



Cybergossip and Problematic Internet Use in cyberaggression and cybervictimisation among adolescents

Ana Cebollero-Salinas^a, Santos Orejudo^b, Jacobo Cano-Escoriaza^a, Tatiana Íñiguez-Berrozpe^{c,*}

^a Department of Educational Sciences, University of Zaragoza, Zaragoza, Spain

^b Department of Psychology and Sociology, University of Zaragoza, Zaragoza, Spain

^c Department of Psychology and Sociology, Faculty of Education, University of Zaragoza, Pedro Cerbuna, 12, 50009, Zaragoza, Spain

ARTICLE INFO

Keywords:

Problematic internet use
Cybergossip
Cyberbullying
Cyberaggression
Cybervictimisation

ABSTRACT

Research on cyberbullying has focused on personal and contextual factors. However, little is known about its relationship with habitual behaviours associated with easy access to the Internet, such as cybergossip and problematic Internet use, as well as the role that gender and age play in relation with these variables. Knowledge about these subjects could contribute to the elaboration of new preventive and educational approaches. This study therefore aims to analyse the influence that cybergossip and problematic Internet use have on cyberaggression and cybervictimisation, considering differences in age, gender, and the age at which the first smartphone was owned. 1013 adolescents between 12 and 18 years old ($M = 14.0$, $SD = 1.42$) (56.4% girls) from thirteen Spanish educational centres participated. The results, obtained through structural equation modelling, show that there is a high association between the four constructs, and explain a high variability of cyberaggression and cybervictimisation. It is relevant that cybergossip has a greater influence on the cyberaggression of girls, on subjects who are 12–14 years old, and on victims aged 15–18, while problematic Internet use has a greater influence on the cybervictimisation of boys and subjects who are 12–14 years old. Furthermore, the fact of having had a smartphone before the age of 11 leads to a higher level of cyberaggression, explained by cybergossip and problematic Internet use. These results allow us to establish new channels of intervention.

1. Theoretical framework

1.1. Cyberbullying: cyberaggression and cybervictimisation

Regarded as a global phenomenon of great concern, cyberbullying is one of the risks associated with the virtual environment (Ang et al., 2014; Sorrentino et al., 2019; Wright et al., 2015). Smith et al. (2008) defined cyberbullying as an aggressive, intentional act, carried out by a group or individual, using electronic forms of contact, repeatedly and over time, against a victim who cannot easily defend him/her self. Spreading private information, insulting, humiliating, sending threatening messages, as well as carrying out actions of exclusion and stigmatization are some of the aggressive behaviours displayed via digital devices (Whittaker & Kowalski, 2015). Some authors have found a close connection between bullying and cyberbullying (Baldry et al., 2016; Ortega-Ruiz et al., 2016); however, online aggression implies being able to harass others without being limited by one's location, in addition to

the persistence over time of inflicted damage, and the fact that the aggressor often remains anonymous (Tokunaga, 2010). This leads to major psychological and mental problems such as depression, anxiety, low self-esteem, stress, anguish, loneliness, and even suicidal ideations (Hinduja & Patchin, 2019; Kwan et al., 2020). Therefore, cyberbullying has become an immense challenge for the educational community.

The socio-ecological model of diathesis-stress (Swearer & Hymel, 2015) provides a holistic framework that allows us to understand cyberbullying, since it integrates the dynamic interaction of genetic, social, and environmental factors. Although it was initially proposed as an explanatory framework for bullying, it has a potential for explaining cyberbullying as well (Ansary, 2020). The model is based on the premise that aspects such as the school environment, peer influence, family environment, factors related to cyberspace, personality, and attitudes towards aggression are all interrelated. However, in the latest reviews and meta-analysis that integrate this model – the individual, the family,

* Corresponding author.

E-mail addresses: anacebollero@unizar.es (A. Cebollero-Salinas), sorejudo@unizar.es (S. Orejudo), jcano@unizar.es (J. Cano-Escoriaza), tatianai@unizar.es (T. Íñiguez-Berrozpe).

