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The Role of Self-Control in Cyberbullying Bystander Behavior

Revital Sela-Shayovitz [1,*], Michal Levy [2,3] and Jonathan Hasson [4,5]

[1] The Faculty of Humanities and Social Sciences, Ono Academic College, Kiryat Ono 5510101, Israel
[2] Special Education Department, David Yellin College of Education, Jerusalem 9634207, Israel; michallevy100@dyellin.ac.il
[3] Special Education Department, Seymour Fox School of Education, The Hebrew University of Jerusalem, Mt. Scopus, Jerusalem 9190501, Israel
[4] Centre for Criminology, Faculty of Law, University of Oxford, Oxford OX1 3UL, UK; joni1303@gmail.com
[5] Center for the Study of Crime, Law and Society, University of Haifa, Haifa 3103301, Israel
* Correspondence: revital.s@ono.ac.il

Abstract: The present study examined the association between general low self-control (LSC) and its three subcomponents: risk taking, self-centeredness, and impulsivity and various bystander behaviors of cyberbullying. The study utilized a bifactor modeling approach and included a sample of 501 adolescents aged 14–18 years old. Participants' behaviors were measured using a self-reported questionnaire. General LSC was positively associated with the cyberbully-supporters' and passive bystanders' behaviors. Additionally, risk taking was positively associated with both the victim-defender's and cyberbully-supporter's behaviors, while self-centeredness was positively associated with both the passive bystander's and the cyberbully-supporter's behaviors. Furthermore, impulsivity was positively associated with the cyberbully-supporter's behaviors. We conclude that general LSC plays an important role in understanding the cyberbully-supporter's and passive bystander's behaviors in cyberspace. Furthermore, the analysis revealed that LSC subcomponents were also associated with the bystanders' behaviors above and beyond the associations between general LSC and these types of behaviors.

Keywords: low self-control (LSC); bystanders; cyberbullying; risk taking; self-centeredness; impulsivity

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1. Introduction

Social media has become integral to almost every aspect of daily life, and provides multiple forms of speedy global interaction, mainly for young people (Turel et al. 2019). Although social media may have positive effects by promoting psychological wellbeing and reducing feelings of loneliness and social anxiety (Ando and Sakamoto 2008; Pittman and Reich 2016), it also provides new opportunities for deviance and cyberbullying (Nazir and Thabassum 2021; Vandebosch et al. 2012).

Cyberbullying refers to an intentional, repeated aggressive behavior utilizing electronic technology, often involving a power imbalance between the perpetrators and victims (Vismara et al. 2022). There is an ongoing debate about the definition of cyberbullying and whether the three criteria offered by Olweus (1993) for defining traditional bullying—intent, repetitiveness, and imbalance—are applicable to cyberbullying (Menesini et al. 2012; Menin et al. 2021; Olweus and Limber 2018). Some researchers believe that there is no essential difference between cyberbullying and traditional bullying (Olweus and Limber 2018; see Vaillancourt et al. 2017), while others believe there is and that some characteristics of cyberbullying need to be reconceptualized (Barlett et al. 2017; Savage and Tokunaga 2017). For instance, studies show that the power imbalance has shifted from the difference in physical strength or higher status in traditional bullying to technical knowledge that allows broader and faster exposure in cyberbullying. Furthermore, the online environment enables bullies to harm the victim anonymously, acting without inhibition as they are not visually confronted with the victim's

distress (Hinduja and Patchin 2015; Peter and Petermann 2018). The criterion of repetition is also debatable due to the key features of cyberbullying, including the potential 24/7 exposure to online bullying by multiple users (Hinduja and Patchin 2015; Peter and Petermann 2018), and the potential for a broader audience, amplifying the exposure and embarrassment of the victim when shared online (Kowalski et al. 2019; Selkie et al. 2016; Vismara et al. 2022).

In the last decades, cyberbullying has become a crucial problem for adolescents (Chan et al. 2023; Chamizo-Nieto et al. 2020; Eyuboglu et al. 2021; Peled 2019). Furthermore, during the COVID-19 pandemic, there has been an increase in cyberbullying rates partly because of the increased use of social media and the wish to stay connected following the enforcement of social distancing measures (Karmakar and Das 2020; Nazir and Thabassum 2021). Cyberbullying has adverse effects on mental health and poses a risk to the emotional and psychological well-being of youth across countries (Nazir and Thabassum 2021; Patchin and Hinduja 2010). Adolescents victimized by cyberbullying report mental distress as well as feelings of hopelessness, loneliness, and anxiety (Das et al. 2020; Nixon 2014).

In addition to the victim–bully dyad, bystanders play a key role in maintaining or preventing cyberbullying (Allison and Bussey 2016). They can actively defend the victim and confront the aggressor or help the victim indirectly, for example, by calling for assistance. But they can also actively support and encourage the aggressor or choose not to respond, ignore the aggressive incident, and remain outsiders (Schultze-Krumbholz et al. 2018). Despite the identification of distinct roles for cyber bystanders in prior research (Polanco-Levicán and Salvo-Garrido 2021), defining fixed roles in the context of cyberbullying proves to be a complex challenge. Individuals involved in cyberbullying exhibit diverse positions, taking on roles as perpetrators, victims, or bystanders (Vismara et al. 2022). These roles are dynamic, changing over time and across different contexts (Moretti and Herkovits 2021). Thus, in the present study, we distinguish between cyberbully-supporters', victim-defenders', and passive bystanders' behaviors. However, we do acknowledge the dynamic and mutable nature of these behaviors.

Investigating cyberbullying bystanders' behavior is important for several reasons. First, bystanders' behavior has a powerful influence on the dynamics of cyberbullying and can aggravate the aggression or bring the incident to an end (Allison and Bussey 2016). Second, the online environment is characterized by anonymity, physical distance, and a lower level of adult supervision (Patchin and Hinduja 2010). These characteristics contribute to expressing oneself freely without restraint and the fear of being punished (Macaulay et al. 2022; Suler 2004). Thus, some adolescents utilize the cyberspace for toxic behavior containing hatred, rude language, and offensive behaviors (Suler 2004; Wachs and Wright 2018). Under these circumstances, cyberbullying bystanders may engage in supporting the bully or avoiding/ignoring the cyberbullying incident altogether. Recent studies have provided evidence about the role of personal factors, such as prosocial behaviors, cognitive and affective empathy, and moral reasoning skills in explaining cyberbullying bystander behaviors (Barlińska et al. 2018; Macháčková et al. 2018). Therefore, it is important to understand the various factors that influence their behavior.

The current study draws on the general theory of crime (Gottfredson and Hirschi 1990) to explore cyberbullying bystander behaviors. There is growing knowledge on the role of general low self-control (LSC) and offline bullying and cyberbullying (Holt et al. 2012; Lianos and McGrath 2018; Vazsonyi et al. 2012). However, little is known about the association between general LSC and cyberbullying bystander behaviors. Considering the low level of adult supervision (Patchin and Hinduja 2010) in the cyberspace and adolescents' disinhibited cyber response patterns (Macaulay et al. 2022; Suler 2004), exploring the factors that may influence bystander behaviors is particularly pertinent. The present study attempts to fill this gap by analyzing whether general LSC is associated with cyberbullying bystander behaviors. Furthermore, although the use of the general LSC scale has been found to be a strong predictor of delinquency and criminal behavior (Marcus 2004), there is a debate about LSC dimensionality and its measurement (Bobbio and Arbach 2021). Furthermore, examining cyberbullying bystander behaviors only by general LSC may limit our understanding of how specific subcomponents of LSC contribute to explaining the variance in cyberbullying

bystander behaviors. Thus, we used a bifactor modeling approach that allowed us to assess whether general LSC is associated with various behaviors of cyberbullying bystanders, above and beyond the three core subcomponents of LSC (i.e., impulsivity, risk taking, and self-centeredness; Gottfredson and Hirschi 1990) and vice versa.

