01$ to r=-0.06, $p<0.05$). What's more, the various dimensions of the impulse system were significantly positively correlated with the victimization and perpetration of cyberbullying (from $r=0.11$, $p<0.01$ to $r=0.56$, $p<0.01$).

Self-controlled submersible profile analysis

As shown in Table 2, the values of *AIC*, *BIC*, *aBIC* gradually decreased with the increase of the number of classifications, and declined flattened after the 4-profile, indicating that the 4-profile model was the inflection point of the descent. Secondly, the *LMR* and *BLRT* tests of the 4-profile model reached significant levels, and *Entropy* value got the largest at 4-profile model. In addition, the *LMR* of the 5-profile model was not significant. Therefore, it was more appropriate to choose 4-profile model, which had the best fitting data.

Considering the enumeration indexes, the 4-profile model was the optimal model, and the average probability of attribution of high school students in each profile was between 84 and 97%, which means that the results of the 4-profile model were credible. The scores of the four profiles on the 5 dimensions of self-control were shown in Fig. 2. Among them, the C1 profile scored significantly lower on each dimension than other profiles, containing 3.49% (49) of the participants, and this profile was named "low-control type" according to its scoring characteristics; The C3 profile scored significantly higher on all dimensions of the impulse system than other profiles, containing 18.49% (259) of the participants, and this profile was named "high-impulse type"; The C4 profile scored significantly higher in each dimension of the control system than other profiles, which contained 13.78% (193) of the participants, and this profile

Table 1 Mean, standard deviations and correlation matrices of variables

Variables	*M*	*SD*	CS_PS	CS_FTP	IS_I	IS_D	IS_PDG	CV	CI
CS_PS	2.7	0.7	1						
CS_FTP	1.99	0.92	0.5**	1					
IS_I	1.39	0.85	-0.22**	-0.25**	1				
IS_D	1.69	1.00	-0.18**	-0.29**	0.56**	1			
IS_PDG	1.21	0.82	-0.15**	-0.13**	0.49**	0.42**	1		
CV	0.22	0.36	-0.07**	-0.06*	0.15**	0.14**	0.13**	1	
CI	0.04	0.15	-0.07**	-0.06*	0.17**	0.11**	0.11**	0.44**	1

N=1,401, *$p<.05$, **$p<.01$. *CS_PS* problem solving dimension of control system, *CS_FTP* future time perspective dimension of control system, *IS_I* impulsivity dimension of impulse system, *IS_D* distractibility dimension of impulse system, *IS_PDG* poor delay of gratification dimension of impulse system, *CV* Cyberbullying Victimization, *CI* Cyberbullying Implementation

Table 2 Model fit of latent profile analysis

Model	*FP*	*LL*	*AIC*	*BIC*	*aBIC*	*Entropy*	*BLRT*(*p*)	*LMR*(*p*)	Class Proportions
1	10	-8,803.35	17,626.71	17,679.16	17,647.39				
2	16	-8,394.83	16,821.65	16,905.57	16,854.74	0.71	<0.01	<0.01	0.25/0.75
3	22	-8,090.95	16,225.90	16,341.29	16,271.40	0.81	<0.01	<0.01	0.66/0.03/0.31
4	28	-7,864.69	15,785.38	15,932.24	15,843.30	0.83	<0.01	<0.01	0.04/0.64/0.18/0.14
5	34	-7,800.28	15,668.57	15,846.90	15,738.89	0.77	<0.01	>0.05	0.04/0.36/0.43/0.11/0.06

FP Free Parameters, *LL* Model-Based Log-Likelihood Statistic, *AIC* Akaike Information Criteria, *BIC* Bayesian Information Criteria, *aBIC* Sample-Size Adjusted BIC, *LMR* Lo-Mendell Rubin Likelihood Ratio Test, *BLRT* Bootstrap Likelihood Ratio Test

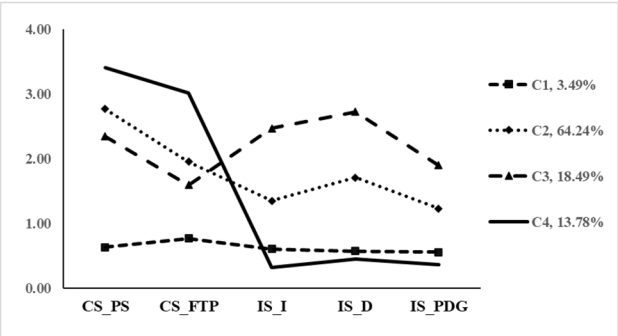

Fig. 2 Latent Profile Analysis Diagram of Self-Control

was named "high-control type"; The C2 profile scored lower than the C3 profile in each dimension of the impulse system and the C4 profile in control system respectively, but higher than the C1 profile overall, which contained 64.24% (900) of the participants, and this profile was named "balance type".

