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The role of aggression in the association of cyberbullying victimization with cyberbullying perpetration and problematic social media use among adolescents

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Abstract. *Objectives:* Previous studies have shown that cyberbullying victimization and perpetration are moderately associated. However, possible underlying factors in this relationship are still unclear. Moreover, less is known regarding the relationship between cyberbullying victimization and problematic social media use. The purpose of the present study was to test the direct and indirect association of cyberbullying victimization with cyberbullying perpetration and problematic social media use via aggression. *Methods:* A total of 496 adolescents completed a survey comprising psychometric instruments of the aforementioned variables. *Results:* Structural equation modeling indicated that cyberbullying victimization was directly and indirectly related to cyberbullying perpetration and problematic social media use. Aggression partially explained the aforementioned associations. The model was invariant across male and female adolescents. The findings of the present study suggest that being a cyberbullying victim is related to elevated levels of problematic social media use and cyberbullying perpetration among adolescents. *Discussion:* Health professionals and clinicians that aim to develop intervention strategies for adolescent problematic and anti-social social media use should focus on alleviating negative feelings arising from being a cyberbullying victim.

Keywords: Cyberbullying Victimization, Cyberbullying Perpetration, Problematic Social Media Use, Aggression, Internet Addiction.

Introduction

Social media sites have transformed human communication. There are now 4.74 billion social media users worldwide, accounting for 58% of the global population (Kepios, 2022). Individuals are also using a variety of social media platforms, and it has been reported that the typical social media user has approximately nine social media accounts worldwide (Dean, 2020). Furthermore, social media sites are being used by individuals across a wide range of demographic groups (Pew Research Centre, 2018). These sites allow individuals to connect and create an online community, as well as encouraging learning, social awareness, and creativity. However, there is evidence to suggest that social media use can have a negative impact on some users' health and daily life (Balouch et al. 2019; Jenkins et al. 2020; Masood et al., 2020). Consequently, the popularity, capabilities, and potential impact of social media has encouraged researchers to further investigate this technology.

Problematic social media use

Increasing evidence has shown that problematic social media use (PSMU) is experienced by a minority of social media users which may lead to conflicts in the individual's work, personal and/or family life (Tosuntaş et al., 2020; Zheng & Lee, 2016). Researchers have defined PSMU as a maladaptive dependency on social media to the extent that there are addiction-like symptoms (Cao et al., 2020; Chen, 2019). The symptoms of behavioral addictions consist of: (1) salience, (2) tolerance, (3) mood modification, (4) relapse, (5) withdrawal symptoms, and (6) conflict (Griffiths, 2005). Different terms have been used to describe PSMU including 'social networking site addiction' (Kuss & Griffiths, 2011), 'social media addiction' (Andreassen et al., 2016) and 'internet-communication disorder' (Wegmann & Brand, 2016), as well sub-varieties such as 'Facebook addiction' (Andreassen et al., 2012; Ryan et al., 2014), 'Instagram addiction' (Kircaburun & Griffiths, 2018) and 'YouTube addiction' (Balakrishnan & Griffiths, 2017). Unlike (internet) gaming disorder, PSMU is not listed in DSM-5 or ICD-11 as a provisional or official diagnostic category. Moreover, it is important not to overpathologize such behaviour (Billieux et al. 2015). Therefore, the term 'problematic social media use' is often used to distinguish it from formal clinical conditions (Hussain & Starcevic, 2020; Lee et al., 2017).

Varying prevalence rates for PSMU have been reported. For example, a recent meta-analysis of 32 studies have concluded that the prevalence of PSMU (i) varied by classification schemes and culture and (ii) was 31% for collectivist countries and 14% for individualist countries (Cheng et al., 2021). Only a few studies have used nationally representative samples. Wartberg et al. (2020) reported that 2.6% of their German representative sample of adolescents (n=1001) were at risk of PSMU, whereas Banyai et al. (2017) reported that 4.5% of their Hungarian representative sample of adolescents (n=5961) were at risk of PSMU.