Given the positive associations between bullies, bully-supporters, and passive bystanders (Levy and Sela-Shayovitz 2020; Oh and Hazler 2009), an examination of general LSC and its subcomponents may provide a better understanding of the cyberbully bystander's decision to support the bully or remain passive. Understanding these associations may help design effective school interventions to reduce cyberbullying.

2. Cyberbullying Bystanders

Cyberbullying bystander behavior is affected by a range of contextual and personal factors (Jeyagobi et al. 2022). The severity of the incident, a previous good relationship with the victim, the victims' upset response, and their direct requests for help have been positively associated with support of the victim (Bastiaensens et al. 2014; Macaulay et al. 2022; Macháčková et al. 2013). Bystanders are more likely to intervene actively on behalf of the victim in incidents with multiple online aggressors and in cases with a power imbalance between the aggressors and the victim (Kazerooni et al. 2018).

The personal factors that have been found to be positively related to supporting the cyberbullying victim include a general tendency toward prosocial behavior, high level of moral reasoning skills, self-efficacy, affective and cognitive empathy, and the bystander's prior experience as a victim of aggressive behavior (Barlińska et al. 2018; Jeyagobi et al. 2022; Macháčková et al. 2018). Conversely, cyberbully-supporters and passive bystanders are more likely to have lower empathy than cyberbullying victim-defenders (Pozzoli et al. 2017; Van Cleemput et al. 2014). Passive bystanders and bully-supporters are also more likely to display moral disengagement than victim-defenders (DeSmet et al. 2014; Van Cleemput et al. 2014). Thus, research findings have indicated that there are some similar personal patterns between the cyberbully-supporter and the passive bystander. In this context, it has been suggested that passive bystanders' behaviors are perceived by the bully as quietly consenting to the bullying incident and thereby reinforcing the bully's behavior (Menesini et al. 2003; Salmivalli 2010), thus suggesting both types of bystander behaviors support the bully (i.e., pro-bully bystander behaviors).

Regarding demographic differences, several studies found no correlation between age and cyberbullying bystander behavior (Bastiaensens et al. 2015; Macaulay et al. 2022; Macháčková et al. 2013). However, other studies demonstrated that older adolescents were less inclined to assist the victim and were more likely to remain passive or join the cyberbullies than younger adolescents (Erreygers et al. 2016; Panumaporn et al. 2020). Furthermore, the findings on gender differences in cyberbullying bystander behavior are inconsistent. Some indicate that no evidence was found for gender differences in bystander online behaviors (Barlińska et al. 2013; Bastiaensens et al. 2015; Kozubal et al. 2019; Macháčková et al. 2013). In contrast, other studies show that boys are more likely to display negative behavior, join in the cyberbullying, or remain passive (Schultze-Krumbholz et al. 2018; González-Cabrera et al. 2019), whereas girls are more likely to positively defend the victim (Bastiaensens et al. 2014; Campbell et al. 2017; Macháčková et al. 2015; Panumaporn et al. 2020).

3. Self-Control Theory

The general theory of crime (Gottfredson and Hirschi 1990) proposes that crime and delinquency are rooted in individuals' inability to restrain their behavior as a result of LSC. Hirschi (2004) redefined self-control as a cognitive tendency to assess the possible consequences of a given behavior. Accordingly, individuals with LSC are characterized by a low level of self-regulation and inability to consider the consequences of their behavior in the short and long term, which leads them to engage in crime and delinquency. This seminal theory shifted the cause of crime back to early childhood socialization practices within the family and had a profound effect on criminological debate and on empirical studies (e.g., Engel

2012; Pratt and Cullen 2000). Gottfredson and Hirschi (1990) suggested that self-control is established in the late childhood years and appears to remain stable throughout one's lifetime.

Recent studies, however, indicate that self-control does not remain stable, but levels increase or decrease over the course of life and as a result of stressful life events. In particular, youths have a greater tendency to lose self-control than do adults (Pratt 2016). The theory proposes that individuals with LSC share six essential subcomponents: (a) preference for simple tasks, (b) preference for physical rather than mental activities, (c) risk taking, (d) impulsivity, (e) self-centeredness, and (f) difficulty controlling personal temper. These six subcomponents of LSC coalesce into a personality structure characterized by a tendency to engage in illegal behavior and crime (Gottfredson and Hirschi 1990). Accordingly, individuals with LSC are more likely to be involved in antisocial behavior because they strive to increase their pleasure and are incapable of controlling their behavior in search of this pleasure (Gottfredson and Hirschi 1990). Therefore, they tend to choose antisocial behaviors that provide immediate gains, even if they have negative consequences in the long term (Holt et al. 2012).

Based on the concept of the general theory of crime (Gottfredson and Hirschi 1990), Grasmick et al. (1993) designed a scale that is commonly used as a unidimensional model of LSC (Walters 2016). This LSC scale has gained empirical support for deviant and criminal behaviors (Holtfreter et al. 2010; Gottfredson 2006; Pratt and Cullen 2000; Vazsonyi et al. 2017) and is associated with juvenile delinquency (Brownfield and Sorenson 1993; DeLisi and Vaughn 2008), youth violent offenses and their likelihood of being arrested by the police (Jackson et al. 2020), and bullying behavior (Chui and Chan 2013). Nevertheless, there is an ongoing debate regarding the unidimensionality of the LSC scale (Piquero and Rosay 1998), and scholars have demonstrated the existence of a multidimensional model consisting of six correlated subcomponents that better explain the structure of LSC in a variety of samples (e.g., Arneklev et al. 1993; Conner et al. 2009; Vazsonyi et al. 2001).

Among the six subcomponents of LSC, impulsivity and preference for risk taking were found to be strong predictors of engaging in delinquency and crime (Longshore 1998; Piquero and Rosay 1998; Rocque et al. 2016; Ward et al. 2015), and these subcomponents as well as self-centeredness are associated with behavioral disorders and conduct problems, independently of the general construct of LSC (Hay and Meldrum 2015; Loeber et al. 1998; Moffitt et al. 2011; Pechorro et al. 2022), suggesting these three subcomponents are the core features of LSC (Pechorro et al. 2022). To this end, Pechorro et al. (2022) examined different structures (i.e., general factor, correlated factors, second order factor, and bifactor model) of the original and shorter version of the LSC scale (i.e., consisting of risk taking, self-centeredness, and impulsivity) and found adequate to good fit indices as well as strong cross-gender measurement invariance for the latter. Thus, we propose examining a shorter version of the LSC scale by empirically examining a bifactor model that consists of the three core components of LSC as well as a general construct of LSC.