Differences in the total self-control score and dimensions of different profile of high school students

In order to explore whether the classification of latent profiles of self-control in high school students was heterogeneous, the self-control of high school students with four latent profiles was compared, and the results were as shown in Table 3. *Post-hoc* multiple comparison analysis found that there were significant differences in the total scores and dimensions of self-control among different profiles of high school students, which indicated that the latent profile of self-control of high school students could distinguish the degree of self-control of high school students, and also showed that the latent profile was effective, supporting H1.

Effects of demographic variables on the latent profile of self-control in high school students

Using R3STEP command, the four latent profiles of self-control were used as the dependent variables, and gender, only child or not, location were used as the independent variables for polynomial *logistic* regression analysis, according to *OR* (odds ration) values determining the impact of gender, only child or not, and location on high school students' self-control. It can be seen from Table 4 that with the low-control type (C1) of high school students as the reference group, the balanced type (C2), high -impulse type (C3) and high-control type (C4) of high school students were compared with them. According to the *OR* value, Gender affected the distribution of self-control profiles of high school students, but the only child or not and the location did not affect the distribution of self-control types of high school students. Specifically, girls were more likely to belong to C1 (lower levels of self-control) than boys, which supported H2.

Table 3 Comparison of Self-Control Status in Different Self-Control Profiles of High School Students

	Latent Profile of Self-Control				*F*	Post Hoc
	C1	C2	C3	C4		
SC_CS	0.61	1.42	2.44	0.34	1,180.30***	C4 < C1 < C2 < C3
SC_IS	0.66	2.50	2.05	3.30	541.37***	C1 < C3 < C2 < C4
CS_PS	0.61	2.77	2.30	3.43	538.37***	C1 < C3 < C2 < C4
CS_FTP	0.77	1.96	1.55	3.03	185.10***	C1 < C3 < C2 < C4
IS_I	0.62	1.35	2.54	0.28	706.04***	C4 < C1 < C2 < C3
IS_D	0.58	1.71	2.78	0.42	434.98***	C4, C1 < C2 < C3
IS_PDG	0.56	1.23	1.95	0.32	236.78***	C4 < C1 < C2 < C3

$N = 1{,}401$, $^{***}p < .001$. *SC_CS* control system of self-control, *SC_IS* impulse system of self-control, *CS_PS* problem solving dimension of control system, *CS_FTP* future time perspective dimension of control system, *IS_I* impulsivity dimension of impulse system, *IS_D* distractibility dimension of impulse system, *IS_PDG* poor delay of gratification dimension of impulse system

Table 4 Polynomial *Logistic* regression with self-control

Anterior Dependent Variable	Balance Type		High-Impulse Type		High-Control Type	
	OR	*CI (95%)*	*OR*	*CI (95%)*	*OR*	*CI (95%)*
Gender	0.22***	[0.11, 0.41]	0.24***	[0.12, 0.47]	0.27***	[0.13, 0.54]
Child	0.98	[0.46, 2.09]	0.90	[0.40, 2.01]	1.09	[0.48, 2.48]
Location	0.86	[0.41, 1.79]	0.81	[0.37, 1.75]	0.75	[0.34, 1.65]

$N = 1{,}401$, $^{***}p < .001$

The impact of latent profile of high school students' self-control on cyberbullying

In order to explore the influence of different types of self-control on high school students cyberbullying victimization and perpetration, BCH command was used to analyze the differences between cyberbullying victimization and perpetration of different self-control profiles. From Table 5, there were significant differences in the different types of self-control profiles in both cyberbullying victimization and perpetration. Specifically, high-impulse type high school students had the highest levels of cyberbullying victimization and perpetration behavior, while high-control type high school students had the lowest levels of cyberbullying victimization and perpetration.

The moderating role of the self-control latent profile between high school students cyberbullying victimization and perpetration

Using the BCH command, with the four latent profiles of self-control as moderator variables, high school students' cyberbullying victimization as an independent variable, and cyberbullying perpetration as a dependent variable, grouped regression analysis was performed. The results showed that the impact of high school students' cyberbullying victimization on the perpetration of cyberbullying was different in different profile groups. As shown in Fig. 3, the balance type (C2) ($\beta = 0.461$, $p < 0.001$) and the high-impulse type (C4) ($\beta = 0.541$, $p < 0.001$). High school students' cyberbullying victimization significantly predicted the perpetration, and compared with balanced type, with the increase of cyberbullying victimization level, high-impulse type individuals were more likely to implement cyberbullying, which supported H3.