Explanations for the large differences between prevalence rates are most likely due to the use of predominately small samples, different cultural groups being investigated, and the large number of different psychometric instruments used to assess PSMU.

Several studies have presented evidence of PSMU and associations with psychological variables (e.g., Banyai et al. 2017; Cudo et al., 2020; Kircaburun et al., 2020; Shensa et al. 2017). For instance, Hawk et al. (2019) found that earlier adolescent narcissism predicted later PSMU. Wartberg et al. (2020) found that more depression symptoms, lower interpersonal trust, and family functioning were associated with PSMU. However, there is still a gap in the literature on the underlying factors that promote onset and maintenance of PSMU. For instance, less is known about the association of cyberbullying victimization and PSMU. although, it is logical to assume that there would be a positive relationship between the former and latter. Because cyberbullying victims experience elevated mental health problems including depression and anxiety (Tosuntaş et al., 2020), such individuals could easily use social media as a maladaptive coping strategy to deal with their negative emotional and psychological states.

Cyberbullying (victimization and perpetration)

Although there are many benefits of using SNSs, cyberbullying has emerged as one of the potential harms emanating from SNS use. Cyberbullying is defined as intent to consistently harass another individual to cause harm via any electronic method, including social media (Watts et al., 2017). Cyberbullying has been defined as “*repeated unwanted, hurtful, harassing, and/or threatening interaction through electronic communication media*” (Rafferty & Vander Ven, 2014; p. 364). Some studies utilize the terms ‘cyberbullying’ and ‘cyber-aggression’ interchangeably (Mishna et al. 2018), the remainder of the present paper uses cyberbullying perpetration (CBP). Cybervictimization is defined as the harm suffered due to being a victim of cyberbullying (Corcoran et al., 2015). According to a meta-analytic study that included 80 studies, approximately 15% of adolescents worldwide have suffered from cybervictimization (Modecki et al., 2014). A review of 159 studies by Brochado et al. (2017) found that the highest median prevalence of cyberbullying was found in a group of studies from Canada (23.8%, varying between 1.9% and 65.0%).

Research has reported that cyberbullying and cybervictimization are predictors of adolescents’ emotional and behavioral problems (Kim et al., 2018). Furthermore, cyberbullying has been associated with a number of psychological and health problems (Gamez-Gaudix et al., 2014; Kircaburun et al., 2021; Nixon 2014; Sinclair et al., 2012; Vollink et al., 2013). Cybervictimization has been associated with negative mental health (Sargent et al., 2016; Tian et al., 2018), and increased suicide risk (Kim et al., 2020). Moreover, cyberbullying victims are more likely to use psychoactive substances (e.g., alcohol, marijuana, and other drugs) than non-victims (Cénat et al., 2018). Wright and Li (2013) conducted

longitudinal research and found that peer rejection and cybervictimization at baseline was associated with subsequent cyber-aggression six months later among adolescents. The researchers speculated that adolescents may be engaging in cyber-aggression to deal with the strain of cybervictimization. Supporting this assertion, previous research has indicated that cybervictimization and stress are associated with cyber-aggression (Patchin & Hinduja, 2011; Stefanek et al., 2012). It may be that adolescents who were victimized develop aggressive behavior as a reaction to the victimization, demonstrating anger, impulsive reactions to perceived provocation (Sullivan et al., 2021). Repeatedly angered adolescents may become frustrated, leading to aggression (Paquin et al., 2017).