Regarding age differences, some studies have concluded that LSC develops up until the age of 8–10 and remains stable throughout adolescence and adulthood (Higgins et al. 2009; Coyne and Wright 2014), while others have demonstrated changes in adolescent's LSC (Na and Paternoster 2012). For instance, a recent study found LSC to be the primary predictor of delinquency among young adolescents between 13 and 15 years and to be more stable between older adolescents between ages 15 and 17 (Huijsmans et al. 2019). Other studies have suggested that LSC remains stable among some individuals and varies among others (Meldrum et al. 2012; Ray et al. 2013). One explanation to this inconsistency lies in the development of each LSC behavior. For instance, risk-seeking, which relates to seeking out new and exciting experiences emerges in early adolescence, whereas impulsivity, which refers to acting on the spur of the moment or difficulty in delaying gratification, develops in childhood and declines in adolescence (Forrest et al. 2019). As for gender differences, LSC is more common among boys than girls. Girls are less likely than boys to be impulsive, have a temper and engage in physical activities, self-centeredness, and risk taking (Longshore et al. 1998; Gibson et al. 2010). Additionally, past research has argued that the SC scale has a low predictive ability in explaining female involvement in crime (Longshore et al. 1998).

Low Self-Control and Cybercrime

Researchers have explored the associations between general LSC and offline school aggression (Chui and Chan 2013) and general LSC and cybercrime and cyberbullying (Holt et al. 2012; Lianos and McGrath 2018; Vazsonyi et al. 2012). Findings indicate that general LSC is significantly associated with cyberbullying behavior of youths (Cho and Rustu 2020; Kim et al. 2022; Shadmanfaat et al. 2019) and strongly correlated to cybercrime in general (Holt et al. 2012). Furthermore, low self-control significantly predicts cyber offending and cybervictim-offending (Nodeland 2020). Individuals with LSC are more likely to be involved in cyberbullying than those with high self-control (Li et al. 2016; Lianos and McGrath 2018). Additionally, an indirect effect was found between LSC and cyber-victimization and perpetration, whereby this association was mediated by offline victimization and perpetration (Vazsonyi et al. 2012) or by greater opportunity, such as the amount of time spent online (Lianos and McGrath 2018).

Despite the growing knowledge regarding the positive association between general LSC and offline bullying and cyberbullying, little is known about the association between general LSC and online bystander behaviors. However, previous studies indicated associations between offline bullies, bully-supporters, and passive bystanders. For instance, similar to bullies' behavioral patterns, the bully-supporter engages in antisocial behaviors to reinforce and encourage the bully in hurting the victim (Salmivalli 2010). Other studies have also shown positive associations among bullies, aggressive victims, bully-supporters, and passive bystanders (Levy and Sela-Shayovitz 2020; Oh and Hazler 2009), whereby past bullies or aggressive-victims reported also supporting the bully or ignoring the bullying events. Thus, similar to the bullies, it is likely that LSC will also be positively associated with the cyberbully-supporters and passive bystanders.

At the same time, bystander behaviors in cyberspace may be related to specific components of LSC, especially with regards to the three central subcomponents of LSC (i.e., impulsivity, risk taking, and self-centeredness). For instance, Pozzoli and Gini's (2010) study on bystander behaviors in offline bullying showed that students may engage in passive bystander behaviors (i.e., avoiding or staying away from the bullying incident) because it is less risky than defending the victim, and these behaviors may protect them from being victimized or rejected by peers. Conversely, the victim-defenders may take risks in protecting the victim, possibly because they are less sensitive to the rewards (benefits) of avoiding defending the victim in social conflicts and are more concerned with the wellbeing of others and less concerned with their own wellbeing (Nocentini et al. 2020), thus suggesting that they take risks to defend the victim and are not self-centered. Lastly, Erreygers et al. (2016) found impulsivity to be negatively correlated with defending the victim, as noted.

4. The Current Study

The current study aims to examine the relationship between LSC and bystander responses to cyberbullying. Based on the literature on LSC and bystanders' behaviors, we hypothesized that general LSC would be associated with the cyberbully-supporter and passive bystander beyond the subcomponents of LSC; however, this construct would not be associated with the victim-defender (H_1). We also expected to find associations between LSC subcomponents and all three types of bystander behaviors, such that risk taking would positively be linked to the cyberbully-supporter and victim-defender (H_2); self-centeredness would be positively associated with the passive bystander and the cyberbully-supporter (H_3); and impulsivity would be positively associated with the cyberbully-supporter (H_4).

5. Method

5.1. Data

Data were collected through an online self-report survey from a sample of Israeli adolescents by a professional research institute, Panel4all, which worked under the authors' supervision and in accordance with the ethical standards of the National Institutes of Health (NIH) during the year 2020. The research institute was commissioned to create a random

sample of adolescents from different age groups. Parents of the adolescents received a link to an information page describing the aims of the study and a link to the questionnaire. In the first stage, the parents of adolescents were asked to actively consent to their children's participation. The rate of parents' refusal to allow their children to participate in the study was 14.3%, and 34.6% did not respond. Next, the adolescents received information about the aims of the study and were required to sign their informed consent to participate in the study. The final sample consisted of 501 adolescents who were 14–18 years old (M = 16.31, SD = 1.34), and 330 (65.9%) participants were female. No missing data were reported in the current study.

5.2. Measures

Dependent Variables. Bystander behaviors were measured using a questionnaire based on the revised version of the Participant Role Questionnaire (Salmivalli and Voeten 2004) and adjusted to cyberbullying incidents. The scale consists of 10 items measuring three types of cyber bystander behaviors (see Table 1). Participants were asked to think of cyberbullying incidents they had encountered on social network sites in the preceding six months and to rate their response on a 5-point behavioral rating scale: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Frequently, 5 = Always. Questions referred to the adolescents' general experiences of cyberbullying, not to limit their experiences to a specific online context. Three bystander behaviors were measured: victim-defender was measured using four items (e.g., "You sent a message to the whole group demanding that they stop the aggression against the victim") (M = 2.27, SD = 1.00); cyberbully-supporter was measured using three items (e.g., "You responded with laughter to the insult (you sent comments like: "ha, ha" or a laughing emoji)") (M = 1.25, SD = 0.58); passive bystander was measured using three items (e.g., "You read the offensive messages sent to the victim, however you did not respond") (M = 2.30, SD = 0.90). A confirmatory factor analysis (CFA) was conducted using the AMOS ver. 29 software to estimate the measurement model of the bystander behaviors' scale. Table 1 displays the results of the CFA for the bystander three-factor model. Fit indices of the model indicate a very good fit. The $\chi^{2/df}$ ratio (1.78), as well as the root mean square error of approximation (RMSEA) value (0.04) and SRMR value (0.04), were acceptable, and both the comparative fit index (CFI: 0.98) and the Tucker-Lewis fit index (TLI: 0.97) indicate a good fit to the data. The factor loadings presented in Table 1 are equal to or greater than 0.49 and significant ($p < 0.001$). Table 1 includes Cronbach's reliability alpha for each type of bystander. These were 0.80, 0.82, and 0.56 for the victim-defender, cyberbully-supporter, and passive bystander, respectively.