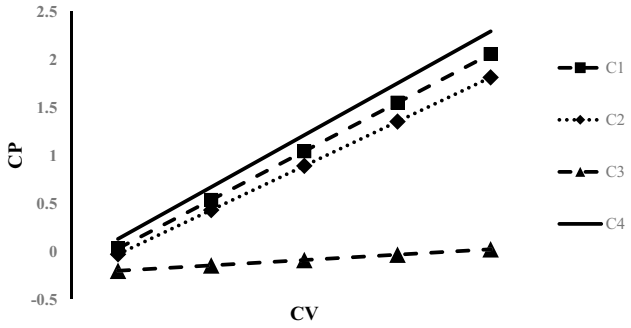

Fig. 3 Moderating Effect of Latent Profile Class of Self-Control

Discussion

Although there had been rich research results on self-control, previous researches had mainly focused on variables, exploring the structure of self-control and its negative effects. Little was known about how the structure of self-control exists at the individual level and how it relates to cyberbullying. Based on the General Aggressive Model of cyberbullying and the dual-system model of self-control, this study used LPA to explore the latent structure of self-control of high school students at the individual level, and analyzed its relationship with demographic statistical variables and cyberbullying, which provided a new and dialectical perspective for self-control related research.

First, different from previous variable-centered studies, this study is individual-centered and explores the underlying structure of high school students' self-control based on latent profile analysis, and relevant statistical indicators support the 4-profile model. Gender can affect the profile categories of high school students' self-control, and different profiles also affect the level of cyberbullying victimization and perpetration, which also shows the scientific nature and significance of the classification. According to the response patterns of the participants to the relevant measurement items, the self-control profiles of high school students were named as "low-control type", "high-impulse type", "high-control type" and "balance type" respectively, and excavated the composition mode of each dimension of the self-control at the individual level. Therefore, the different types of self-control profiles analyzed by the latent profile have differences in the impulsive system and the control system, respectively, which further supports the dual-system model of self-control and provide a new perspective for understanding the self-control types of high school students. Second, by analyzing the relationship between different profiles of self-control and cyberbullying among high school students, this study further revealed the moderating effect of self-control between cyberbullying victimization and perpetration, that is, high-impulse type individuals are more likely to bully others in a similar way after being cybervictims. The results improve the mechanism of cognitive factors affecting the development of victims into bullies in the General Aggressive Model of cyberbullying. In addition, the findings of the study also have certain implications for educational work. On the one hand, with the development of the information age, the problem of

Table 5 Positive and negative effects of different latent profiles

	C1($n=49$)	C2($n=900$)	C3($n=259$)	C4($n=193$)	F	Post Hoc
CV	0.22 ± 0.06	0.21 ± 0.01	0.33 ± 0.03	0.12 ± 0.03	24.65^{***}	C3 > C2 > C4
CP	0.05 ± 0.03	0.04 ± 0.01	0.09 ± 0.02	0.01 ± 0.01	29.86^{***}	C3 > C2 > C4

$N = 1{,}401$, $^{***}p < .001$. *CV* Cyberbullying Victimization, *CP* Cyberbullying Perpetration

youth campus bullying has developed from offline to Internet platforms, and its negative impact on students' development has become more and more serious. School administrators should pay attention to the harm of cyberbullying, and through mental health education and self-control intervention, reduce the risk of students being victimization and cyberbully, and take correct measures to deal with bullying, so as to create a free, healthy and active learning environment for high school students that promotes their learning engagement in order to achieve better academic outcomes and life development.

Latent profile analysis of self-control in high school students

Based on the five dimensions of self-control of high school students, LPA was used to explore the latent structure of self-control of high school students, and the 4-profiles model was selected as the optimal model according to the comprehensive consideration of relevant fitting indicators, including four profiles of low control type, high impulsivity type, high control type and balance type. The present study found that self-control in high school students could be classified by differences in impulse system and control system scores, indicating that high school students were not a homogeneous group and that there were group differences within them (Xiang et al., 2021; Xu et al., 2022). Among them, the low-control type (C1) scored lower than other profiles in each dimension; The high-impulse type (C2) scored significantly higher on all dimensions of the impulse system than other profiles; The high-control type (C3) scored in each dimension of the control system were significantly higher than those of other profiles; The balance type (C2) scored lower than C3 and C4 in the impulse system and control system dimensions, respectively, but the overall score was higher than the C1 profile in each dimension, which showed that most of the self-control ability of high school students belonged to the balanced development of impulse systems and control systems, impulse and controlling high school students accounted for a certain proportion, and individuals with low impulse systems and control systems relatively accounted for the smallest proportion.

