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Follow the herd or your heart? The role of trait mindfulness in adolescents' responses to observed cyberbullying

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ABSTRACT

Cyberbullying has been a critical dark side of the digital era, but we have insufficient knowledge about how observers react to it. For adolescents, cyberbullying observation could represent the primary way of cyberbullying involvement. After observing cyberbullying, do adolescents learn to develop a similar behavioral pattern or not? The current study examined the effect of observed cyberbullying on adolescents' cyberbullying behavior, with a focus on the moderating role of trait mindfulness and the mediating mechanisms of emotion-related processes. Across three progressive studies (N = 1081), we found a social learning effect in which past observed cyberbullying experience was positively associated with adolescents' cyberbullying behavior. Importantly, trait mindfulness can weaken this effect via emotion-related processes (e.g., increased affective empathy). The findings provide both theoretical and practical implications for alleviating or preventing cyberbullying behavior among adolescents.

1. Introduction

Digital technologies give people access to not only convenient interpersonal communication on social networking but also a range of dark sides. Cyberbullying is a typical dark side of digitalization among adolescents, and how to prevent cyberbullying has been a major concern for parents, educators, and adolescents. Cyberbullying refers to intentional and repeated aggression against other people who are less able to defend themselves in cyberspace (Kowalski et al., 2012). In the literature on cyberbullying, perpetrators and victims represent two primary perspectives in understanding the interpersonal issues regarding cyberbullying (e.g., Camacho et al., 2023; Gao et al., 2023; Hinduja & Patchin, 2018; Varghese & Pistole, 2017; Wang & Ge, 2021). Although with less research attention, observers can also play a critical role in preventing or intervening in cyberbullying (DeSmet et al., 2016). Compared to conventional bullying, cyberbullying could be observed in a more frequent manner, because observers may experience cyberbullying events at any time and any place with the Internet (Van Cleemput et al., 2014). Does past experiences of cyberbullying observation shape individuals' cyberbullying behavior? The current study aims to examine the effect of observed cyberbullying on cyberbullying behavior, as well as its boundary conditions and mediating mechanisms, among adolescents.

According to the social learning theory (Bandura, 1978), adolescents imitate others' acts and develop their own behaviors through social observation. Thus, when adolescents observe others' cyberbullying behavior, they might conduct more cyberbullying behaviors. However, we posit that trait mindfulness buffers the positive effect of observed cyberbullying on cyberbullying behavior by regulating people's emotions (e.g., by raising positive emotions and reducing negative emotions). To illustrate, people with high trait mindfulness tend to interact with others in a calm rather than impulsive manner when being exposed to negative events (Bishop, 2004) and are able to protect themselves from ruminative thoughts and negative emotions (Borders et al., 2010). Thus, we argue that compared to those with low trait mindfulness, people with high mindfulness are more resourceful in managing their emotions to regulate their behaviors from cyberbullying despite being exposed to a cyberbullying environment.

This present study proposed a comprehensive research framework to examine the effect of observed cyberbullying on adolescents' cyberbullying behavior and tested it through a series of empirical studies. The main theoretical and practical contributions of this paper are as follows. First, this paper adds to the literature on adolescents' cyberbullying behavior by introducing past experiences of cyberbullying observation as an essential driver of adolescents' cyberbullying behavior.

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Second, this paper reveals that trait mindfulness could moderate the effect of observed cyberbullying on cyberbullying behavior among adolescents. This presents a nuanced psychological mechanism that can explain which adolescents (i.e., those with high trait mindfulness) conduct less cyberbullying behavior after they have observed cyberbullying. In this line, mindfulness-based interventions should be encouraged to be used in educational settings (Linehan, 1993; Segal et al., 2002) to reduce adolescents' cyberbullying behavior.

Third, this paper reveals that emotion-related states (e.g., affective empathy) mediate the moderation effect of trait mindfulness between observed cyberbullying and cyberbullying behavior among adolescents. This provides an extended understanding of why trait mindfulness could alleviate the adolescents' cyberbullying behavior under past life experiences (i.e., cyberbullying observation). In addition, it is worth noting that this research adds to the theoretical work demonstrating the orthogonal structure of affect (e.g., Warr et al., 1983; Watson et al., 1988). Particularly, we examined positive affect and negative affect as two orthogonal factors, which is important in understanding how they might uniquely contribute to outcomes of interest.

2. Theoretical framework and research hypothesis

2.1. Observed cyberbullying and cyberbullying behavior among adolescents

Adolescence is an important stage of human development, and the behavioral patterns developed in this stage extend to adulthood. Drawing on the social learning theory (Bandura, 1978), adolescents' behaviors are developed through social observation. The development of adolescents' cyberbullying behavior would be no exception. Indeed, cyberbullying occurs widely among adolescents (Macaulay et al., 2020). As estimated by previous studies, above 70 % of school-age adolescents experienced cyberbullying at least once a year (Juvonen & Gross, 2008), and the 2019 Youth Risk Behavior Surveillance System reported that 17.4 % to 28.3 % of middle schoolers were cyberbullied (Basile et al., 2020). Moreover, surveys showed that nearly 60 % of Canadian adolescents reported that they have observed cyberbullying (Li et al., 2015). In all, observing cyberbullying could be a common experience for adolescents in today's digitalized social networks (Holfeld & Mishna, 2018).

As a primary hypothesis in our study, we propose that past cyberbullying observation could predict adolescents' cyberbullying behavior. This idea has been evidenced or suggested by a few previous studies (Bastiaensens et al., 2016; Festl & Quandt, 2016; Holfeld & Mishna, 2018), but not investigated systematically, let alone the underlying *when* and *why* questions. Thus, our study aims first to test the hypothesis that observed cyberbullying is positively associated with adolescents' cyberbullying behavior (*Hypothesis 1*, *H1*) and then further investigate the potential boundary conditions and mediating mechanisms.

2.2. The moderating role of trait mindfulness

We draw on the conceptualization of mindfulness to examine the individual differences as *for whom* cyberbullying behavior can be less developed via observing cyberbullying. Understanding this potential boundary condition is critical for buffering the undesirable effect of observed cyberbullying on adolescents' cyberbullying behavior.

Mindfulness refers to a trait or the awareness of paying attention to and nonjudgmental acceptance of the present-moment experience (Hayes & Feldman, 2004; Kabat-Zinn, 2003), which has been theoretically and empirically associated with positive emotional and behavioral regulations (Bishop, 2004; Royuela-Colomer et al., 2018). Previous studies have evidenced that mindfulness was positively related to mental health (Juozelskyte & Catling, 2024; MacDonald & Neville, 2023), psychological well-being (Sheng et al., 2022), and physical health (De Cieri et al., 2019), and negatively related to stress, depression, and anxiety (Bajaj et al., 2016; Sharma & Kumra, 2022). Moreover, mindfulness may play an essential role in promoting individuals' moral behavior (Norenzayan, 2013), prosociality (Guan & Geng, 2024; Hafenbrack et al., 2020), and decreasing ostracism (Jones et al., 2019).