To ensure that the bystander behavior scale has adequate psychometric properties across gender and age, we conducted an invariance analysis. Measurement invariance means that each item contributes to the latent construct to a similar degree across groups and that the correlations between factors are equivalent across groups. Invariance analysis involves testing and comparing models that impose successive restrictions on model parameters. The unconstrained model freely estimates all the parameters across groups. Next, in a more restrictive model, factor loadings are constrained to be equal across groups. In the last model, factor loadings and factor covariances are constrained to be equal across groups.

This type of metric invariance is usually the common form of invariance tested in the field of education and social sciences (Putnick and Bornstein 2016). Invariance is achieved when an insignificant chi-square difference between nested models is obtained. Because full measurement invariance in all steps is often not supported, a common practice is to accept some violations of measurement invariance (e.g., relaxing constraints on one or more loadings). A factor can be considered partially invariant if the majority of items loading on it are invariant (Vandenberg and Lance 2000).

Starting with gender invariance, the unconstrained model ($\chi^2(64) = 79.70$, $p = 0.089$, CFI = 0.99, TLI = 0.98, RMSEA = 0.02) and the loading constrained model ($\chi^2(71) = 92.02$, $p = 0.048$, CFI = 0.99, TLI = 0.98, RMSEA = 0.02) were not significantly different ($\Delta\chi^2(7) = 12.32$,

p = 0.091). Next, after relaxing the two equality constrains from the correlation between victim-defender and cyberbully and between cyberbully and passive bystander ($\chi^2(72) = 94.77$, $p = 0.037$, CFI = 0.98, TLI = 0.98, RMSEA = 0.03), a covariance invariance was achieved ($\Delta\chi^2(1) = 2.75$, $p = 0.097$).

As for age invariance, the unconstrained model ($\chi^2(64) = 109.89$, $p < 0.001$, CFI = 0.97, TLI = 0.95, RMSEA = 0.04) and the loading constrained model ($\chi^2(70) = 116.75$, $p < 0.001$, CFI = 0.97, TLI = 0.96, RMSEA = 0.04) were not significantly different ($\Delta\chi^2(6) = 6.86$, $p = 0.334$) after relaxing one loading in the cyberbully factor. Next, imposing additional constrains on the factor covariances ($\chi^2(73) = 119.06$, $p < 0.001$, CFI = 0.97, TLI = 0.96, RMSEA = 0.04) did not significantly change the model fit ($\Delta\chi^2(3) = 2.32$, $p = 0.509$). In summary, measurement invariance indicated that age and gender equivalence was achieved for 92% and 85% of the parameters, respectively. Given that 50% equivalence is accepted for a partial invariance, the bystander behavior scale is considered partially invariant across gender and age.

Table 1. Confirmatory factor analysis (cfa) of the bystander behavior three-factor model.

		Model 1		
		DF	**BS**	**PB**
1.	You sent a message to the whole group demanding that they stop the aggression against the victim	0.71		
2.	You sent messages to others asking them to help the victim	0.68		
3.	You notified an adult (parent, teacher, principal, counselor) about the victim's online abuse	0.68		
4.	After the event, you went with the victim to get help	0.75		
5.	You encouraged others to send the abusive messages to the victim		0.85	
6.	You spread the offensive messages or offensive photos about the victim on other social networks.		0.86	
7.	You responded with laughter to the insult (you sent comments like: "ha, ha" or a laughing emoji)		0.66	
8.	You read the offensive messages sent to the victim, however you did not respond.			0.61
9.	You preferred to disconnect and not follow what was happening			0.54
10.	You ignored the offensive messages that were sent to the victim.			0.49
% variance explained		80%	32%	44%
Cronbach's alpha (α)		0.80	0.82	0.56

Note. DF = defender; BS = bully-supporter; PB = passive bystander; factor loadings are standardized; model fit indices: $\chi^{2/df}$ ratio = 1.78, TLI (Tucker-Lewis fit index) = 0.97, CFI (comparative fit index) = 0.98, RMSEA (root mean square error of approximation) = 0.04, SRMR = 0.04.

Independent Variable. Self-control was measured using the shorter version of the LSC scale, recommended by Pechorro et al. (2022), and included three subcomponents of LSC: risk taking, self-centeredness, and impulsivity. These elements were measured using Grasmick et al.'s (1993) scale of four items for each of the LSC subcomponents. Participants were asked to rate their level of agreement with each LSC scale item, based on a 5-point Likert scale, ranging from 1 = *Not at all* to 5 = *Very much*. Thus, higher values indicate lower self-control. Cronbach's reliability alpha for general LSC was 0.83 and were 0.80, 0.73, and 0.66 for risk taking, self-centeredness, and impulsivity, respectively.

Control Variables. Two control variables were used in the study. Gender consisted of 1 = male and 2 = female (M = 1.66, SD = 0.48). Age included 5 values: 1 = 14 years, 2 = 15 years, 3 = 16 years, 4 = 17 years, and 5 = 18 years (M = 16.3, SD = 1.34).

5.3. Analytical Strategies

In the preliminary analysis (using SPSS ver. 25), we examined the frequencies of the bystander behaviors (cyberbully-supporter, victim-defender, and passive bystander) and demographic variables (i.e., gender and age).

Second, we examined the interrelations among the research variables to obtain a preliminary understanding of how LSC variables are related to cyberbullying bystander behaviors by calculating Spearman correlation coefficients (using SPSS ver. 25).

Third, due to the ongoing debate over whether to treat self-control as a unidimensional or a multidimensional model (Bobbio and Arbach 2021; Longshore 1998; Piquero and Rosay 1998; Rocque et al. 2016; Ward et al. 2015), we assessed what would be the best-fitting model for analyzing the relationship between LSC and bystanders' behaviors. Accordingly, a CFA (using AMOS ver. 29) was conducted to compare the fit of (a) a unidimensional model of LSC that includes all observed items (i.e., risk taking, self-centeredness, and impulsivity) loaded on one latent construct (i.e., general factor); (b) a correlated factor structure where the three subcomponents are treated as unique latent constructs (i.e., specific factors) that are correlated; (c) a second-order factor structure, where the observed items are explained by the three core subcomponents, and these subcomponents are explained by general LSC; and (d) a bifactor model, where the variance from each of the observed items is simultaneously partitioned by both the general factor and its subcomponent.

Fourth, based on the results of the CFA analysis, a bifactor model was used to examine whether general LSC and its subcomponents could explain the differences in cyberbullying bystander behaviors using Structural Equation Models (SEM) with AMOS ver. 29 software. In a bifactor model, each observed variable is loaded simultaneously on a specific factor (i.e., impulsivity, risk taking, and self-centeredness) as well as on a general factor (i.e., general LSC) and all factors are defined as orthogonal. As such, all latent variables in the model are first-order factors and are defined directly by the observed variables. The items' loadings on the general factor and one of the subcomponents are freely estimated while their cross-loadings on the remaining subcomponents are constrained to zero. As such, the covariance between the observed items is explained by the general factor underlying the items, and the residual covariance is explained by the subcomponents (Morin et al. 2016), thus solving the problem of psychometric multicollinearity between subcomponents by defining a general factor that explains the shared variance among all observed items (Reise 2012). Gender and participants' age were incorporated as covariates in the analyses to manage additional demographic variance. Drawing on the scientific literature (Bastiaensens et al. 2014; Macháčková et al. 2015; Pratt 2016), associations were established between gender and the three bystander behaviors, as well as between gender, general LSC, and the three LSC subcomponents. Additionally, connections were added between age and general LSC, the three LSC subcomponents, and the three bystander behaviors. The SEM analysis was based on the maximum likelihood method of estimation, and fit indices included the chi-square value ($\chi^{2/df}$) and the cut-off values of <0.06 for RMSEA (root mean square error of approximation), <0.08 for SRMR (standardized root mean square residual), >0.95 for CFI (comparative fit index), and >0.90 for TLI (Tucker Lewis index) (Hu and Bentler 1999; Schreiber et al. 2006).