<https://doi.org/10.1016/j.chb.2022.107230>

Received 25 September 2021; Received in revised form 31 January 2022; Accepted 2 February 2022

Available online 4 February 2022

0747-5632/© 2022 The Authors.

Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

peers, school and community – (Guo, 2016; Kowalski et al., 2019; Zych et al., 2019) it can be seen that the literature has focused mainly on the analysis of certain environmental and social factors, such as school climate, family supervision, rejection and isolation from peers, as well as on individual factors such as self-esteem, self-control, empathy, competence, moral disengagement, impulsivity, social competence, previous experiences of bullying, and attitudes towards aggression, but very few studies have specifically addressed cyberactivities per se (such as cybergossip, problematic Internet use, media-multitasking, etc.). An exception is the frequency and extent of online activities, which becomes a risk factor for cyberbullies as well as for cybervictims (Guo, 2016; Zych et al., 2019). In this sense, personal and communicative cyberactivities could be relevant in explaining cyberbullying, given that this complex phenomenon occurs more frequently in online games where users chat and texts are sent on social networks among children, as well as among adolescents and young adults (Kowalski et al., 2019). In fact, Brody and Vangelisti (2017) concluded that public and private comments, status updates, and posts are the most common ways to engage in cyberbullying through social media. This could be widespread even at an early age: although most social media platforms require a minimum user age of 13, in many countries they are used in a significant proportion from the age of 9: for example, 14% in France and 45% in Russia (Smahel et al., 2020, pp. 1–47).

The evidence provided by these data leads us to hypothesize that cyberbehaviours such as the publication of online comments about third parties (cybergossip) and the problematic use of the Internet (excessive concern about connecting to the Internet with difficulty in controlling oneself, specifically centred in our model in Internet abuse -i.e. social media-, although problematic Internet use also includes behaviours such as compulsive online gambling, compulsive online shopping, etc.) may be part of a complex grid of elements involved in cyberbullying. Consequently, studies of these cyberbehaviours can be essential in order to help us achieve an adequate representation of risk and protection factors, while making progress in developing an explanatory model of cyberbullying.

1.2. Cybergossip

Cybergossip involves making evaluative comments about third parties through digital devices (Romera et al., 2018). This cyberbehaviour has different functions of service to the group, which may be related to positive aspects of social learning, such as informing the members of the group about its operation (Grosser et al., 2010), learning about how one achieves success or avoids failure in social situations (Baumeister et al., 2004), or providing positive gossip models to emulate (Litman & Pezzo, 2005). That is, cybergossip offers the possibility of lending cohesion to the group and improving interpersonal relationships, but it can also be used in ways that damage cyber-coexistence, such as negatively influencing someone's reputation and even using it with the intention of doing harm, as happens in cyberbullying. In adolescence, the Internet is frequently used to communicate with friends, and this is usually motivated by peer pressure (Steijn, 2014). The competition for reputation or popularity typical of adolescence (Kisfalusi et al., 2019) could be the cause for disinhibition in the comments (Suler, 2004) and the use of the image, ethnicity, or other characteristic of a member of the group to spread hostile, even hateful comments. The scant research that exists to date suggests that cybergossip can be related to problematic Internet use (Romera et al., 2021) and it also can increase the involvement of adolescents in cyberaggression and cybervictimisation, and that it acts as a mediator between filial disclosure and cyberaggression (Romera et al., 2021). As the virtual environment is more limited in transmitting the information normally provided by non-verbal communication, this increases the chances of misunderstandings and the attribution of intentions that do not correspond with the sender's original purpose. In fact, a recent study shows that the interpretation of information or the cognitive

reconstruction thereof may be the mechanism that mediates between cybergossip and cyberbullying among adolescents (Falla et al., 2021).