Relationship between demographic variables and different self-control profiles of high school students

The results of polynomial regression analysis showed that gender significantly predicted that individuals belonged to a specific profile. In other words, compared with boys, girls were more likely to belong to the type of self-control profile with lower impulse and control systems. Previous studies have also shown that boys have higher levels of self-control than girls (Ding et al., 2022; Wang et al., 2022). These gender differences may come from the fact that gender roleization in the Chinese cultural context gives boys a stronger sense of calmness and responsibility, requiring them to keep calm in their daily life, to do things carefully and not to be impulsive to influence their judgments; girls are required to be more Well-behaved and docile, easy to obtain and use social support, have a higher tolerance for impulsiveness and can make some uncontrolled behaviors. This also suggests that educators should pay attention to the current situation of weak self-control girls, non-only children and rural household of high school students as well as related problem behaviors such as cyberbullying, mobile phone addiction, and non-suicidal self-injury (Gao et al., 2021; Li & Jin, 2020).

The impact of different high school students' self-control profiles on victimization and perpetration of cyberbullying

This study employed BCH command to examine the effects of different profiles of self-control between cyberbullying victimization and perpetration. The results showed that high-impulse type students scored significantly higher on cyberbullying victimization and perpetration behaviors than the other two profiles, indicating that the stronger the control system trait of individual self-control, the less likely it is to become a cybervictim and cyberperpetrator, which was consistent with previous studies that people with low self-control are more likely to fall into criminal behavior and become repeated victims and perpetrators (Flexon et al., 2015; Jennings et al., 2010; Lee & Kim, 2016). The results of the moderation effect test showed that the relationship between cyberbullying victimization and perpetration of high school students varied with the differences in self-control profiles, specifically, when experiencing cyberbullying victimization, high-impulse type individuals that had higher scores on the impulsive system and lower scores on the control system are more likely to develop cyberbullying behaviors than balance type individuals, in other words, those with high control system scores are less likely to commit criminal behavior in the face of violent situations (Brown, 2019). The result was also in line with the assumption of the General Aggressive Model of cyberbullying, that is, people with high levels of the control system are more likely to exhibit behaviors that conform to social expectations and norms, while people with high levels of the impulsive system tend to seek thrill-seeking and risk-taking behaviors and regardless behavioral long-term consequences (Wong et al., 2018). As a result, the internal assessment strategies of individuals affected by cyberbullying are affected by self-control, thereby changing their attempts to carry out cyberbullying behaviors (Kowalski et al., 2014). In conclusion, a stronger individual control

system can help mitigate the negative effects of risk factors on the cyberbullying perpetration.

Limitations and future stance

There are some inadequacies in this study. Firstly, although this paper analyzes the causes and consequences of self-control of high school students by constructing a latent profiles model from cross-sectional data, it is still difficult to accurately infer the causal relationship between these variables. Future studies could employ longitudinal study designs or experimental designs to test causal relationships between self-control and more relevant variables. Secondly, the participants of this study only used a single group of high school students, and future studies can use a variety of samples such as middle school students or college students to verify the self-controlled cross-sectional results and their relationships. Thirdly, the variables in this study were all self-reported by students, and although common method bias was not tested as serious, future studies could use multiple sources of reporting to collect data to enhance the objectivity of the results.

Conclusion

There are four latent profiles of self-control in high school students, namely "low-control type", "high-impulse type", "high-control type" and "balance type"; Female high school students are more likely to be low control than male high school students; Different profiles of self-control have a moderating effect between the impact of cyberbullying victimization and perpetration, compared with balance individuals, that is, with the increase in the level of cyberbullying victimization, high-impulse type individuals are more likely to be cyberperpetrators.

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Declarations

Ethical approval The questionnaire and methodology for this study was approved by the Human Research Ethics committee of the Kunming Medical University (Ethics approval number: 2021kmykdx6f66).

Informed consent Informed consent was obtained from all individual participants and legal guardians included in the study. The participant has consented to the submission of the data to the journal.

Conflicts of interest The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Adediran, A. O. (2020). Cyberbullying in Nigeria: examining the adequacy of legal responses. *International Journal for the Semiotics of Law - Revue Internationale De Sémiotique Juridique, 34*(4), 965–984. https://doi.org/10.1007/s11196-020-09697-7

Álvarez-García, D., Núñez, J. C., García, T., & Barreiro-Collazo, A. (2018). Individual, family, and community predictors of cyber-aggression among adolescents. *The European Journal of Psychology Applied to Legal Context, 2018*(2), 1–10. https://doi.org/10.5093/ejpalc2018a8

Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology, 53*(1), 27–51. https://doi.org/10.1146/annurev.psych.53.100901.135231

Asparouhov, T., & Muthén, B. (2014a). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal, 21*(3), 329–341. https://doi.org/10.1080/10705511.2014.915181

Asparouhov, T., & Muthen, B. (2014b). Auxiliary variables in mixture modeling: Using the BCH method in Mplus to estimate a distal outcome model and an arbitrary secondary model.