To evaluate the Structural Equation Model's (SEM) robustness, we conducted a power analysis using MacCallum et al.'s (2010) method in R software (ver. 4.0.5), with an expected RAMSEA of 0.05, significance level (α) at 0.05, and 214 degrees of freedom (^{df}). The analysis demonstrated a 99% statistical power, signifying the model's ability to detect the specified effect size. The achieved sample size for this study is 300 participants based on these results.

6. Results

6.1. Descriptive Statistics

Descriptive statistics for this study's variables are presented in Table 2 and show that 54 (10.8%) were classified as cyberbully-supporters, 91 (18.2%) as passive bystanders, and 76 (15.2%) as victim-defenders. Mardia's coefficients were applied to assess the multivariate measure of kurtosis (Table 2), revealing potential non-normality in the data (especially for the bully-supporter scale). Notably, this test's sensitivity to sample sizes was acknowledged, prompting the decision to maintain the original sample size at $N = 501$.

Table 2. Descriptive statistics (N = 501).

	Mean	SD	Skewness	Kurtosis	Multivariate Kurtosis	c.r.	Min	Max
1. Risk taking	2.01	0.88	0.82	0.15	9.96	16.09	1.00	5.00
2. Self-centeredness	2.14	0.83	0.82	0.49	8.15	13.16	1.00	5.00
3. Impulsivity	2.18	0.84	0.68	0.27	3.96	6.39	1.00	5.00
4. General LSC	2.26	0.61	0.54	0.79	48.18	29.42	1.00	5.00
5. Victim-defender	2.27	1.00	0.52	−0.55	5.49	8.86	1.00	5.00
6. Passive bystander	2.30	0.90	0.26	−0.66	1.55	3.17	1.00	5.00
7. Bully-supporter	1.25	0.58	3.07	10.46	66.73	136.34	1.00	5.00
8. Gender	1.66	0.48	−0.67	−1.56	−1.54	−7.03	1.00	2.00
9. Age	16.31	1.34	−0.28	−1.11	1.54	7.04	1.00	2.00

Note. c.r. = critical ratio.

6.2. Spearman Correlation Coefficients among Research Variables

The findings in Table 3 indicate that supporting cyberbullying was positively associated with boys more than with girls. In addition, there was a positive association between supporting cyberbullying and general LSC as well as with all three subcomponents of LSC. Cyber victim-defender behaviors were positively associated with risk taking. Passive bystander behaviors were positively associated with boys more than with girls and positively associated with general LSC and all three subcomponents. Age was not found to be associated with any of the cyberbullying bystander behaviors; however, LSC was associated with younger adolescents.

Table 3. Spearman correlations between averaged scores of general lsc, lsc subcomponents, cyberbullying bystander behaviors, and demographic variables (N = 501).

	2	3	4	5	6	7	8	9
1. Risk taking	0.38 ***	0.34 ***	0.68 ***	0.15 ***	0.18 ***	0.30 ***	−0.12 **	−0.10 *
2. Self-centeredness		0.43 ***	0.65 ***	0.01	0.33 ***	0.29 ***	−0.14 **	−0.06
3. Impulsivity			0.72 ***	0.01	0.28 ***	0.30 ***	−0.02	−0.08
4. General LSC				0.10 *	0.25 ***	0.34 ***	−0.08	−0.14 ***
5. Victim-defender					−0.01	0.16 ***	0.03	0.03
6. Passive bystander						0.24 ***	−0.10 *	0.01
7. Bully-supporter							−0.17 ***	−0.01
8. Gender								0.07
9. Age								-

Note. * ($p < 0.05$), ** ($p < 0.01$), *** ($p < 0.001$).

6.3. Confirmatory Factor Analysis

Table 4 summarizes the fit indices of the four LSC measurement models. The $\chi^{2/df}$ = 3.06, the RMSEA = 0.06, SRMR = 0.04, and the CFI (0.95) and TLI (0.92) indices all indicate the bifactor model has the best fit to the data. Regression loadings of the four models are presented in Table 5. The factor loadings presented in the bifactor model are equal to or greater than 0.37 and significant ($p < 0.001$), with the exception of two items that had low regression loadings (items 10 and 12). However, based on previous studies that demonstrated impulsivity as one of the core subcomponents of LSC associated with behavioral disorders and conduct problems (Longshore 1998; Pechorro et al. 2022; Piquero and Rosay 1998; Rocque et al. 2016; Ward et al. 2015), we included impulsivity as a subcomponent in the final model.

To examine the LSC bifactor invariance across gender and age, we applied a similar approach as described for the bystander scale. Given that the LSC bifactor model did not include covariances, only loading invariance was examined. Starting with gender invariance, the unconstrained model ($\chi^2(85)$ = 187.36, $p < 0.001$, CFI = 0.94, TLI = 0.91, RMSEA = 0.05) and the loading constrained model ($\chi^2(99)$ = 203.77, $p < 0.001$, CFI = 0.94,

TLI = 0.92, RMSEA = 0.05) were not significantly different ($\Delta\chi^2(14) = 16.41$, $p = 0.289$) after relaxing 9 paths out of 24. Hence, 63% invariance was achieved. As for age invariance, the unconstrained model ($\chi^2(84) = 192.98$, $p < 0.001$, CFI = 0.94, TLI = 0.90, RMSEA = 0.05) and the loading constrained model ($\chi^2(103) = 222.24$, $p < 0.001$, CFI = 0.94, TLI = 0.90, RMSEA = 0.045) were not significantly different ($\Delta\chi^2(19) = 29.26$, $p = 0.062$) after relaxing 5 paths out of 24. Hence, 79% invariance was achieved. Taken together, partial invariance across gender and age was achieved.

Table 4. CFA fit indices of the four models of low self-control ($N = 501$).

Model	χ^2	df	CMIN/DF	CFI	TLI	RMSEA	SRMR	AIC
Unidimensional model (general LSC)	475.36	54	8.80	0.75	0.69	0.13	0.04	523.36
Multidimensional model	182.08	51	3.57	0.92	0.90	0.07	0.05	235.71
Second order model	182.08	51	3.57	0.92	0.90	0.07	0.05	235.71
Bifactor model	128.39	42	3.06	0.95	0.92	0.06	0.04	200.14

Note: CMIN/DF = chi-square on degrees of freedom; TLI = Tucker-Lewis fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation; AIC = Akaike information criterion. $p < 0.001$.