In particular, mindfulness can act as a protective individual factor against aggression or violence experiences (Gillions et al., 2019). Compared to people with low mindfulness, those with high mindfulness interact with others in a calm rather than impulsive manner when being exposed to negative events (Bishop, 2004), and are able to protect themselves from ruminative thoughts and negative emotions (Borders et al., 2010). Moreover, mindfulness can facilitate adolescents' emotional regulation and cognitive skills and consequently reduce problem behaviors (Goodman et al., 2017; Pallozzi et al., 2016). It has also been evidenced that adolescents with high mindfulness were less likely to conduct cyberbullying than those with low mindfulness (Emirtekin et al., 2019). Thus, we propose that trait mindfulness can weaken the positive effect of observed cyberbullying on adolescents' cyberbullying behavior (*Hypothesis 2*, *H2*).

2.3. The mediating role of emotion-related states

In this section, we extend our theorizing on *why* trait mindfulness may buffer the effect of past cyberbullying observation on adolescents' cyberbullying behavior, by focusing on emotion-related processes. First, compared with younger or older individuals, adolescents especially tend toward frequent and intense emotions that impact their behavior development (Larson et al., 1980; Silk et al., 2003). For instance, previous studies have suggested that negative emotions are especially likely to trigger aggressive behavior among adolescents (Kokkinos & Voulgaridou, 2017). This suggests that emotion-related processes might be especially important in understanding how adolescent behavior is shaped by external influences. In this line, withdrawing adolescents' cyberbullying behavior could be prompted by regulating their emotion-related states more effectively (Arató et al., 2021).

We focus on emotion-related states to understand the underlying mechanisms of trait mindfulness's buffering effect because a core approach to achieving the benefits of mindfulness is providing energies with which adolescents can better regulate their emotions (Goodman et al., 2017; Pallozzi et al., 2016). Thereby, we propose trait mindfulness can buffer the effect of past cyberbullying observations on adolescents' cyberbullying behavior by regulating multiple emotion-related states. More specifically, we investigate three core types of emotion-related states, namely negative affect, positive affect, and affective empathy.

Before moving on, we demonstrate the orthogonal structure of affect, which has been a long-lasting assumption in previous theoretical work (e.g., Warr et al., 1983; Watson et al., 1988). In particular, positive affect and negative affect have been repeatedly evidenced to be orthogonal and representative of distinct neurobiological bases (Carver & White, 1994; Mancini et al., 2016; Tellegen et al., 1999). For example, research has found that positive affect and negative affect show different developmental trajectories over time (e.g., Buecker et al., 2023), are impacted by different antecedents (e.g., de Vries & Bartels, 2025; Ulichney et al., 2024), and contribute to unique variances in outcomes (e.g., Layous et al., 2023; Pressman & Cohen, 2005). Moreover, we regard affective empathy (i.e., a companionate concern for vulnerable others) as an emotion-related state in our study, as consistent with relevant literature (e.g., Bernhardt & Singer, 2012; Brett et al., 2024; Clark et al., 2019; Pfattheicher et al., 2020; Sassenrath et al., 2016). Research has also documented unique neurobiological bases of empathy (Bernhardt & Singer, 2012).

As supported by the literature, mindfulness can help people to better tackle negative life events, such as resisting negative affect (e.g., Giluk, 2009), maintaining positive affect (e,g., Malinowski & Lim, 2015), and raising affective empathy for others' suffering (e,g., Winning & Boag, 2015). In turn, cyberbullying behavior could be reduced with less negative affect (e.g., Baek et al., 2019; Hong et al., 2014), more positive affect (e.g., Jin & Miao, 2022), and more empathy (e.g., Barlińska et al.,

2013). In sum, we developed *Hypothesis 3 (H3)*: Trait mindfulness can weaken the positive effect of observed cyberbullying on adolescents' cyberbullying behavior via emotion-related processes (i.e., higher level of positive affect [*H3a*], lower level of negative affect [*H3b*], and higher level of affective empathy [*H3c*]).

Fig. 1 offers a comprehensive model of our study.

2.4. Overview of the current research

We conducted three empirical studies to test our hypotheses. Using an adolescent sample from a middle-high school, Study 1 aimed to test the overall effect of observed cyberbullying on adolescents' cyberbullying behavior (*H1*) and the moderating role of trait mindfulness (*H2*). Further, using another adolescent sample of high school and university students, Study 2 aimed to replicate the results of Study 1 and to further test the mediating emotion-related processes (*H3*). Study 3[1] aimed to replicate the results of Study 1 and Study 2. To minimize the likelihood of common method bias, we have considered several procedural controls in our survey design, such as providing clear and precise instructions to participants, ensuring the confidentiality and anonymity of participant responses, using clear and unambiguous language in survey items, and maintaining brevity and avoiding unnecessary length to enhance participant engagement and minimize response fatigue. Such attempts are helpful to reduce the likelihood of common method bias (Podsakoff et al., 2012).

3. Study 1

3.1. Method

3.1.1. Participants and procedure

A total of 260 adolescents were collected from a middle-high school located in Southern China with the help of the school's managers. These adolescent participants were aged 12 to 20 ($M = 15.32$, $SD = 2.13$, 65 % female). In the surveys, participants took measurements of our focal and control variables. After that, they were debriefed and thanked. An inquiry done at the end of the survey showed that no participant surmised the actual research purpose.

We adhered to research ethics guidelines from the research ethics committee of the first authors' university. All the participants voluntarily participated in our study, signed consent forms and information sheets, and were assured of the confidentiality of their responses. We ensured and indicated to the participants about the sole academic purposes of our research, and that their participation would do no harm to their well-being.

3.2. Measures

3.2.1. Observed cyberbullying

Observed cyberbullying was measured using the adapted scale of the E-Victimization Scale (E-VS) for adolescents. The E-VS scale was developed and validated by Lam and Li (2013). The original five items with a victim perspective were adapted into an observer perspective (e.g., "How many times did you observe someone was teased using emails, texting, short messages, on a website such as Weibo and WeChat, etc.?"; 7-point Likert scale; 1 "never" to 7 "always"; Cronbach's α = 0.94).

3.2.2. Trait mindfulness

Trait mindfulness was measured using the Mindful Attention Awareness Scale (MAAS) developed by Brown and Ryan (Brown & Ryan, 2003). The MAAS scale consists of 15 items (e.g., a reverse coded item "It seems I am 'running on automatic,' without much awareness of what I'm doing"; 6-point Likert scale; 1 "never" to 6 "always"; Cronbach's α = 0.89).

3.2.3. Cyberbullying behavior

Adolescents' cyberbullying behavior was measured using the scale of the E-Bullying Scale (E-BS) for adolescents. The E-BS scale was also developed and validated by Lam and Li (2013). The E-BS scale consists of 6 items (e.g., "How many times did you tease someone using emails, texting, short messages, on a website such as Weibo and WeChat, etc.?"; 7-point Likert scale; 1 "never" to 7 "always"; Cronbach's α = 0.94).