Recently, research has shown associations between PSMU and cyberbullying (Kircaburun et al. 2019). The Dark Tetrad traits of Machiavellianism and sadism have been found to be associated with PSMU through cyberbullying (Kircaburun et al., 2018). Furthermore, research by Kircaburun et al. (2020) showed that cyberbullying perpetrators had higher scores on PSMU, dissociative experiences, Cluster B (narcissistic, histrionic, anti-social, and borderline) personality traits, depression, and childhood emotional trauma, and lower scores on self-esteem. According to one longitudinal study, social media use at the first timepoint significantly predicted positive attitudes regarding cyberbullying at the second timepoint, which significantly predicted cyberbullying perpetration at the third timepoint (Barlett et al., 2018). In a qualitative study, Kırılı (2020) investigated the effect of social media use on cyberbullying and reported that social media use was associated with cyberbullying or cyber victimization. Moreover, Çimke and Cerit (2021) found that social media addiction was positively related to cyberbullying perpetration and victimization. Altogether, research studies suggest that there are associations between PSMU, cyberbullying, and personality traits. However, further research into the possible effects of cyberbullying, cybervictimization, and PSMU is warranted.

Aggression

Aggressive individuals may experience trouble in controlling aggressive feelings and demonstrate hostile behaviors toward others (Buss & Perry, 1992; Jeong et al. 2017). There may be several factors that can lead to elevated aggression. Cyber-victimization has been related to mental health and behavioural problems (Dooley et al., 2012). Individuals who are victims of cyberbullying may become aggressive individuals due to the increased level of depression and anxiety (Tosuntaş et al., 2020). Also, it is well established that aggression is related to cyberbullying perpetration (CBP; İçellioğlu & Özden 2014). A longitudinal study with 3449 Korean middle-school students identified that higher aggression level was associated with increased cyberbullying (You & Lim, 2016). The same study concluded that longer use of the internet, previous offline bullying and victim experiences,

and lack of self-control was also related to increased cyberbullying perpetration.

The role of aggression in cyberbullying has been highlighted in research. Mishna et al. (2018) reported that a quarter of their participants (n=1350) had a private video or photo shared one or more times without their permission, and 28% were sent an angry, rude, vulgar, threatening or intimidating message online or through text message. Kokkinos and Voulgaridou (2017) reported that proactive and reactive aggression were associated with cyberbullying. Other studies report that a lack of family rules predicts cyber-aggression (Martins et al. 2017), and cyber-aggression has been found to be associated with high levels of traditional peer aggression (Pornari & Wood, 2010). A recent study with adolescents reported that aggression, depression-related aggression, and anxiety-related aggression were all positively associated with elevated cyberbullying perpetration (Tosuntaş et al., 2020). In sum, research studies have demonstrated robust associations between cyberbullying and aggression.

CBP is typically separated from aggression with slight differences such as repetition, technology use, and power imbalance principles (Patchin & Hinduja 2015). Aggression is any behavior which is intended to harm another person (Anderson & Bushman, 2002). Proactive aggression refers to negative behavior intended to obtain a resource or reach a desired goal at the cost of another person whereas reactive aggression occurs as an angry reaction to a frustration or provocation (Barlett et al., 2018). It may be that cyberbullying is a subtype of general aggression and that CBP may have stronger association with proactive aggression than reactive aggression (Schultze-Krumbholz et al., 2018).