6.4. A Bifactor Model

Next, we conducted SEM analysis (using AMOS ver. 29) to examine the paths between the bifactor model (G-factor and two S-factors) and cyberbullying bystander behaviors. The $\chi^{2/df} = 1.99$, RMSEA = 0.04, SRMR = 0.05, and the CFI (0.94) and TLI (0.92) indices indicate a reasonable fit to the data.

Figure 1 presents regression weights between general LSC and its subcomponents in the bifactor model and the three types of bystander behaviors and indicates that general LSC is positively and significantly associated with the cyberbully-supporter behaviors (0.17, $p < 0.05$) and with the passive bystander behaviors (0.41, $p < 0.001$), beyond the association of LSC subcomponents with these types of bystander behaviors. LSC subcomponents were also associated with the bystanders' behaviors above and beyond the associations between general LSC and these types of behaviors. Risk taking was positively associated with both the victim-defenders' behaviors (0.33, $p < 0.001$) and cyberbully-supporters' behaviors (0.41, $p < 0.001$). In addition, self-centeredness was positively associated with both the passive bystanders' behaviors (0.40, $p < 0.001$) and the cyberbully-supporters' behaviors (0.42, $p < 0.001$). Impulsivity was positively associated with the cyberbully-supporters' behaviors (0.66, $p < 0.001$). Among the covariates, gender was associated with victim-defender behaviors, such that girls reported defending the victims more than boys (0.21, $p < 0.01$). Gender was not associated with passive bystanders' or cyberbully-supporters' behaviors ($p > 0.05$). Gender was also associated with the LSC subcomponents, such that boys were more likely to report risk taking (-0.24, $p < 0.01$) and self-centeredness (-0.23, $p < 0.01$) than girls. Lastly, age was positively associated with both the bully-supporter (0.32, $p < 0.05$) and victim-defender (0.18, $p < 0.05$) behaviors. That is, older adolescents are more likely to support the cyberbully or defend the cybervictim. Additionally, age was positively associated with risk taking (-0.21, $p < 0.01$) and impulsivity (-0.30, $p < 0.05$). Namely, younger adolescents were more likely to engage in these behaviors. Table 6 displays measurement models of the bystander behaviors and LSC bifactor model within the SEM model.

Table 5. Confirmatory factor analyses (CFA) regression weights of the unidimensional, multidimensional, second order factor, and bifactor models of LSC.

		Model 1 Unidimensional Model of LSC	Model 2 Multidimensional Correlated Model			Model 3 Second Order Factor Model				Model 4 Bifactor Models			
	Items	General LSC	Risk	Self-Cent	Impul	Risk	Self-Cent	Impul	Second Factor LSC	Risk	Self-Cent	Impul	General LSC
1.	I like to test myself every now and then by doing something a little risky.	0.63	0.77			0.77				0.72			0.47
2.	Sometimes, I will take a risk just for the fun of it.	0.58	0.64			0.64				0.38			0.49
3.	I sometimes find it exciting to do things for which I might get in trouble.	0.67	0.74			0.74			0.69	0.50			0.54
4.	Excitement and adventure are more important to me than security.	0.65	0.68			0.68				0.38			0.52
5.	I try to look out for myself first, even if it means making things difficult for other people.	0.46		0.67			0.67				0.49		0.46
6.	I'm not very sympathetic to other people when they are having problems.	0.43		0.53			0.53				0.36		0.38
7.	If things I do upset people, it's their problem, not mine.	0.48		0.67			0.67		0.69		0.59		0.42
8.	I will try to get the things I want even when I know it's causing problems for other people.	0.54		0.65			0.65				0.38		0.52
9.	I don't devote much thought and effort to preparing for the future.	0.38			0.44			0.44				0.34	0.37
10.	I often act on the spur of the moment.	0.56			0.57			0.57				−0.17	0.65
11.	I'm more concerned with what happens to me in the short run than in the long run.	0.53			0.62			0.62	0.98			0.43	0.56
12.	I often do whatever brings me pleasure here and now, even at the cost of some distant goal.	0.60			0.72			0.72				0.24	0.67
% variance explained		-	-	-	-	0.47	0.48	0.95					
Cronbach's alpha (α)		0.83	0.79	0.72	0.65								
McDonald's ω		0.84	0.80	0.73	0.66								

Note. Risk = risk taking, Self-cent = self-centeredness, Impul = impulsivity; all factor loadings were standardized and significant ($p < 0.001$), except for item 10 ("I often act on the spur of the moment"), regressed on the impulsivity factor in the bifactor model. Factor correlations between LSC latent variables in the multidimensional correlated model: risk-taking <--> self-centeredness = 0.18; self-centeredness <--> impulsivity = 0.26; risk-taking <--> impulsivity = 0.38. All factor correlations were significant at $p < 0.001$.