Bailin, A., Milanaik, R., & Adesman, A. (2014). Health implications of new age technologies for adolescents: A review of the research. *Current Opinion in Pediatrics, 26*(5), 605–619. https://doi.org/10.1097/MOP.0000000000000140

Brown, W. (2019). The influence of self-control on the impact of exposure to violence among youths. *Victims & Offenders, 14*(6), 692–711. https://doi.org/10.1080/15564886.2019.1630539

Buelga, S., Cava, M. J., & Musitu, G. (2012). Validation of the adolescent victimization through mobile phone and internet scale. *Revista Panamericana de Salud Publica, 32*(1), 36-42. https://doi.org/10.1590/s1020-49892012000700006 (Validacion de la Escala de Victimizacion entre Adolescentes a Traves del Telefono Movil y de Internet.)

Cagirkan, B., & Bilek, G. (2021). Cyberbullying among Turkish high school students. *Scandinavian Journal of Psychology, 62*(4), 608–616. https://doi.org/10.1111/sjop.12720

Calpbinici, P., & TasArslan, F. (2019). Virtual behaviors affecting adolescent mental health: The usage of Internet and mobile phone and cyberbullying. *Journal of Child and Adolescent Psychiatric Nursing, 32*(3), 139–148. https://doi.org/10.1111/jcap.12244

Cañas, E., Estévez, E., Marzo, J. C., & Piqueras, J. A. (2019). Psychological adjustment in cybervictims and cyberbullies in secondary education. *Anales De Psicologia, 35*(3), 434–443. https://doi.org/10.6018/analesps.35.3.323151

Canestrari, C., Arroyo, G. D. M., Carrieri, A., Muzi, M., & Fermani, A. (2021). Parental attachment and cyberbullying victims: the mediation effect of gelotophobia. *Current Psychology*, 1-12. https://doi.org/10.1007/s12144-021-01642-6

Casey, B. J., Jones, R. M., & Hare, T. A. (2008). The adolescent brain. *Annals of the New York Academy of Sciences, 1124*(1), 111–126.

Catone, G., Senese, V. P., Pisano, S., Siciliano, M., Russo, K., Muratori, P., Marotta, R., Pascotto, A., & Broome, M. R. (2020). The drawbacks of Information and communication technologies: Interplay and psychopathological risk of nomophobia and cyberbullying, results from the bullying and youth mental health Naples study (BYMHNS). *Computers in Human Behavior, 113*, Article 106496. https://doi.org/10.1016/j.chb.2020.106496

D Nagin 2009 Group-based modeling of development Harvard University Press https://doi.org/10.4159/9780674041318

Delgado, M. R. (2007). Reward-related responses in the human striatum. *Annals of the New York Academy of Sciences, 1104*, 70–88. https://doi.org/10.1196/annals.1390.002

Ding, Q., Wang, Z., Zhang, Y., & Zhou, Z. (2022). The more "Gossip", the more addicted: The relationship between interpersonal curiosity and social networking sites addiction tendencies in college students. *Psychological Development and Education, 38*(01), 118–125. https://doi.org/10.16187/j.cnki.issn1001-4918.2022.01.14

Dou, G., Xiang, Y., Sun, X., & Chen, L. (2020). Link between cyberbullying victimization and perpetration among undergraduates: Mediating effects of trait anger and moral disengagement. *Psychology Research and Behavior Management, 13*, 1269–1276. https://doi.org/10.2147/prbm.S286543

Dvorak, R. D., & Simons, J. S. (2009). Moderation of resource depletion in the self-control strength model: Differing effects of two modes of self-control. *Personality & Social Psychology Bulletin, 35*(5), 572–583. https://doi.org/10.1177/0146167208330855

Flexon, J. L., Meldrum, R. C., & Piquero, A. R. (2015). Low self-control and the victim-offender overlap: A gendered analysis. *Journal of Interpersonal Violence, 31*(11), 2052–2076. https://doi.org/10.1177/0886260515572471

Gao, B., Zhu, S., & Wu, J. (2021). The Relationship between mobile phone addiction and learning engagement in college students: The mediating effect of self-control and moderating effect of core self-evaluation. *Psychological Development and Education, 37*(03), 400–406. https://doi.org/10.16187/j.cnki.issn1001-4918.2021.03.11