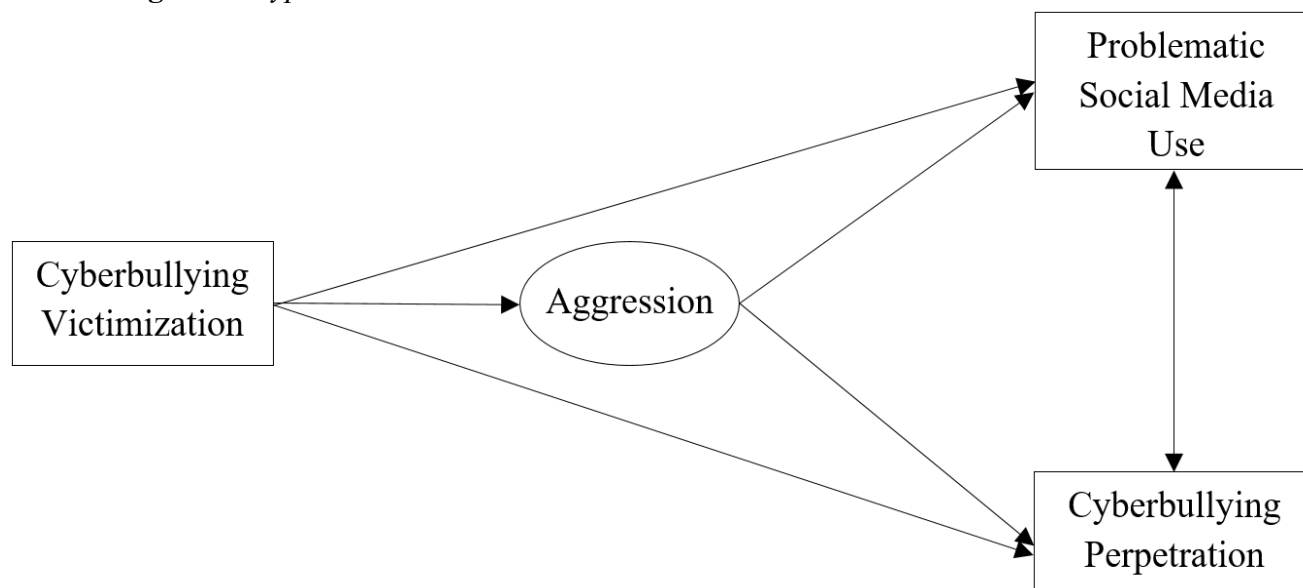
Studies have positively associated aggression to addictive use of technological tools and applications. Some studies have associated aggression with internet addiction (Alavi et al., 2011). A cross-sectional study with 123 university students who were gamers found that aggression was significantly related to more online gaming addiction (Mehroof & Griffiths, 2010). A cross-sectional study examining 1471 online gamers concluded that gaming addiction was predicted by aggression, self-control, interpersonal relationship, and narcissistic personality traits (Kim et al., 2007). Only one study has reported that appetitive aggression (i.e., being rewarded by engaging in aggressive behaviors) was associated with social media addiction among 1064 adolescents (Wong et al., 2022).

Aims of the present study

Concerns about the effects of cyberbullying and cyber-victimization appears to be increasing. Therefore, the present study investigated the associations between cyberbullying victimization, aggression, CBP, and PSMU. The proposed theoretical model predicted that cyberbullying victimization would be associated with PSMU via aggression (mediator), and that cyberbullying victimization would be associated with

cyberbullying perpetration, and that aggression would be a mediating variable (see Figure 1).

Figure 1. *Hypothesized model*



Methods

Participants, procedure, and ethics

A total of 496 adolescents were recruited from a Turkish high school for the study (47% female; mean age = 16.56 years, standard deviation = .50). Paper-and-pencil questionnaires were handed out in the classrooms by the research team after providing the necessary information about the details of the study. The data collection was completed in a single day. The study was carried out only with second and third year students. This was because freshman year students were in a different outside activity and senior students declined to participate in the study because they were studying for university exams. Participation in the study was voluntary and anonymous. Students were not compensated for their participation in the study. Ethical approval for the study was received from the research team's relevant faculty administrative boards before the recruitment of the participants and complied with the Declaration of Helsinki.

Measures

Cyberbullying Offending Scale (CBOS): The Turkish form (Kırcaburun et al., 2019) of the CBOS (Patchin & Hinduja, 2015) was used to assess adolescents' cyberbullying perpetration. The scale comprises nine items (e.g., "*I spread rumors about someone online*") rated on a five-point Likert scale: "never" (=1), "once" (=2), "a few times" (=3), "several times" (=4) and "many times" (=5). The total scores range from 9 to 45 and higher scores indicate higher CBP. This scale has been widely used

worldwide to assess different cyberbullying behaviors (Patchin & Hinduja, 2015). The internal consistency was high in the present study (Cronbach's $\alpha = .84$).