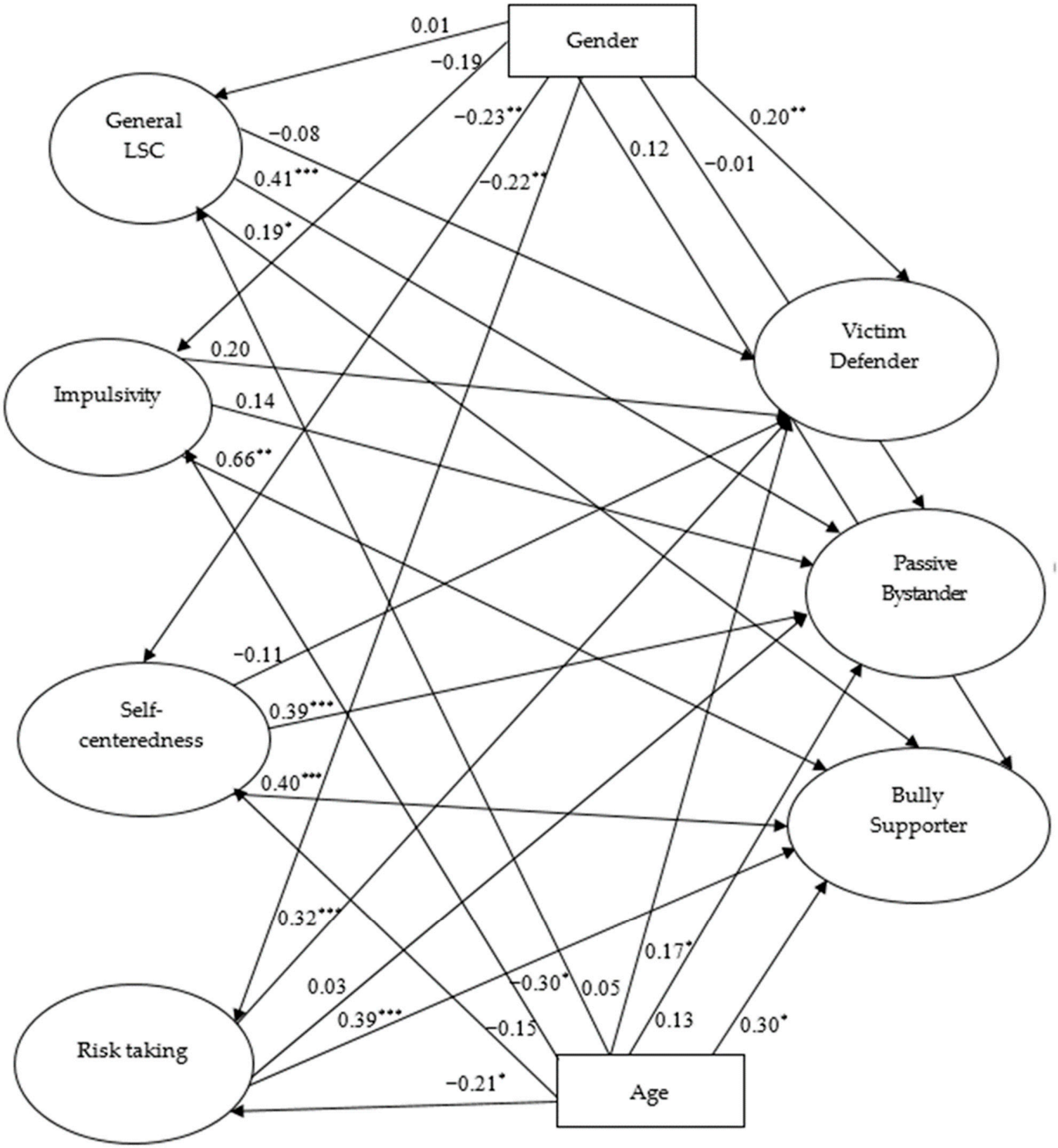

Figure 1. SEM analysis of bifactor model (G-factor and S-factors) as a predictor of cyberbullying bystander behaviors while controlling for gender and age. *Notes*. Values of regression loadings are standardized; model fit indices: $\chi^{2/df}$ ratio = 1.99, TLI (Tucker-Lewis fit index) = 0.92, CFI (comparative fit index) = 0.94, RMSEA (root mean square error of approximation) = 0.04, SRMR = 0.05, AIC (Akaike information criterion) = 597.61. * ($p < 0.05$), ** ($p < 0.01$), *** ($p < 0.001$).

Table 6. Structural Equation Modeling (SEM) regression weights of the bystander behaviors and LSC bifactor measurement models.

	LSC Bifactor Measurement Model	Risk	Self-Cent	Impul	General LSC	DF	BS	PB
1.	I like to test myself every now and then by doing something a little risky.	0.66			0.47			
2.	Sometimes, I will take a risk just for the fun of it.	0.40			0.48			
3.	I sometimes find it exciting to do things for which I might get in trouble.	0.55			0.52			
4.	Excitement and adventure are more important to me than security.	0.43			0.52			
5.	I try to look out for myself first, even if it means making things difficult for other people.		0.48		0.46			
6.	I'm not very sympathetic to other people when they are having problems.		0.43		0.36			
7.	If things I do upset people, it's their problem, not mine.		0.52		0.44			
8.	I will try to get the things I want even when I know it's causing problems for other people.		0.39		0.51			
9.	I don't devote much thought and effort to preparing for the future.			0.40	0.35			
10.	I often act on the spur of the moment.			0.06	0.59			
11.	I'm more concerned with what happens to me in the short run than in the long run.			0.29	0.57			
12.	I often do whatever brings me pleasure here and now, even at the cost of some distant goal.			0.32	0.65			
13.	You sent a message to the whole group demanding that they stop the aggression against the victim.					0.71		
14.	You sent messages to others asking them to help the victim.					0.68		
15.	You notified an adult (parent, teacher, principal, counselor) about the victim's online abuse.					0.67		
16.	After the event, you went with the victim to get help.					0.75		
17.	You encouraged others to send the abusive messages to the victim.						0.84	
18.	You spread the offensive messages or offensive photos about the victim on other social networks.						0.86	
19.	You responded with laughter to the insult (you sent comments like: "ha, ha" or a laughing emoji).						0.67	
20.	You read the offensive messages sent to the victim, however you did not respond.							0.61
21.	You preferred to disconnect and not follow what was happening.							0.55
22.	You ignored the offensive messages that were sent to the victim.							0.49
% variance explained		0.10	0.08	0.13	0.00	0.15	0.74	0.34

Note. Risk = risk taking, Self-cent = self-centeredness, Impul = impulsivity; DF = defender; BS = bully-supporter; PB = passive bystander; all factor loadings were standardized and significant ($p < 0.001$), except for the item 10 ("I often act on the spur of the moment") that was regressed on the impulsivity factor in the bifactor model.

To test whether the model presented in Figure 1 (without gender and age) is equivalent across gender, we used the multi-group approach in SEM. To do so, we compared the fit indices of a "free" model, where all regression paths were freely estimated for each gender group, to the fit indices of a "constrained" model in which the path coefficients were constrained to be equal across gender. Model comparison was conducted by testing the significance of the chi-square difference between the free and constrained models. Results indicated that the free and constrained models were significantly different ($\Delta\chi^2(12) = 25.03$, $p = 0.015$). Yet after relaxing the equality constraint on the path between risk taking to cyberbully-supporters, no significant difference was found between the models ($\Delta\chi^2(11) = 17.59$, $p = 0.092$). Thus, except for the association between risk taking and cyberbully-supporters, which was significant for girls ($\beta = 0.26$, $p < 0.001$) but not for boys ($\beta = -0.19$, $p = 0.259$), all other path coefficients were equivalent across gender. Hence, it may be concluded that gender equivalence was achieved.

7. Discussion

Cyberbullying bystander behavior has attracted increasing attention in the past decade. Nevertheless, little is known about the utility of LSC in explaining response patterns of bystanders to aggressive online behavior. The current study utilized a bifactor model to explore whether general LSC explains various behaviors of cyberbullying bystanders, above and beyond LSC subcomponents and vice versa. Several findings are noteworthy.

First, the findings show that a bifactor model, which consists of both general LSC and its subcomponents, best represents the structure of LSC, exhibiting partial invariance across gender and age. This finding may indicate that LSC measures are interpreted differently across gender and age groups, and these distinct interpretations of LSC measures should be taken into account in future studies.

Concurrent with previous research (Bobbio and Arbach 2021; Pechorro et al. 2022), the bifactor model represents both uni- and multidimensions of the LSC scale, while taking into consideration psychometric multicollinearity between subcomponents (Reise 2012). This approach to LSC contributes to the ongoing debate regarding the unidimensionality of the LSC scale (Piquero and Rosay 1998), by taking into consideration the multidimensionality of this measure.

Second, with regard to the associations between LSC and bystander behaviors, general LSC was positively associated with supporting the cyberbully and passively standing by. These findings support the first hypothesis and stress the important role general LSC plays in understanding the bully-supporter and passive bystander behaviors in cyberspace. These findings are in line with previous studies that indicate individuals with LSC are more likely to be involved in cyberbullying than those with high self-control (Li et al. 2016; Lianos and McGrath 2018). Furthermore, previous studies have shown positive associations between bullies, cyberbully-supporters, and passive bystanders (Levy and Sela-Shayovitz 2020; Oh and Hazler 2009). Thus, it can be assumed that, similar to the link between the bully and LSC, the cyberbully-supporter and the passive bystander are also associated with LSC.