Gonzalez-Cabrera, J. M., Leon-Mejia, A., Machimbarrena, J. M., Balea, A., & Calvete, E. (2019). Psychometric properties of the cyberbullying triangulation questionnaire: A prevalence analysis through seven roles. *Scandinavian Journal of Psychology, 60*(2), 160–168. https://doi.org/10.1111/sjop.12518

Guerra-Bustamante, J., Yuste-Tosina, R., Lopez-Ramos, V. M., & Mendo-Lazaro, S. (2021). The Modelling effect of emotional competence on cyberbullying profiles. *Anales De Psicologia, 37*(2), 202–209. https://doi.org/10.6018/analesps.3380711

Gül, H., Fırat, S., Sertçelik, M., Gül, A., Gürel, Y., & Kılıç, B. G. (2018). Cyberbullying among a clinical adolescent sample in Turkey: Effects of problematic smartphone use, psychiatric symptoms, and emotion regulation difficulties. *Psychiatry and Clinical Psychopharmacology, 29*(4), 547–557. https://doi.org/10.1080/24750573.2018.1472923

Hofmann, W., Friese, M., & Strack, F. (2009). Impulse and Self-Control From a Dual-Systems Perspective. *Perspectives on Psychological Science, 4*(2), 162–176. https://doi.org/10.1111/j.1745-6924.2009.01116.x

Hu, F., Chen, G., & Cai, T. (2012). Preliminary Study on Self-Control Scale on Chinese Middle School Students. *China Journal of Health Psychology, 20*(8), 1183–1184.

Huifen, S., Cuiying, F., Xiaowei, C., Xuechen, Z., & Lingling, W. (2020). Cyberbullying victimization and cyberbullying perpetration among adolescents: The roles of normative beliefs about aggression and dual-mode of self-control. *Journal of Psychological Science, 43*(05), 1117–1124. https://doi.org/10.16719/j.cnki.1671-6981.20200513

Jacobson, C., Bailin, A., Milanaik, R., & Adesman, A. (2016). Adolescent health implications of new age technology. *Pediatric Clinics of North America, 63*(1), 183–194. https://doi.org/10.1016/j.pcl.2015.09.001

Jennings, W. G., Higgins, G. E., Tewksbury, R., Gover, A. R., & Piquero, A. R. (2010). A longitudinal assessment of the victim-offender overlap. *Journal of Interpersonal Violence, 25*(12), 2147–2174. https://doi.org/10.1177/0886260509354888

Jieting, Z., Can, J., & Minqiang, Z. (2010). Application of Latent Class Analysis in Psychological Research. *Advances in Psychological Science, 18*(12), 1991–1998. {https://journal.psych.ac.cn/xlkxjz/CN/abstract/article_966.shtml}

Kim, J.-G. (2013). The Effect of Violence Victimization and Academic Stress on Cyberbullying of Youths. *Korean Criminal Psychology Review, 9*(1), 47–68. <Go to ISI>://KJD:ART001766687

Kowalski, R. M., & Limber, S. P. (2007). Electronic bullying among middle school students. *Journal of Adolescent Health, 41*(6 Suppl 1), S22-30. https://doi.org/10.1016/j.jadohealth.2007.08.017

Kowalski, R. M., Giumetti, G. W., Schroeder, A. N., & Lattanner, M. R. (2014). Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. *Psychological Bulletin, 140*(4), 1073–1137. https://doi.org/10.1037/a0035618

Kraft, E. (2006). Cyberbullying: a worldwide trend of misusing technology to harass others. In K. Morgan, C. A. Brebbia, & J. M. Spector (Eds.), *Internet Society II: Advances in Education, Commerce & Governance* (Vol. 36, pp. 155–166). https://doi.org/10.2495/is060161

Lee, Y., & Kim, J. (2016). An examination of victimization trajectories among a sample of South Korean adolescents: Risk and protective factors. *Crime & Delinquency, 63*(11), 1434–1457. https://doi.org/10.1177/0011128716634103

Lee, C., Patchin, J. W., Hinduja, S., & Dischinger, A. (2020). Bullying and delinquency: The impact of anger and frustration. *Violence and Victims, 35*(4), 503–523. https://doi.org/10.1891/VV-D-19-00076

Li, S., & Jin, C. (2020). Parental Monitoring and Middle School Students' Involvement in Cyberbullying:The Chain Mediating Role of Self-control and Interpersonal Adjustment. *Chinese Journal of Clinical Psychology, 28*(06), 1221–1225. https://doi.org/10.16128/j.cnki.1005-3611.2020.06.029

Lim, S. (2013). Anti-Cyberbullying Law and Anti-Cyberbullying Education: Cases of Korean Anti School Violence Law. *Journal of Ethics, 1*(91), 107–125. <Go to ISI>://KJD:ART001804726