3.2.4. Controls

In Study 1, besides controlling for the basic demographic variables (i.e., age, gender, and family income), we additionally controlled for the effects of the psychological distance between observers and perpetrators and victims, measured with four items. Two items were "How distant do you feel between you and the perpetrators/bulliers?" and "How distant do you feel between you and the victims/bullied persons?". The other two items were graphical measures consisting of seven increasingly overlapping circles, with the labels "Self" and "The perpetrators/bulliers" and the labels "Self" and "The victims/bullied persons." Such a graphical measure has been evidenced as useful in measuring individuals' cognitive patterns of relationship distance (Schultz, 2002). We created the measurement for psychological distance with the perpetrators (Cronbach's α = 0.70) and psychological distance with the victims (Cronbach's α = 0.78) by averaging two related items, respectively, for each measurement (7-point Likert scale; 1 "very far" to 7 "very close").

3.3. Results

3.3.1. Common method bias test

We used Harman's single-factor method to test the common method bias (Harman, 1976). As revealed by an unrotated explorative factor analysis for all items, the first factor accounted for 35.73 %, being lower than the 40 % standard. Therefore, we did not detect a serious common method bias in the current study (Podsakoff et al., 2003).

3.3.2. Confirmatory factor analysis and descriptive statistics

Descriptive statistics and the correlation matrix of all the measured variables in Study 1 are shown in Table 1. We conducted confirmatory factor analysis (CFA) to test the factorial validity of our multiple-item measures using the "lavaan" package (Rosseel, 2012) in R 4.1.0 (R-Core-Team, 2021). The results of CFA provided support for the factorial validity of the constructs measured in Study 1 ($\chi^2/340 = 2.71$, CFI = 0.87, TLI = 0.86, RMSEA = 0.08, SRMR = 0.06) (Hu & Bentler, 1999; Kline, 2010; Williams et al., 2020). The fit of this eight-factor model was significantly better than alternative CFA models in which any two of the eight factors were combined (*ps* of $\triangle\chi^2 < 0.001$). Together, the CFA analyses demonstrated sufficient validity for our measurements of different constructs.

3.3.3. Hypothesis test

H1 and *H2* were tested through multiple regressions in R 4.1.0 (R-Core-Team, 2021). We included controls in Step 1, then added the main effects of observed cyberbullying and trait mindfulness in Step 2 and Step 3, respectively, and finally added the interaction in Step 4. As shown in Table 2, we found that observed cyberbullying was positively associated with adolescents' cyberbullying behavior in Step 2 (β = 0.20, $SE = 0.07$, $p < .01$), supporting *H1*. Moreover, we found that trait mindfulness was negatively related to adolescents' cyberbullying behavior in Step 3 (β = −0.21, $SE = 0.06$, $p < .001$) and the interaction of observed cyberbullying and trait mindfulness was negatively associated with adolescents' cyberbullying behavior in Step 4 (β = −0.23, $SE = 0.05$, $p < .001$). Specifically, the simple slope of observed cyberbullying on adolescents' cyberbullying behavior was significantly positive

[1] Study 3 has been a preregistered study (for the preregistration information, please see https://osf.io/v68s9/?view_only=1d3d5ec40f244ccea286a7b1b4c10c13).

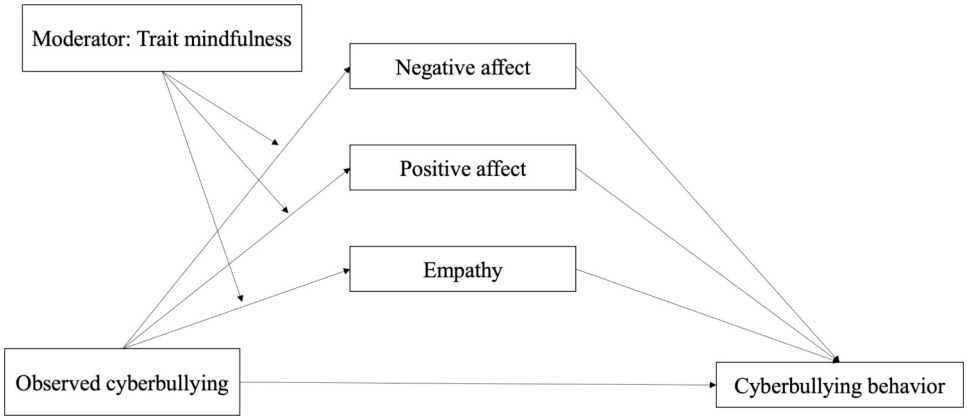

Fig. 1. The conceptional model of the study.

Table 1
Descriptive statistics and correlation matrix (Study 1).

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Age	15.32	2.13	–								
2. Gender [a]	–	–	−0.13*	–							
3. Family income [b]	2.86	2.15	0.32***	−0.02	–						
4. PD (perpetrator)	2.29	1.57	0.10	0.01	0.26***	–					
5. PD (victim)	2.85	1.89	0.18**	−0.01	0.32***	0.69***	–				
6. Observed cyberbullying	2.92	1.48	0.37***	−0.08	0.42***	0.50***	0.53***	–			
7. Trait mindfulness	4.02	0.91	−0.29***	0.07	−0.31***	−0.42***	−0.42***	−0.53***	–		
8. Cyberbullying behavior	1.62	1.01	0.08	−0.02	0.20**	0.55***	0.34***	0.40***	−0.41***		

Note. $N = 260$; [a] male = 1, female = 0; [b] we measured seven levels of family income with a range from <50 thousand to >300 thousand RMB per year; PD (Perpetrator) indicates the psychological distance between the observer and the perpetrator; PD (Victim) indicates the psychological distance between the observer and the victim; * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2
Regression models on adolescents' cyberbullying behavior (Study 1).

	Step 1	Step 2	Step 3	Step 4
Age	0.013	−0.032	−0.056	0.009
	(0.056)	(0.057)	(0.056)	(0.056)
Gender	−0.029	−0.019	−0.013	−0.038
	(0.053)	(0.052)	(0.051)	(0.049)
Family income	0.068	0.027	0.012	−0.031
	(0.057)	(0.058)	(0.057)	(0.056)
PD (perpetrator)	0.605***	0.553***	0.520***	0.465***
	(0.072)	(0.073)	(0.073)	(0.071)
PD (victim)	−0.107	−0.158*	−0.177*	−0.135
	(0.074)	(0.075)	(0.074)	(0.072)
Observed cyberbullying		0.202**	0.135	0.110
		(0.068)	(0.070)	(0.068)
Trait mindfulness			−0.208***	−0.192**
			(0.061)	(0.059)
Observed cyberbullying × trait mindfulness				−0.232***
				(0.053)
R^2	0.311	0.334	0.363	0.409

Note. PD (Perpetrator) indicates the psychological distance between the observer and the perpetrator; PD (Victim) indicates the psychological distance between the observer and the victim; Standardized regression coefficients are displayed, with standard errors in parentheses.
* $p < .05$. ** $p < .01$. *** $p < .001$.

at low levels (−1 *SD*) of trait mindfulness ($b = 0.21$, $SE = 0.05$, $p < .001$) but became insignificant at high levels (+1 *SD*) of trait mindfulness ($b = -0.06$, $SE = 0.06$, $p = .30$). Fig. 2 provides a plot of this interactive effect at one *SD* below or above the mean of trait mindfulness. Therefore, we obtained support for *H2*, as the negative effect of observed cyberbullying on adolescents' cyberbullying behavior could be significantly weakened by trait mindfulness.