Despite the fact that cybergossip is a common cyberbehaviour displayed from an early age (López-Pradas et al., 2017), the study of this phenomenon is still not very developed. Although research does not indicate differences in the frequency with which boys and girls cybergossip (Romera et al., 2018), it is unknown if cybergossip affects cyberaggression and cybervictimisation differently according to sex and/or age. The constant development of new instant messaging applications and the increasing visibility of any type of information suggests that cybergossip is a growing behaviour that requires further investigation.

1.3. Problematic Internet Use

The time dedicated to online activities (Müller et al., 2016), the immediate gratifications that the Internet provides (Authors, 2021), and the impulsivity provoked by the online environment's stimulating demands (Chen et al., 2017; Meerkerk et al., 2010) can all lead to problematic Internet use (hereinafter PIU). This situation is aggravated by the structure of social networks, which are so designed that users spend as long as possible on them as they are stimulated by an intermittent reinforcement programme (van Velthoven et al., 2018).

It is necessary to point out that the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association (DSM-V) does not include Internet addiction as an addictive disorder or as a behavioural addiction. Therefore, one of the most used terms in the literature is "problematic use of the Internet" (Caplan, 2010) to refer to a pattern that includes excessive concern about connecting to the Internet with difficulty in controlling oneself, which affects the normal development of the adolescent's daily life and is used to artificially alleviate their emotional state. This behaviour has been also measured as Compulsive Internet Use (Sarmiento et al., 2021, pp. 108–116). It is a highly prevalent behaviour in adolescents, varying between 5% and 15.2% in Europe, and between 2.5% and 26.8% in Asian countries (Kuss et al., 2014; Wang et al., 2016).

A substantial group of studies carried out among the adolescent population have warned about the effects of PIU. For example, excessive use of the Internet may be related to a greater exaggeration of social communication trends that exist in all cultures, such as cybergossip, making them available to a wider audience (Romera et al., 2021; Subrahmanyam et al., 2008; Yudes-Gómez et al., 2018). PIU is also related to psychological consequences such as loneliness (Ang et al., 2012), low self-esteem and academic aspirations (Mei et al., 2016; Mo et al., 2020), higher levels of FOMO (fear of missing out on something online) (Santana-Vega et al., 2019), depression and hostility (Ko et al., 2014), and a higher degree of victimization among peers in children aged 11 to 13 (Martínez-Ferrer et al., 2018). PIU is also associated with online risks such as cyberaggression and cybervictimisation (Brighi et al., 2019; Chang et al., 2015; Gámez-Guadix et al., 2016; Yudes-Gómez et al., 2018).

Furthermore, if the problematic use of the Internet is related to the amount of time spent on it (Brighi et al., 2019), we can hypothesize that the higher the level of PIU, the higher the level of cyberbullying. This relationship was also pointed out in other studies like Machimbarrena's et al. (2018; 2021), in Spain, and Feijoo et al. (2021) in Italy. Both found that adolescents involved in cyberbullying tend to be heavy Internet users, not obtaining significant differences by sex, although, in terms of age, there appears to be a greater tendency to bully among older participants (16–17 years old).

Regarding these differences, research has highlighted that there is a change in Internet use patterns associated with sex, age and access to the Internet which is associated with the possession of a smartphone. Boys and girls differ in terms of their digital activities. Girls apparently spend more time on social networks, whereas boys spend more time playing games (Twenge & Martin, 2020; Álvarez-García et al., 2017). This could

have consequences for the different types of cyberbullying behaviours. Some authors conclude that girls, to a greater extent, harass and are victims of indirect aggressions such as rumors and defamations, whereas boys exercise and suffer a greater degree of direct violence, such as insults and threats (Festl et al., 2017; Martínez-Montegudo et al., 2019; Mishna et al., 2010). On the other hand, age is relevant in the study of cyberactivities, since the emotional and cognitive regulatory systems that govern behaviour only come to full maturity in young adulthood; thus, school-age users of social networks are a population that is vulnerable to online risks (Pharo et al., 2011).