Cyberbullying Victimization Scale (CBVS): The CBVS (Patchin & Hinduja, 2015) was used to assess adolescents' cyberbullying victimization. The Turkish adaptation was carried out for the present study using confirmatory factor analysis (CFA) and following a standardized forward-and back-translation process (Beaton et al., 2000). CFA indicated adequate fit to the data ($\chi^2/df = 4.54$, Root Mean Square Residuals [RMSEA] = .08 confidence interval [CI] 90% [.07, .10], Standardized Root Mean Square Residuals SRMR = .05, Comparative Fit Index [CFI] = .95, Goodness of Fit Index [GFI] = .95. In order to indicate goodness of fit, RMSEA and SRMR should be below .05, and GFI and CFI should be higher than .95. Also, RMSEA and SRMR < .08 is acceptable, and GFI and CFI > .90 is acceptable (Hu & Bentler, 1999). Standardized regression weights ranging between .37 and .72 indicated that all items significantly contributed to the scale. The scale comprises nine items (e.g., "Someone spread rumors about me online") rated on a five-point Likert scale: "never" (=1), "once" (=2), "a few times" (=3), "several times" (=4) and "many times" (=5). The total scores range from 9 to 45 and higher scores indicate higher cyberbullying victimization. The Turkish form of the CBVS was deemed to be valid and reliable for assessing cyberbullying victimization of Turkish participants. The internal consistency was high in the present study (Cronbach's $\alpha = .82$).

Social Media Addiction Scale (SMAS): The SMAS is an adaptation of the unidimensional Instagram Addiction Scale (Yurdagül et al., 2021) by replacing the word 'Instagram' with 'social media' and was used to assess the risk of social media addiction. This scale comprises six items (e.g., "How often in the past year have you become restless or troubled if you have been prohibited from using social media?") rated on a five-point Likert scale from "very rarely" to "very often" that assess six components of addiction (i.e., salience, conflict, withdrawal, mood modification, tolerance, and relapse) outlined in the biopsychosocial framework of addiction (Griffiths, 2005). The total scores range from 6 to 30 and higher scores indicate higher PSMU. The internal consistency was high in the present study (Cronbach's $\alpha = .79$).

Aggression Questionnaire (AQ): The Turkish form (Evren et al., 2011) of the AQ (Bryant & Smith, 2001; Buss & Perry, 1992) was used to assess participants' aggression. The scale has 12 items rated on a five-point Likert scale from "1 = never" to "5 = always", and comprises four sub-dimensions including physical aggression (e.g., "Given enough provocation, I may hit another person"), verbal aggression (e.g., "I often find myself disagreeing with people"), hostility (e.g., "Other people always seem to get the breaks"), and anger (e.g., "I have trouble controlling my temper"). The total scores range from 12 to 60 and higher scores indicate greater aggression. The internal consistency of the total scale (Cronbach's

$\alpha = .85$) and sub-dimensions (Cronbach's α ranging between .67 and .76) were adequate in the present study.

Results

Descriptive statistics and Pearson's correlations were used to determine mean scores, standard deviations, and correlation coefficients of the study variables (Table 1). Cyberbullying perpetration was moderately positively correlated with cyberbullying victimization ($r = .57, p < .001$), aggression ($r = .43, p < .001$), physical aggression ($r = .43, p < .001$), verbal aggression ($r = .36, p < .001$), and hostility ($r = .31, p < .001$), and weakly positively correlated with problematic social media use ($r = .23, p < .001$) and anger ($r = .23, p < .001$). Problematic social media use was moderately positively correlated with aggression ($r = .35, p < .001$) and hostility ($r = .33, p < .001$), and weakly positively correlated with cyberbullying victimization ($r = .25, p < .001$), physical aggression ($r = .24, p < .001$), verbal aggression ($r = .24, p < .001$), and anger ($r = .27, p < .001$). A series of t -tests were performed to examine gender differences on scores of study variables. Males had significantly higher scores for cyberbullying perpetration ($t[494] = -2.89, p < .001$) and physical aggression ($t[494] = -4.25, p < .001$) compared to females but there were no significant differences regarding problematic social media use, cyberbullying victimization, verbal aggression, hostility, and anger between males and females.