4. Study 2

4.1. Method

4.1.1. Participants and procedure

A total of 353 adolescents were collected from a middle-high school in southern China (this school was different from the one in Study 1). With the help of the school's managers., we invited the students to voluntarily fulfill our online questionnaires generated through a professional online survey website (https://www.wjx.cn/). These adolescent participants were aged 11 to 20 ($M = 17.15$, $SD = 1.74$, 40 % female). The procedure of the survey was similar to Study 1.

4.2. Measures

4.2.1. Observed cyberbullying

Observed cyberbullying was measured using the same scale as used in Study 1 (Cronbach's α = 0.93).

4.2.2. Trait mindfulness

In the study, to reduce the respondents' cognitive load, we measured trait mindfulness using a short-form version of the MAAS scale with five items (Van Dam et al., 2010) (6-point Likert scale; 1 “never” to 6 “always”; Cronbach's α = 88).

4.2.3. Cyberbullying behavior

Cyberbullying behavior was measured using the same scale as used in Study 1 (Cronbach's α = 0.98).

4.2.4. Positive affect and negative affect

Five items were used to measure positive affect (e.g., excited, enthusiastic) and negative affect (e.g., upset, distressed), respectively (Mackinnon et al., 1999). A 5-point Likert scale was used (1 “very

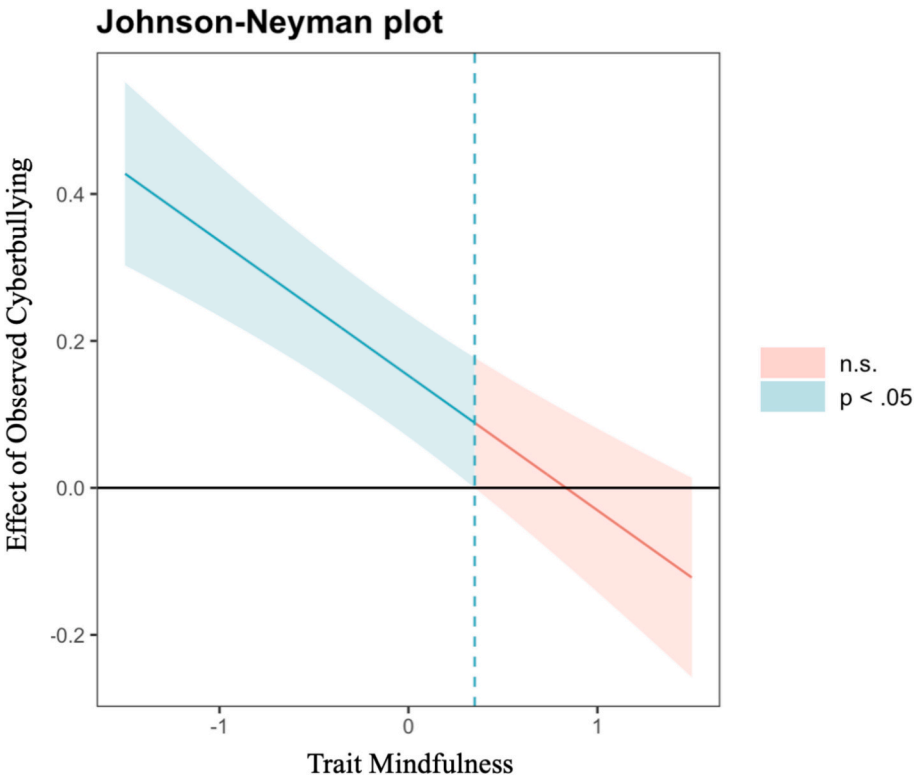

Fig. 2. The moderating role of trait mindfulness in the relationship between observed cyberbullying and cyberbullying behavior (Study 1).

slightly or not at all" to 5 "very much"). The Cronbach's α was 0.90 and 0.89 for positive affect and negative affect, respectively.

4.2.5. Affective empathy

We measured affective empathy for the victims of cyberbullying with three items (e.g., "I feel compassion for the victims of cyberbullying"), adapted from a validated scale (Pfattheicher et al., 2019). A 5-point Likert scale was used (1, "strongly disagree" to 5, "strongly agree", Cronbach's α = 0.87).

4.2.6. Controls

As in Study 1, we controlled for the basic demographic variables (i.e., age, gender, and family income). We additionally controlled for adolescents' social media use frequency because social media is the most common space where cyberbullying happens. Based on previous research (Boer et al., 2020; Mascheroni & Ólafsson, 2014; Van den Eijnden et al., 2016), four items were used to measure social media use frequency (e.g., "how often do you have online contact through social media with close friends?"; 6-point Likert scale; 1 "never" to 6 "always"; Cronbach's α = 0.83 in the current study).

4.3. Results

4.3.1. Common method bias test

Similar to Study 1, we used Harman's single-factor method to test the common method bias and found the first factor accounted for 30.32 % (lower than the 40 % standard). Therefore, we did not detect a serious common method bias in the current study (Podsakoff et al., 2003).

4.3.2. Confirmatory factor analysis and descriptive statistics

Descriptive statistics and the correlation matrix of all the measured variables in Study 2 are shown in Table 3. Similar to Study 1, we conducted CFA to test the factorial validity of our multiple-item measures. The results of CFA provided support for the factorial validity of the constructs measured in Study 2 ($\chi^2/474 = 2.62$, CFI = 0.92, TLI = 0.91, RMSEA = 0.07, SRMR = 0.06). The fit of this ten-factor model was significantly better than alternative CFA models in which any two of the ten factors were combined (*ps* of $\triangle\chi^2 < 0.001$). Together, the CFA analyses demonstrated sufficient validity for our measurements of different constructs.

Table 3
Descriptive statistics and correlation matrix (Study 2).