Liu, D., Chen, Y., Yang, A., Ye, M., & Wu, L. (2020). The Relationship between Workaholism profiles and Job Performance of High School Teachers: A Latent Profile Analysis. *Journal of Psychological Science, 43*(1), 193–199. http://www.psysci.org/CN/abstract/article_10493.shtml

Lucas-Molina, B., Perez-Albeniz, A., & Fonseca-Pedrero, E. (2018). The potential role of subjective wellbeing and gender in the relationship between bullying or cyberbullying and suicidal ideation. *Psychiatry Research, 270*, 595–601. https://doi.org/10.1016/j.psychres.2018.10.043

Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., Houts, R., Poulton, R., Roberts, B. W., & Ross, S. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences, 108*(7), 2693–2698. https://doi.org/10.1073/pnas.1010076108

Moreno-Ruiz, D., Martínez-Ferrer, B., & García-Bacete, F. (2019). Parenting styles, cyberaggression, and cybervictimization among adolescents. *Computers in Human Behavior, 93*, 252–259. https://doi.org/10.1016/j.chb.2018.12.031

Mottram, A., & Fleming, M. (2009). Extraversion, Impulsivity, and Online Group Membership as Predictors of Problematic Internet Use. *Cyberpsychology & Behavior : The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society, 12*(3), 319–321. https://doi.org/10.1089/cpb.2007.0170

Nylund-Gibson, K., Asparouhov, T., & Muthén, B. (2007). Deciding on the number of classes in latent class analysis and growth mixture

modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(4), 535–569. https://doi.org/10.1080/10705510701575396

Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. *Trends in Cognitive Sciences, 9*(5), 242–249. https://doi.org/10.1016/j.tics.2005.03.010

Ortega-Barón, J., Buelga-Vasquez, S., & Cava-Caballero, M. J. (2016). The influence of school climate and family climate among adolescents victims of cyberbullying. *Comunicar, 24*(46), 57–65. https://doi.org/10.3916/c46-2016-06

Peugh, J., & Fan, X. (2013). Modeling unobserved heterogeneity using latent profile analysis: A Monte Carlo simulation. *Structural Equation Modeling A Multidisciplinary Journal, 20*(4), 616–639.

Ramos Salazar, L. (2021). Cyberbullying victimization as a predictor of cyberbullying perpetration, body image dissatisfaction, healthy eating and dieting behaviors, and life satisfaction. *Journal of Interpersonal Violence, 36*(1–2), 354–380. https://doi.org/10.1177/0886260517725737

Shuo, Z., Xuebin, C., Xuyang, D., & Xin, Z. (2022). The Relationship between family functioning and psychological resilience of adolescents: A moderated mediation model. *Studies of Psychology and Behavior, 20*(02), 204–211.

Smith, P. K., Mahdavi, J., Carvalho, M., Fisher, S., Russell, S., & Tippett, N. (2008). Cyberbullying: Its nature and impact in secondary school pupils. *Journal of Child Psychology and Psychiatry, 49*(4), 376–385. https://doi.org/10.1111/j.1469-7610.2007.01846.x

Somerville, L. H., Jones, R. M., & Casey, B. J. (2009). A time of change: Behavioral and neural correlates of adolescent sensitivity to appetitive and aversive environmental cues. *Brain and Cognition, 72*(1), 124–133. https://doi.org/10.1016/j.bandc.2009.07.003

Stanley, L., Kellermanns, F. W., & Zellweger, T. M. (2016). Latent Profile Analysis: Understanding Family Firm Profiles. *Family Business Review, 30*(1), 84–102. https://doi.org/10.1177/0894486516677426

Steinberg, L. (2008). A Social Neuroscience Perspective on Adolescent Risk-Taking. *Developmental Review : DR, 28*(1), 78–106. https://doi.org/10.1016/j.dr.2007.08.002

Tan, S., & Guo, Y. (2008). Revision of Self-Control Scale for Chinese College Students. *Chinese Journal of Clinical Psychology, 16*(5), 468–470.

Tofighi, D., & Enders, C. K. (2008). Identifying the correct number of classes in growth mixture models. *Advances in Latent Variable Mixture Models, 2007*(1), 317–341.