Table 1. Mean scores, standard deviations, and correlation coefficients of the study variables

	1	2	3	4	5	6	7	8
1. Cyberbullying perpetration	-							
2. Problematic social media use	.23*	-						
3. Cyberbullying victimization	.57*	.25*	-					
4. Aggression	.43*	.35*	.35*	-				
5. Physical aggression	.43*	.24*	.32*	.79*	-			
6. Verbal aggression	.36*	.24*	.26*	.74*	.53*	-		
7. Hostility	.31*	.33*	.29*	.77*	.43*	.39*	-	
8. Anger	.23*	.27*	.20*	.78*	.45*	.44*	.52*	-
<i>M</i>	13.86	15.31	14.43	31.76	8.01	6.12	9.18	8.45
<i>SD</i>	6.28	5.51	6.39	10.33	3.59	2.91	3.47	3.41

* $p < .001$

Structural equation modeling was applied to examine the hypothesized direct and indirect relationships of cyberbullying victimization with cyberbullying perpetration and problematic social media use via aggression (Figure 1). Cyberbullying victimization, cyberbullying perpetration, and problematic social media use were included in the model as observed variables, whereas aggression was the latent variable with four sub-dimensions including physical aggression, verbal aggression, hostility,

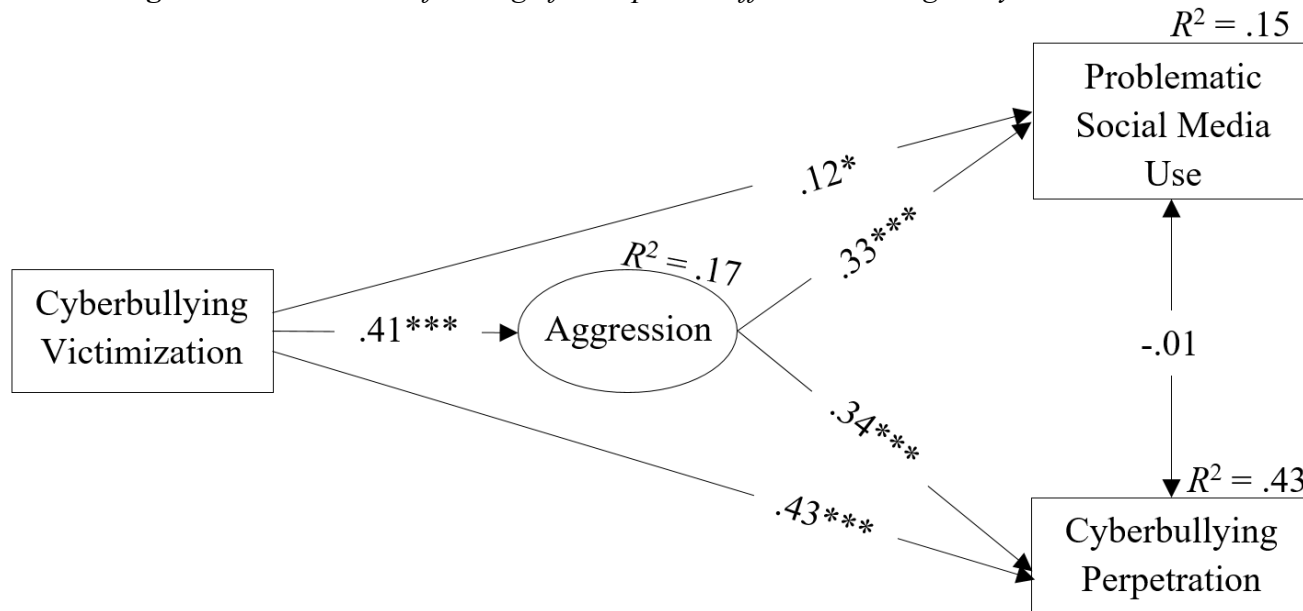
and anger. The tested model had a good fit to the data ($\chi^2 = 28.08$, $df = 10$, $RMSEA = .06$ CI 90% [.04, .09], $SRMR = .03$, $CFI = .98$, $GFI = .98$). The indirect effects were tested using bootstrapping method with 10,000 bootstrap samples and 95% confidence intervals.