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Age	17.15	1.74	–								
2. Gender [a]	–	–	−0.04	–							
3. Family income [b]	4.42	2.22	0.14**	0.00	–						
4. Social media use frequency	4.11	1.19	0.10	0.02	0.25***	–					
5. Observed cyberbullying	2.92	1.06	−0.04	0.06	0.06	0.19***	–				
6. Trait mindfulness	9.23	1.07	0.04	0.05	0.09	−0.12*	−0.45***	–			
7. Negative affect	2.30	0.83	−0.03	−0.15**	−0.06	0.01	0.51***	−0.51***	–		
8. Positive affect	3.13	0.89	0.12*	−0.00	0.25***	0.24***	−0.23***	0.32***	−0.31***	–	
9. Affective empathy	3.33	0.83	0.02	0.06	0.07	0.15**	−0.06	0.01	−0.13*	0.31***	–
10. Cyberbullying behavior	1.56	0.84	0.01	0.21***	−0.06	0.01	0.34***	−0.33***	0.35***	−0.30***	−0.20***

Note. $N = 353$; [a] male = 1, female = 0; [b] we measured seven levels of family income with a range from <50 thousand to >300 thousand RMB per year; * $p < .05$. ** $p < .01$. *** $p < .001$.

4.3.3. Hypothesis test

As in Study 1, all the hypotheses were tested through multiple regressions in R 4.1.0 (R-Core-Team, 2021). As shown in Table 4, we found that observed cyberbullying was positively associated with adolescents' cyberbullying behavior in Step 2 (β = 0.35, *SE* = 0.05, $p < .001$), supporting *H1*. Moreover, we found that trait mindfulness was negatively related to adolescents' cyberbullying behavior in Step 3 (β = −0.23, *SE* = 0.05, $p < .001$) and the interaction of observed cyberbullying and trait mindfulness was negatively associated with adolescents' cyberbullying behavior in Step 4 (β = −0.11, *SE* = 0.05, $p < .05$). Specifically, the simple slope of observed cyberbullying on adolescents' cyberbullying behavior was significantly positive at low levels (−1 *SD*) of trait mindfulness ($b = 0.26$, *SE* = 0.05, $p < .001$) but became weaker at high levels (+1 *SD*) of trait mindfulness ($b = 0.12$, *SE* = 0.05, $p < .05$). Fig. 3 provides a plot of this interactive effect at one *SD* below or above the mean of trait mindfulness. Therefore, we obtained support for *H2*, and replicated the results of Study 1.

Next, *H3* was tested by estimating the conditional indirect effects of observed cyberbullying on adolescents' cyberbullying via emotion-related processes at different levels of trait mindfulness (Edwards & Lambert, 2007; Preacher et al., 2007). We adopted a bootstrapping approach in path analysis (we estimated the full model as presented in Fig. 1) to calculate 95 % bias-corrected confidence intervals (CIs) with 5000 random samples (Lockhart et al., 2011; Vandenberghe et al., 2021), using the "lavaan" package (Rosseel, 2012) in R 4.1.0 (R-Core-Team, 2021). As shown in Table 5, a significant difference between low levels and high levels of trait mindfulness was detected for the conditional indirect effects of observed cyberbullying on adolescents' cyberbullying behavior via positive affect (△*effect* = 0.042, 95 % CI = [0.009, 0.099]) and affective empathy (△*effect* = 0.029, 95 % CI = [0.007, 0.074]), but not via negative affect (△*effect* = 0.036, 95 % CI = [−0.002, 0.091]). Therefore, *H3a* and *H3c* were supported, but *H3b* was not supported.

5. Study 3

5.1. Method

5.1.1. Participants and procedure

A total of 468 adolescents were collected from several middle-high schools and universities in Northern and Eastern China. By posting online and offline flyers about our study (adolescent cyber use), we invited the students to voluntarily fulfill the online questionnaire generated through a professional online survey website (https://www.wjx.cn/). These adolescent participants were aged 12 to 23 ($M = 17.84$, $SD = 1.90$, 48 % female). The procedure of the survey was similar to Study 1 and Study 2.

Table 4
Regression models on adolescents' cyberbullying behavior (Study 2).

	Step 1	Step 2	Step 3	Step 4
Age	0.022	0.043	0.045	0.041
	(0.053)	(0.050)	(0.049)	(0.048)
Gender	0.206***	0.188***	0.205***	0.196***
	(0.052)	(0.049)	(0.048)	(0.048)
Family income	–0.074	–0.082	–0.051	–0.064
	(0.054)	(0.051)	(0.050)	(0.050)
Social media use frequency	0.024	–0.042	–0.058	–0.059
	(0.054)	(0.052)	(0.051)	(0.050)
Observed cyberbullying		0.349***	0.246***	0.242***
		(0.050)	(0.055)	(0.054)
Trait mindfulness			–0.230***	–0.218***
			(0.054)	(0.054)
Observed cyberbullying × Trait mindfulness				–0.107*
				(0.049)
R^2	0.048	0.164	0.205	0.216

Note. Standardized regression coefficients are displayed, with standard errors in parentheses.
* $p < .05$. ** $p < .01$. *** $p < .001$.

5.2. Measures

5.2.1. Observed cyberbullying

Observed cyberbullying was measured using the same scale as used in Study 1 and Study 2 (Cronbach's α = 0.90).

5.2.2. Trait mindfulness

Trait mindfulness using the same scale as used in Study 2 (Cronbach's α = 82).

5.2.3. Cyberbullying behavior

Cyberbullying behavior was measured using the same scale as used in Study 1 and Study 2 (Cronbach's α = 0.96).

5.2.4. Positive affect and negative affect

Positive affect and negative affect were measured using the same scale as used in Study 2 (Cronbach's α = 0.96). The Cronbach's α was 0.82 and 0.89 for positive affect and negative affect, respectively.

5.2.5. Affective empathy

Affective empathy was measured using the same scale as used in Study 2 (Cronbach's α = 0.86).

5.2.6. Controls

In Study 3, we controlled for the basic demographic variables (i.e., age, gender, and family income).

5.3. Results

5.3.1. Common method bias test

Similar to Studies 1 & 2, we used Harman's single-factor method and did not detect a serious common method bias in the current study, as the first factor accounted for 27.59 % (lower than the 40 % standard; Podsakoff et al., 2003).

5.3.2. Confirmatory factor analysis and descriptive statistics

Descriptive statistics and the correlation matrix of all the measured variables in Study 2 are shown in Table 6. Similar to Study 1, we conducted CFA to test the factorial validity of our multiple-item measures. The results of CFA provided support for the factorial validity of the constructs measured in Study 2 ($\chi^2/474 = 2.53$, CFI = 0.93, TLI = 0.92, RMSEA = 0.06, SRMR = 0.05). The fit of this nine-factor model was significantly better than alternative CFA models in which any two of the nine factors were combined (*ps* of $\triangle\chi^2 < 0.001$). Together, the CFA analyses demonstrated sufficient validity for our measurements of different constructs.