These pattern changes in terms of age and gender can also be observed in the incidence of cyberbullying, and results are mixed. Several studies carried out with adolescents suggest that boys are cyberbullying aggressors in a greater proportion (Bae, 2021; Sorrentino et al., 2019; Wong et al., 2018), and further ones find that girls are more victimized (Kowalski et al., 2019, 2014; Palermi et al., 2017; Rey et al., 2018). However, other authors argue the opposite, with boys being the ones who suffer the most from cyberbullying (Gámez-Guadix et al., 2014; Yang et al., 2014). One can find still find further examples where no differences between the sexes are registered (Fletcher et al., 2014; Giménez Gualdo et al., 2015). Some authors find that cyberbullying increases with age (Larrañaga et al., 2018; Walrave & Heirman, 2011), while other studies find that it decreases (Moore et al., 2012; Tokunaga, 2010), and even others have found no differences (Garaigordobil, 2015; Marín-López et al., 2020). In cybervictimisation, the situation is similar. Certain studies on adolescents do not find significant differences with age (Bauman, 2010; Walrave & Heirman, 2011); others, however, find that cybervictimization decreases with age (Mishna et al., 2012). In others, conversely, it increases (Hinduja & Patchin, 2008; Rey et al., 2018).

Such inconsistencies point to the likelihood that there are more nuanced differences in the ways men and women relate to one another online, and in how each age group interacts on the Internet.

Finally, it should be noted that the most common channel through which children and adolescents access the Internet is the smartphone (and the Internet is even more present in their daily lives since the rise of online gambling). In fact, in most European countries, almost 30% of children aged 9–11 access the Internet several times a day through these devices, estimating that they use it between 1 and 3 h a day. These figures increase by around 70–90% from the age of 12, a point at which they invest up to 4 h a day (Smahel et al., 2020, pp. 1–47). In recent years, access to the Internet through the smartphone has exerted a profound influence on social interactions. Some studies show that cybervictimisation and cyberaggression may increase depending on access to the Internet through the smartphone (Gül et al., 2019): this is motivated, for example, by easy access to a camera, by the possibilities of greater exchange of information, and due to the fact that a greater number of children and adolescents are online (George & Odgers, 2015). Therefore, one aspect we will study is the relationship of cyberbullying with the age at which the first smartphone was first owned.

Given students' massive use of the Internet from an early age, the changes it is producing in their behaviour, and the scarcity of research on the relationship between cyberbullying and cyberactivities such as cybergossip and PIU taking different patterns of use according to age and gender into account, the need arises to explore the relationship of these variables with cyberaggression and cybervictimisation. Hence, this study's objective is to analyse the relationship and influence of cybergossip and problematic use of the Internet on cyberbullying in a population between 12 and 18 years old, taking age and gender into account, as well as the age of having owned the first smartphone. Additionally, we are interested in ascertaining the relationship between cybergossip and PIU. This study may be key in gaining a more holistic grasp of the phenomenon of cyberbullying, as well as in proposing preventive strategies for daily use in such a way that they encourage responsible use of the Internet and positive cyber-coexistence (Ang et al., 2014; Park et al., 2014).

Derived from our analysis of the literature as exposed above, we propose the following hypothetical model in which we test the influence of PIU and cybergossip on the involvement of adolescents as victims or aggressors of cyberbullying.

Based on the previous literature, the hypotheses that we propose regarding these relationships are the following:

- H1.** The higher the level of PIU on the part of adolescents, the greater their involvement as victims or aggressors of cyberbullying (β_1 ; β_2)
- H2.** The greater the degree of adolescents' cybergossip, the greater their involvement as victims or aggressors of cyberbullying (β_3 ; β_4)
- H3.** There are significant differences by sex in the influence of PIU and cybergossip on cyberbullying (β_1 ; β_2 ; β_3 ; β_4)
- H4.** There are significant differences by age group in the influence of PIU and cybergossip on cyberbullying (β_1 ; β_2 ; β_3 ; β_4)
- H5.** The fact of having owned a smartphone at a younger age significantly affects the influence of PIU and cybergossip on cyberbullying (β_1 ; β_2 ; β_3 ; β_4)
- H6.** A higher degree of adolescents' cybergossip is related to a higher degree of PIU (C1)