Cyberbullying victimization was directly ($\beta = .43$, $p < .001$; 95% CI [.32, .54]) and indirectly ($\beta = .14$, $p < .001$; 95% CI [.10, .19]) related to cyberbullying perpetration via aggression (Table 2). Cyberbullying victimization was directly ($\beta = .12$, $p < .05$; 95% CI [.01, .22]) and indirectly ($\beta = .13$, $p < .001$; 95% CI [.08, .20]) related to problematic social media use via aggression. Aggression was directly moderately related to cyberbullying perpetration ($\beta = .34$, $p < .001$; 95% CI [.26, .43]) and problematic social media use ($\beta = .33$, $p < .001$; 95% CI [.21, .45]). Aggression partially explained the relationship between cyberbullying victimization with cyberbullying perpetration and problematic social media use. Because of the significant score differences between males and females, SEM was also tested for males and females separately. However, there were no significant gender differences in direct and indirect associations in the path analysis, indicating that the paths among the variables were invariant across both sexes. The tested model explained (i) 43% of the variance in cyberbullying perpetration and (ii) 15% of the variance in problematic social media use (Figure 2).

Table 2. Standardized estimates of total, direct and indirect effects on CBP and PSMU

	Effect	S.E.	% explained of total effect
CBV → CBP (total effect)	.57***	.05	-
CBV → CBP (direct effect)	.43***	.06	75%
CBV → Aggression → CBP (indirect effect)	.14***	.02	25%
CBV → PSMU (total effect)	.25***	.04	-
CBV → PSMU (direct effect)	.12*	.05	48%
CBV → Aggression → PSMU (indirect effect)	.13***	.03	52%

Note: PSMU = Problematic social media use; CBV = Cyberbullying victimization; CBP = Cyberbullying perpetration. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 2. Final model of the significant path coefficients among study variables

Note. Latent variables are represented in the model by circles while observed variables are represented by rectangles. For clarity sub-dimensions of aggression (i.e. physical aggression, verbal aggression, hostility, anger) are not depicted in the figure. $*p < .05$, $**p < .01$, $***p < .001$

Discussion

The purpose of the present study was to investigate the direct and indirect association of cyberbullying victimization with cyberbullying perpetration (CBP) and problematic social media use (PSMU). The study is the first to explore the direct and indirect associations among cyberbullying victimization and PSMU. The results indicated that cyberbullying victimization was both directly and indirectly related to CBP and PSMU.

Cyberbullying victimization was positively directly related to CBP. This is consistent with the existing literature. There is a well-established association between cyberbullying victimization and CBP. Becoming a cyberbullying victim can transform good and decent individuals into harsh ones (Şahin et al., 2012). Cyberbullying victims have elevated mental and emotional problems including depressive and anxious symptoms (Feinstein et al., 2014). Those present with the aforementioned problems may try and cope with these problems by bullying others to feel powerful (Wright, 2016). Furthermore, individuals who become victims of cyberbullying may lose their ethical principles and become hostile due to moral disengagement which is also one of the strong predictors of CBP (Eraslan-Çapan & Bakioğlu, 2020; Balta et al., 2019).