5.3.3. Hypothesis test

Same as Study 1, *H1* and *H2* were tested through multiple regressions in R 4.1.0 (R-Core-Team, 2021). As shown in Table 7, we found that observed cyberbullying was positively associated with adolescents' cyberbullying behavior in Step 2 (β = 0.29, *SE* = 0.05, $p < .001$), supporting *H1*. Moreover, we found that trait mindfulness was negatively related to adolescents' cyberbullying behavior in Step 3 (β = −0.20, *SE* = 0.05, $p < .001$) and the interaction of observed cyberbullying and trait mindfulness was negatively associated with adolescents' cyberbullying behavior in Step 4 (β = −0.21, *SE* = 0.04, $p < .001$). Specifically, the simple slope of observed cyberbullying on adolescents' cyberbullying behavior was significantly positive at low levels (−1 *SD*) of trait mindfulness ($b = 0.30$, *SE* = 0.04, $p < .001$) but became insignificant at high levels (+1 *SD*) of trait mindfulness ($b = 0.03$, *SE* = 0.04, $p = .50$). Fig. 3 provides a plot of this interactive effect at one *SD* below or above the mean of trait mindfulness. Therefore, we obtained support for *H2*, and

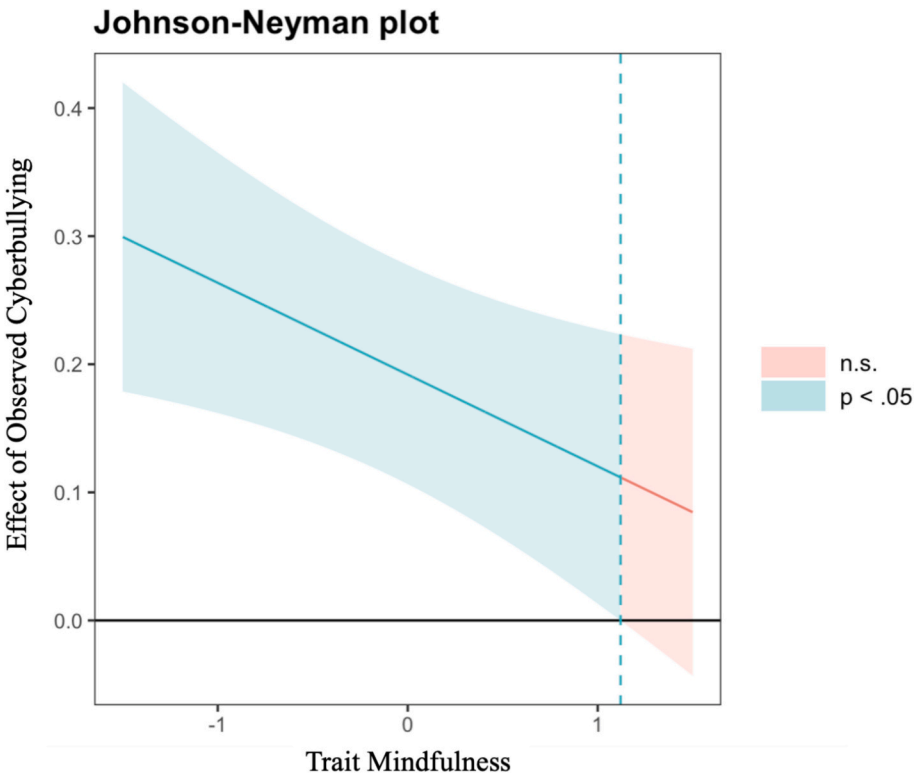

Fig. 3. The moderating role of trait mindfulness in the relationship between observed cyberbullying and cyberbullying behavior (Study 2).

Table 5
Results of conditional indirect effects (Study 2).

Outcome	Mediator	Level of trait mindfulness [a]	Estimate	*SE*	95 % *CI*
Cyberbullying behavior	Negative affect	*Low*	0.049	0.028	[0.009, 0.116]
		High	0.085	0.031	[0.035, 0.159]
		Dif	0.036	0.023	[−0.002, 0.091]
	Positive affect	*Low*	−0.006	0.012	[−0.037, 0.012]
		High	0.036	0.018	[0.009, 0.083]
		Dif	0.042	0.021	[0.009, 0.099]
	Affective empathy	*Low*	−0.006	0.008	[−0.026, 0.007]
		High	0.023	0.014	[0.004, 0.062]
		Dif	0.029	0.015	[0.007, 0.074]

Note. [a] High levels indicate +1 standard deviation above the mean level, while low levels indicate −1 standard deviation below the mean level. *Dif* indicates the difference of conditional indirect effects between low and high levels of trait mindfulness. *CI* indicates confidence interval.

replicated the results of Study 1.

Next, *H3* was tested by estimating the conditional indirect effects of observed cyberbullying on adolescents' cyberbullying via emotion-related processes at different levels of trait mindfulness (Edwards & Lambert, 2007; Preacher et al., 2007). We adopted a bootstrapping approach in path analysis (we estimated the full model as presented in Fig. 4) to calculate 95 % bias-corrected confidence intervals (CIs) with 5000 random samples (Lockhart et al., 2011; Vandenberghe et al., 2021), using the "lavaan" package (Rosseel, 2012) in R 4.1.0 (R-Core-Team, 2021). As shown in Table 8, a significant difference between low levels and high levels of trait mindfulness was detected for the conditional indirect effects of observed cyberbullying on adolescents' cyberbullying behavior via negative affect ($\triangle$*effect* = 0.031, 95 % CI = [0.007, 0.067]) and affective empathy ($\triangle$*effect* = 0.066, 95 % CI = [0.028, 0.120]), but not via positive affect ($\triangle$*effect* = 0.003, 95 % CI = [−0.004, 0.025]). Therefore, *H3b* and *H3c* were supported, but *H3a* was not supported.

6. General discussion

Although being less explored, observers may play a critical role in preventing and intervening cyberbullying (DeSmet et al., 2016). Focusing on adolescents, a population who are particularly vulnerable to cyberbullying, we examined *whether*, *when*, *why*, and *how* observed cyberbullying relates to cyberbullying behavior through three progressive studies. The results have revealed a positive effect of observed cyberbullying on adolescents' cyberbullying behavior, which could be weakened by trait mindfulness via emotion-related processes (e.g., affective empathy). Yet, we did not find consistent support for the mediating roles of positive affect and negative affect to explain why trait mindfulness could weaken the positive effect of observed cyberbullying on adolescents' cyberbullying behavior. Our findings suggest that positive affect and negative affect do not function as two complementary or compensatory paths for understanding why trait mindfulness impacts the social learning process of cyberbullying. Thereby, our findings add to the theoretical work demonstrating the orthogonal structure of affect, indicating that positive affect and negative affect are distinguishably different from each other, rather than two opposites of the same construct (Mackinnon et al., 1999; Watson et al., 1988).

6.1. Theoretical implications

Our findings have several theoretical implications. First, drawing on social learning theory (Bandura, 1978), our study highlights the importance of an observer perspective in understanding cyberbullying

Table 6
Descriptive statistics and correlation matrix (Study 3).