Tözun, M. (2018). Cyber Bullying And Its Effects On Adolescent And Youth Health. *Journal of Clinical and Analytical Medicine, 9*(2), 177–182. https://doi.org/10.4328/jcam.5426

Wang, X., Yan, L., & Ding, D. (2022). The Effect of Adverse Childhood Experiences on Middle School Students'Conscience: The Chain Mediating Role of Self-control Trait and Ego-depletion. *Psychological Development and Education, 38*(04), 566–575. https://doi.org/10.16187/j.cnki.issn1001-4918.2022.04.13

Wang, L., & Ngai, S.S.-Y. (2021). Cyberbullying Perpetration Among Chinese Adolescents: The Role of Power Imbalance, Fun-seeking Tendency, and Attitude Toward Cyberbullying. *Journal of Interpersonal Violence,* Article 08862605211062988. https://doi.org/10.1177/08862605211062988

Wills, T. A., & Stoolmiller, M. (2002). The role of self-control in early escalation of substance use: A time-varying analysis. *Journal of Consulting and Clinical Psychology, 25*(4), 986–997.

Wills, T., AshbyWindle, MichaelCleary, & Sean, & D. (1998). Temperament and novelty seeking in adolescent substance use: Convergence of dimensions of temperament with constructs from Cloninger's theory. *Journal of Personality and Social Psychology, 74*(2), 387–406.

Wills, T. A., Walker, C., Mendoza, D., & Ainette, M. G. (2006). Behavioral and emotional self-control: Relations to substance use in samples of middle and high school students. *Psychology of Addictive Behaviors, 20*(3), 265–278.

Wills, T. A., Ainette, M. G., Mendoza, D., Gibbons, F. X., & Brody, G. H. (2007). Self-control, symptomatology, and substance use precursors: Test of a theoretical model in a community sample of 9-year-old children. *Psychology of Addictive Behaviors, 21*(2), 205–215. https://doi.org/10.1037/0893-164X.21.2.205

Wong, R. Y. M., Cheung, C. M. K., & Xiao, B. (2018). Does gender matter in cyberbullying perpetration? An empirical investigation. *Computers in Human Behavior, 79*, 247–257. https://doi.org/10.1016/j.chb.2017.10.022

Xiang, G., Chen, H., Wang, Y., & Li, Q. (2021). The Correlation between Self-Concept Clarityand Subjective Well-being among Adolescents:A Latent Profile Analysis. *Journal of Southwest University (Social Sciences Edition), 47*(02), 153–160+229. https://doi.org/10.13718/j.cnki.xdsk.2021.02.015

Xie, D., Wang, L., Tao, T., Fan, C., & Gao, W. (2014). Validity and reliability of the Chinese version of the Dual-Mode of Self-Control Scale for adolescents. *Chinese Mental Health Journal, 28*(5), 386–391.

Xu, X., Mo, L., Liu, M., & Deng, C. (2022). Grade 10 Students' Achievement Goal Orientation Patterns and Their Academic Adjustment: Based on Latent Profile Analysis. *Psychological Development and Education, 38*(01), 81–89. https://doi.org/10.16187/j.cnki.issn1001-4918.2022.01.10

Yajun, L., Fumei, C., Furong, L., & Yun, W. (2015). Effect of Cyber Victimization on Deviant Behavior in Adolescents: The Moderating Effect of Self-control. *CHINESE JOURNAL OF CLINICAL PSYCHOLOGY, 23*(5), 896–900.

Yin, K., Peng, J., & Zhang, J. (2020). The application of latent profile analysis in organizational behavior research. *Advances in Psychological Science, 28*(7), 1056–1070. https://doi.org/10.3724/sp.j.1042.2020.01056

Yuanlin, D., Dan, L., & Jie, X. (2018). Parental Monitoring and Adolescents' Self-Control:The Moderating Effect of Fathers' Self-Control. *Chinese Journal of Special Education, 0*(11), 83–91. https://ci.cqvip.com/Qikan/Article/Detail?id=6100011212

Zhan, J., Yang, Y., & Lian, R. (2022). The relationship between cyberbullying victimization and cyberbullying perpetration: The role of social responsibility. *Frontiers in Psychiatry, 13*, 995937–995937. https://doi.org/10.3389/fpsyt.2022.995937

Zhong, X., Li, M., & Li, L. (2021). Preventing and detecting insufficient effort survey responding. *Advances in Psychological Science, 29*(2), 225–237. https://doi.org/10.3724/sp.J.1042.2021.00225

Zhou, H., & Long, L. (2004). Statistical Remedies for Common Method Biases. *Advances in Psychological Science, 12*(6), 942–942. https://doi.org/10.3969/j.issn.1671-3710.2004.06.018

Zhu, Y., Wu, S., Marsiglia, F. F., Wu, Q., & Chen, Q. (2021). Adaptation and validation of the European cyberbullying intervention project questionnaire with and for Chinese adolescents. *Health & Social Care in the Community,* 1–10. https://doi.org/10.1111/hsc.13466