Third, the SEM analysis also revealed that beyond the association between general LSC and the cyberbully-supporters' and passive bystanders' behaviors, subcomponents of LSC were also associated with these bystander behaviors. As for cyberbully-supporters, the results show that they were positively associated with risk taking. This result supports the second hypothesis and suggests that cyberbully-supporters take more risks than other bystanders do. It is possible that, similar to offline bullying, the potential benefits (e.g., gaining popularity, gaining friends, and doing the right thing) outweigh the potential costs (e.g., punishment, loss of friends, and loss of popularity; Spadafora et al. 2020). Thus, cyberbully-supporters choose to actively support cyberbullies by encouraging or assisting them in spreading malicious content against their victims. In addition, a positive association was found between taking risks and protecting the victim. It is possible that cybervictim-defenders are less sensitive to the potential costs (e.g., punishment, loss of

friends, and loss of popularity; Spadafora et al. 2020) of defending the victim in social conflicts and are more concerned with the wellbeing of others and less concerned with their own wellbeing (Nocentini et al. 2020). Thus, results indicate that general LSC does not explain cybervictim-defenders' behaviors; however, risk taking may be considered as a separate personality trait that predicts their involvement in cyberbullying.

Our findings support the third hypothesis and indicate that both the cyberbully-supporters and passive bystanders were positively associated with self-centeredness. Previous studies found that passive bystanders are less concerned with the victims (Pozzoli et al. 2017) and that cyberbully-supporters and passive bystanders have less affective empathy (Van Cleemput et al. 2014) than victim-defenders (Macháčková and Pfetsch 2016). Thus, self-centeredness plays an important role in understanding bully-supporters' and passive bystanders' responses in cyberspace and may help to better understand cyberbully-supporters' and passive bystanders' tendency to focus on their own needs while ignoring others. Furthermore, a previous study (Menesini et al. 2003) indicated that offline bullies are also characterized by self-centeredness. This finding implies some similarity in the dimension of self-centeredness between the bully, the cyberbully-supporter, and the passive bystander. Thus, further research is required to understand the role of self-centeredness in bully and pro-bully bystanders' online behaviors.

Furthermore, our findings demonstrate that impulsivity was positively associated with cyberbully-supporter's behaviors. These findings support the fourth hypothesis and suggest that impulsivity contributes to explaining pro-bully behaviors in cyberspace beyond the significant contribution of general LSC. Also, these results are consistent with previous studies that found that impulsivity is one of the core subcomponents of LSC correlated with behavioral disorders and conduct problems (Longshore 1998; Pechorro et al. 2022; Piquero and Rosay 1998; Rocque et al. 2016; Ward et al. 2015) and support the decision to include impulsivity in the model. However, a recent study found that impulsivity and risk taking have differing trajectories. While impulsive behavior decreases (i.e., ages 10–12) throughout adolescence, risk taking increases during this period of time (Forrest et al. 2019). In light of these differing trajectories and considering this research was conducted on adolescents aged 14–18, further research is needed to explore the relationship between impulsivity and cyberbullying bystander roles.

With regards to the covariates, significant differences were found for gender. Results show that girls are more likely to defend the victim (Bastiaensens et al. 2014; Campbell et al. 2017; Macháčková et al. 2015; Panumaporn et al. 2020), while no gender differences were found for cyberbully-supporters. This finding contradicts previous studies that indicated boys were more inclined to engage in behaviors that support the cyberbully (Bastiaensens et al. 2014; Macháčková et al. 2015; Schultze-Krumbholz et al. 2018; González-Cabrera et al. 2019). Nevertheless, other studies did not find gender differences for bystander behaviors (Erreygers et al. 2016; Kozubal et al. 2019; Macháčková and Pfetsch 2016; Schultze-Krumbholz et al. 2018), and therefore, additional research is warranted. Additionally, gender differences were found for LSC subcomponents. Boys were more likely to report risk taking and self-centeredness than girls; however, no gender differences were found for general LSC. These results are consistent with previous studies that found gender differences in impulsivity, risk-seeking, and self-centeredness, with males demonstrating higher levels than females (Gibson et al. 2010; LaGrange and Silverman 1999; Pechorro et al. 2022).

Regarding the association between age and cyber bystander behaviors, the findings indicate that older adolescents are more likely to support the cyberbully. This is consistent with previous studies showing that older adolescents were more likely to join the cyberbully than younger adolescents (Erreygers et al. 2016; Panumaporn et al. 2020). However, this study also demonstrated that older adolescents were more likely to defend the victim than younger ones, suggesting a diverse range of bystander behaviors among older adolescents (Vismara et al. 2022). Additional research is needed to investigate how factors, such as the bullying context (Moretti and Herkovits 2021) and the relationships between bystanders

and other participants (Macháčková et al. 2018), contribute to the understanding of older adolescents' diverse cyber bystander behaviors.

As for the association between age and LSC, findings of the current study indicate that younger adolescents were also more likely to engage in risk taking and impulsivity than older adolescents. This finding partially coincides with a prior study that indicated risk seeking to emerge in early adolescence, whereas impulsivity developed in childhood and declined in adolescence (Forrest et al. 2019). However, this study measured age as a nominal variable (14–18 years old). It is possible that examining distinct age range groups (younger vs. older adolescents) could yield divergent results.

Finally, the research model was equivalent across gender, with the exception of the association between risk taking and cyberbully-supporters, which was significant for girls but not for boys. This finding indicates that females may perceive their support of cyberbullying as riskier than do males and are therefore less likely to support cyberbullying.

7.1. Limitations and Future Directions

The limitations of the present study include a relatively small sample and overrepresentation of females, potentially affecting the generalizability of the results. Additionally, the passive bystander measure has low internal consistency, potentially affecting the validity of the findings. Furthermore, the factor loading of the impulsivity item "I often act on the spur of the moment" was found to be insignificant. This may indicate a problem with the psychometric properties of the LSC scale, which may potentially affect the validity of the findings. The statistical analysis employed in this study utilized traditional Maximum Likelihood (ML) estimation, which assumes multivariate normality. Given the potentially non-normally distributed nature of the data, the use of Maximum Likelihood with robust standard error (MLR) estimation may have been more adequate for this study. Finally, the current study did not control for additional variables that affect bystander response, such as moral reasoning skills, self-efficacy, affective and cognitive empathy, the bystander's prior experience as a victim or as a bully of aggressive behavior, and relationships with other participants (Barlińska et al. 2018; Jeyagobi et al. 2022; Macháčková et al. 2018). Thus, further research is required to understand more deeply the role of general LSC and its components in cyber bystanders' behaviors.

7.2. Conclusions and Practical Implications

The findings of the current study have several important theoretical and practical implications. Theoretically, this study extends the focus of the research literature regarding the role of LSC and its elements in bystanders' behaviors, as mentioned. Findings suggest that general LSC plays a key role in understanding bully-supporter and passive bystander behaviors in cyberspace. Furthermore, we found evidence that risk taking, self-centeredness, and impulsivity were also associated with bystanders' behaviors beyond the associations between general LSC and these types of behaviors. The practical implications of this study highlight the importance of designing evidence-based interventions that take into consideration the LSC of cyberbully-supporters and passive bystanders. Accordingly, these interventions should focus on teaching them self-control skills (e.g., Ronen and Rosenbaum 2010), empathy skills, and awareness of the victim's experiences (e.g., Schultze-Krumbholz et al. 2018).

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