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Age	17.84	1.90	–								
2. Gender [a]	–	–	0.05	–							
3. Family income [b]	3.00	2.17	−0.10*	−0.11*	–						
4. Observed cyberbullying	2.45	1.03	−0.04	−0.05	0.18***	–					
5. Trait mindfulness	4.10	0.97	0.01	−0.00	−0.02	−0.28***	–				
6. Negative affect	2.36	0.83	0.00	−0.14**	0.08	0.42***	−0.50***	–			
7. Positive affect	3.10	0.74	0.07	0.04	−0.03	−0.03	0.24***	−0.16***	–		
8. Affective empathy	3.38	0.84	−0.05	−0.01	−0.05	−0.01	0.12*	−0.06	0.07	–	
9. Cyberbullying behavior	1.47	0.76	−0.01	0.07	0.04	0.29***	−0.27***	0.28***	−0.01	−0.21***	–

Note. $N = 468$; [a] male = 1, female = 0; [b] we measured seven levels of family income with a range from <50 thousand to >300 thousand RMB per year; PD Perpetrators indicates the psychological distance with the cyberbullying perpetrators; PD Victims indicates the psychological distance with the cyberbullying victims; * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7
Regression models on adolescents' cyberbullying behavior (Study 3).

	Step 1	Step 2	Step 3	Step 4
Age	−0.012	−0.006	−0.006	−0.002
	(0.047)	(0.045)	(0.044)	(0.043)
Gender	0.080	0.087	0.084	0.089*
	(0.047)	(0.045)	(0.044)	(0.043)
Family income	0.044	−0.006	−0.001	0.001
	(0.047)	(0.045)	(0.045)	(0.044)
Observed cyberbullying		0.290***	0.234***	0.225***
		(0.045)	(0.046)	(0.045)
Trait mindfulness			−0.200***	−0.169***
			(0.045)	(0.045)
Observed cyberbullying × Trait mindfulness				−0.206***
				(0.043)
R^2	0.008	0.089	0.126	0.168

Note. Standardized regression coefficients are displayed, with standard errors in parentheses.
* $p < .05$. ** $p < .01$. *** $p < .001$.

among adolescents. The extant literature has widely investigated the predictors of cyberbullying perpetration, or harms caused by cyberbullying victimization (Lu et al., 2019; Tao et al., 2022; Tian et al., 2023; Zhao et al., 2024), which predominantly focuses on the perspective of the perpetrator or victim. Our study contributes to the cyberbullying literature by introducing past experiences of cyberbullying observation as an essential—but previously overlooked—driver of adolescents' cyberbullying behavior. Also, we extend prior studies by emphasizing cyberbullying observation not merely as isolated incidents but as accumulated *life experiences* that impact adolescents' social behaviors, which extends prior studies investigating cyberbullying observation with people's *on-site reactions* to specific cyberbullying events (Barlińska et al., 2013; Obermaier et al., 2016).

Second, we highlight the buffering effect of trait mindfulness in the relationship between observed cyberbullying and adolescents' cyberbullying behavior. This contributes to understanding *when* or *for whom* the experiences of cyberbullying observation less tend to bring about cyberbullying behavior. Investigating such a buffering effect is particularly important given the pervasive nature of cyberbullying in today's digital age. For adolescents, who are increasingly immersed in online

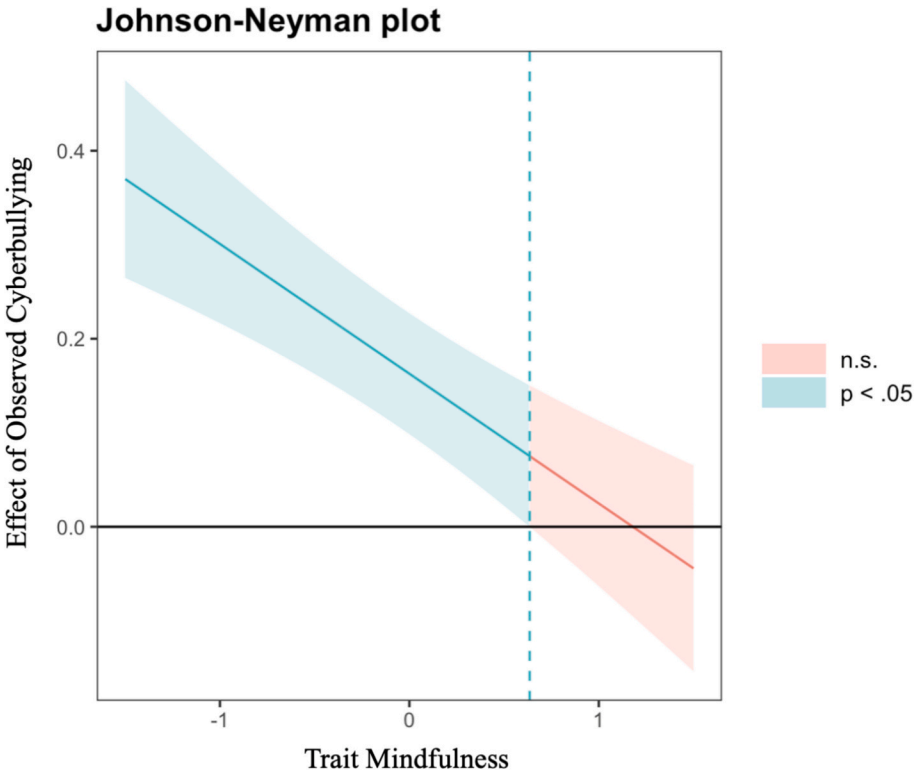

Fig. 4. The moderating role of trait mindfulness in the relationship between observed cyberbullying and cyberbullying behavior (Study 3).

Table 8
Results of conditional indirect effects (Study 3).

Outcome	Mediator	Level of Trait mindfulness[a]	Estimate	*SE*	95 % *CI*
Cyberbullying behavior	Negative affect	*Low*	0.061	0.019	[0.028, 0.105]
		High	0.031	0.012	[0.011, 0.060]
		Dif	0.031	0.015	[0.007, 0.067]
	Positive affect	*Low*	0.012	0.009	[−0.018, 0.042]
		High	0.009	0.012	[−0.014, 0.033]
		Dif	0.003	0.006	[−0.004, 0.025]
	Affective empathy	*Low*	−0.011	0.009	[−0.030, 0.006]
		High	−0.077	0.021	[−0.126, −0.040]
		Dif	0.066	0.023	[0.028, 0.120]

Note. [a] High levels indicate +1 standard deviation above the mean level, while low levels indicate −1 standard deviation below the mean level. *Dif* indicates the difference of conditional indirect effects between low and high levels of trait mindfulness. *CI* indicates confidence interval.

social environments, observing cyberbullying incidents is often unavoidable. More specifically, our findings suggest the benefits of "mindfully observing" cyberbullying, aligning with the existing call for mindfulness in preventing cyberbullying behavior (Emirtekin et al., 2019). By integrating mindfulness into prevention programs, educators and policymakers can potentially empower adolescents to navigate the complexities of online interactions more effectively, thereby reducing the likelihood of cyberbullying perpetration.