Cyberbullying victimization was positively directly related to PSMU. Although, this finding is the first to identify a possible relationship between cyberbullying victimization and PSMU, it is consistent with the previous studies that have found an association between cyberbullying

victimization and mental health problems, and an association between mental health problems and PSMU. Cybervictimization often leads to development and maintenance of psychological problems including depression, anxiety, rumination, and feelings of worthlessness (Patchin & Hinduja, 2015). Individuals who experience these detrimental mental states may try to deal with their problems by engaging in excessive social media use in order to escape from and/or avoid their unpleasant reality (Tosuntaş et al., 2020). This finding also consistent with the studies that have found positive associations of cyberbullying victimization with internet addiction (Altundağ, 2016; Kircaburun & Baştuğ, 2016). Only one study has identified an association between cybervictimization and PSMU (Çimke & Cerit, 2021). However, the aim of the study did not investigate the associations between these two variables.

Aggression was positively directly related to both CBP and PSMU. Those who scored higher on aggression had greater CBP and PSMU. This is consistent with the existing literature reporting that aggressive individuals are susceptible to developing addictive online behavior symptoms and cyberbully others in online platforms (Alavi et al., 2011; Hahn & Kim, 2014; İçellioğlu & Özden, 2014; Kim et al., 2007; Kokkinis & Voulgaridou, 2017; Patchin & Hinduja, 2015; Wong et al., 2022). It appears that aggressive individuals try and cope with their negative feelings by engaging in PSMU where they can behave as they want without suffering any consequences. Furthermore, aggressive traits including anger, hostility, and verbal aggression appear to lead to repeated aggressive behaviors in online contexts among adolescents (İçellioğlu & Özden, 2014).

Cyberbullying victimization was positively indirectly related to CBP and PSMU via aggression. Cyberbullying victimization appears to lead to more aggression, and in turn, aggression is associated with elevated CBP and PSMU. This is consistent with the existing studies showing that being a victim of cyberbullying can lead to elevated aggression over time (Lozano-Blasco et al., 2020). Individuals who experience bullying in online contexts feel powerless and have low self-worth, which may lead to the development of aggressive traits including anger, hostility, and verbal aggression (Kircaburun & Baştuğ, 2016).

Limitations

The present study is not without its limitations. First, causal links between variables cannot be drawn based on the present results due to the cross-sectional nature of the study. Studies that use longitudinal design are warranted to establish more definitive conclusions in terms of the direction of associations. Second, self-report online surveys that were used to collect data in the present study are susceptible to various response biases. Qualitative methods could be used to obtain more in-depth findings in future studies. Third, the data were collected from a single Turkish high school, which prevents the generalizability of the findings. Future studies

should replicate the present results using different samples from different age groups, cultures, and ethnicities.

Conclusion

Despite its limitations, the present study is the first to investigate (i) the relationship between cyberbullying victimization and PSMU, and (ii) cyberbullying victimization, aggression, CBP, and PSMU altogether in a single model. The results suggest that victims of cyberbullying may engage in exacerbated levels of CBP and PSMU, and aggressive traits may play a partial mediating role in the relationship between cyberbullying victimization with CBP and PSMU. The present study findings may help in the development of interventions to prevent cyberbullying. Recent research has reported the positive impact of a cognitive behavioural therapy (CBT) intervention among social media users (Zhou et al., 2020). Although, the study sample was small, the findings are promising, and lead the way for further study in the area.

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Availability of data and material

The data that support the findings of the present study are available from the corresponding author upon reasonable request.

Conflict of Interest

No conflict of interest is declared by any of the authors.

Author's contributions

All authors significantly contributed to the research and preparation of manuscript.

Informed Consent

Informed consent was provided by all participants in the classroom environment.

Ethics Approval

Ethics committee approval was obtained for this study. The study was conducted in accordance with the Helsinki Declaration.

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