Third, our study further investigated *why* or *through what mechanism* trait mindfulness buffered the effect of observed cyberbullying on adolescents' cyberbullying behavior. Specifically, we identified two complementary emotional mechanisms (i.e., negative/positive affect and affective empathy)—after cyberbullying observation, trait mindfulness has the potential to either reduce negative affect or raise positive affect while raising affective empathy, and in turn, to develop less cyberbullying behavior among adolescents. This offers nuanced processes to reveal how adolescents' cyberbullying behavior could be prevented under cyberbullying prevalence. In addition, it is suggested by our study that the roles of negative affect and positive affect, two distinct constructs from each other, might not take effect simultaneously in terms of the emotion-related process led by observed cyberbullying. Hence, we recommend that future studies focus on more specific forms of negative/positive emotions rather than their general form. More broadly, we call for more research contributing to the ongoing discussions on the orthogonal structure of affect.

6.2. Practical implications

Our findings also offer noteworthy practical implications for alleviating cyberbullying behavior among adolescents in a rapidly evolving digital landscape. First, the unexpected effect of cyberbullying observation should not be overlooked, while the protective benefits of mindfulness should be noted. Eliminating cyberbullying observation can hardly be an available practice, whereas mindfulness-based interventions can be a useful approach to reduce anti-social behaviors and improve mental well-being (Foody & Samara, 2018; Kallapiran et al., 2015). As suggested by our study, such interventions on mindfulness may also be helpful to prevent the unexpected effects of cyberbullying observation during adolescents' socialization. In particular, school managers are encouraged to integrated these approaches (e.g., mindfulness-based cognitive therapy, dialectical behavior therapy, etc.) into educational practices such as school curricula (Linehan, 1993; Segal et al., 2002).

Second, our study also suggests negative emotion is a risk driver of cyberbullying behavior, and that positive emotion and affective empathy are protective factors of cyberbullying behavior. These findings open new avenues for practitioners to design targeted interventions aimed at mitigating cyberbullying. Specifically, the practitioners could pay more attention to adolescents' emotional experiences and functions. For interventions, practitioners can turn to, for instance, affect regulation training (ART) and cognitive-behavioral therapy (CBT), which have been documented as effective ways for emotional regulation (Stasiewicz et al., 2013). Additionally, intervening with affective empathy might be a promising way to reduce adolescents' cyberbullying behavior. For example, previous studies have identified that combined behavioral interventions (Moyers et al., 2016), such as those targeting empathy development, can effectively address negative behaviors (e.g., alcohol abuse).

Third, our study underscores the importance of managing the broader social and digital contexts in which cyberbullying occurs. As digital platforms become increasingly integral to adolescents' social lives, the risk of cyberbullying has grown exponentially, making it imperative to consider the environmental and systemic factors that contribute to its prevalence. Schools and policymakers must prioritize comprehensive digital literacy education, equipping adolescents with the skills to navigate online environments responsibly, ethically, and respectfully. Such education should not only focus on technical competencies but also emphasize critical thinking, affective empathy, and the ethical use of digital tools, enabling young people to recognize and counteract cyberbullying behaviors.

6.3. Limitations and future studies

The study has some limitations to be considered. First, all variables were measured by self-report scales in our study. We have examined common method bias and found that common method bias was not a serious problem in our three studies. However, this self-report approach could have led to extra measurement errors. Accordingly, we recommend future studies to use alternative behavioral assessments such as the paradigms that can capture actual cyberbullying behavior.

Second, the study investigated the boundary condition of trait mindfulness, instead of state mindfulness, in the relationship between observed cyberbullying and cyberbullying behavior. Future studies could extend our study by designing mindfulness-based interventions to manipulate state mindfulness. Also, as mindfulness is a complex concept with functions beyond emotional aspects (Ie et al., 2014), alternative cognitive mediating mechanisms could be further investigated.

Third, we did not find consistent support for the mediating role of positive affect and negative affect in the relationships between trait mindfulness, observed cyberbullying, and adolescents' cyberbullying behavior. This may partially be due to the dynamic nature of positive affect and negative affect. We recommend future studies explore how daily affect relates to adolescents' cyberbullying behaviors by using dynamic methods (e.g., experience sampling method) to further test and extend our theorizing. Also, our research mainly focuses on emotion-related processes in the relationship between trait mindfulness, observed cyberbullying, and cyberbullying behaviors, which leaves future research with potentially underexplored mediating processes.

Fourth, there could be some other unmeasured variables that affect the relationship between observed cyberbullying and cyberbullying behavior. For example, internet usage frequency might influence exposure to cyberbullying content, impacting how observed cyberbullying behavior impacts cyberbullying behavior. Although we controlled for the effect of one internet-related factor (i.e., social media use frequency), we did not control for the effect of the overall internet usage patterns of adolescents. Thereby, we recommend future studies to explore such additional variables that could affect the relationship

between observed cyberbullying and cyberbullying behavior.

Finally, we call for more attention to be paid to the observer's perspective in understanding cyberbullying issues. It should be fruitful to deepen our understanding toward no matter the processes or consequences of cyberbullying observation, as such indirect experiences, compared with more direct experiences (e.g., cyberbullying perpetration and victimization), could appear to be more prevalent for people living in today's cyber world.[2]

7. Conclusion

Integrating the social learning theory with the concept of mindfulness, this study examined *whether*, *when*, *why*, and *how* observed cyberbullying relates to cyberbullying behavior among adolescents. The findings revealed a social learning effect such that observed cyberbullying is positively associated with adolescents' cyberbullying behavior. Importantly, trait mindfulness could mitigate the association between observed cyberbullying and adolescents' cyberbullying behavior, indicating that mindfulness could be helpful for keeping adolescents exposed to cyberbullying away from learning cyberbullying behavior. Moreover, emotion-related processes (e.g., increased affective empathy) were evidenced to be a mediating mechanism that explains why and how trait mindfulness mitigates the effect of observed cyberbullying on adolescents' cyberbullying behavior. These findings contribute to a deeper understanding of how cyberbullying behavior is developed among adolescents and provide practical insights for cyberbullying management.

CRediT authorship contribution statement

Zhiwen Dong: Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Writing – review & editing, Writing – original draft. **Zhongda Wu:** Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Writing – review & editing, Writing – original draft. **Xiaotong Sun:** Investigation, Data curation.

Ethical approval

The studies of this research complied with the ethical standards of the American Psychological Association's (APA) Ethical Principles. Also, the studies of this research followed the ethical guidelines of Shanxi University School of Educational Science and Jinan University School of Management.

Declaration of competing interest

The authors declare that they have no conflicts of interest.

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Data availability

Data will be made available on request.

[2] Additionally, we explored the effects on prosocial behavior, the opposite of cyberbullying behavior (Persson, 2005; Wispé, 1972). As in the supplementary analyses, we explored the potential impacts and mechanisms of observed cyberbullying on prosocial behaviors among adolescents. The hypothesis and results of potential effect were shown in supplementary analyses, please see https://osf.io/dwvnb/?view_only=5225337ed8164886b5e1d921f6e5df6b.

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