2. Methods

2.1. Participants

The sample size was $n = 1013$ students ages 12 to 18, enrolled in 26 primary and secondary education centres in the Aragon region (Spain). The sampling procedure began as probabilistic by quotas, according to sex, according to the number of students in each province and, especially, considering each age group according to data from official statistical sources, thereby creating representative sampling units for urban and rural municipalities as well as public and private schools. The members of our research group, supported by a representative of the teachers or of the school's administrative team, were in charge of collecting the questionnaires. To complete the questionnaires, an online platform was set up, an invitation was sent to the schools with relevant information, deadlines, and objectives, and authorizations from the students' families or guardians were collected. Each participant received a password to access the questionnaire once, thus ensuring privacy, anonymity, and confidentiality throughout the process.

However, the pandemic situation and the impossibility of using the computer classrooms for the completion of the questionnaire in a large group greatly limited data collection. It was thus decided to change the type of sampling to non-probabilistic for reasons of convenience, although an attempt was made to maintain the quotas by sex, age, private/public and urban/rural distinctions to ensure the representativeness of the population. The response rate was 67.2%. In the definitive profile of the participants, only a certain bias in age groups can be seen, given the low number of older students (especially 16–18 years old) compared to the other age groups. However, the results show significant relationships, and they are in line with the previous literature on the subject: this would indicate the sample's adequacy for the purpose of this research.

The project was evaluated and approved by the Research Ethics Committee of the Community of Aragon (CEICA), thus ensuring compliance with ethical standards in research with underage subjects.

Regarding the sample's characteristics, 56.4% of the participants were girls and 43.6% boys. The mean age of participants was 14.0 (SD = 1.42). By age groups, 60.4% were in the 10-to-14-year-old age group and 39.6% in the 15-to-18-year-old age group. By academic year, 46.2% were in 1st-2nd year of secondary education, 47.1% in 3rd-4th year of secondary education, and 6.8% in first-second year of baccalaureate (pre-university courses). 21.9% of the participants were from municipalities with fewer than 10,000 inhabitants, 48.0% from cities of

10,000–30,000 inhabitants, and 30.1% from cities with a population of over 30,000. On average, respondents had been 11.3 (SD = 2.54) years old when they had owned their first smartphone.

3. Instruments

The instruments used to collect data, validated in previous studies with the population of the study (see references below), were the following:

The Adolescents « Cybergossip » Questionnaire (CGQ-A) (Romera et al., 2018). This is a one-dimensional questionnaire consisting of 9 items on a 5-point Likert scale (0 = never to 4 = always), based on the four main functions of gossip: informing, influencing, creating friendship, and entertaining. Two examples of the items are “I tell my friends through social networks or WhatsApp the things that I find out that happen to others”, and “I talk about others on social networks or WhatsApp because it makes me feel closer to my group of friends”. With the study sample, the reliability tested through McDonald’s Omega test yielded a coefficient of $\omega = .85$.

The Internet-Related Experiences (CERI) Questionnaire (Casas et al., 2013) quantifies the problematic use of the Internet considering two factors: the interpersonal dimension related to the abusive use of the Internet when interacting with others, and the need to establish friendships online (for example “Do you find it easier to relate to people through the Internet than face to face?” “How often do you make new friends with people connected to the Internet?”) and the intrapersonal dimension of its use related to the decrease of activities, loss of control, the need to be online, avoidance of other activities, and negative effects (for example, “When you are in trouble, does connecting to the Internet help you escape from them?” “How often do you abandon the things you are doing to spend more time online?”). The items are distributed on a 4-point Likert scale ranging from 1 (never) to 4 (always). Optimal values were obtained with the reliability study sample using McDonald’s Omega, with coefficients on the interpersonal scales of $\omega = 0.70$, intrapersonal $\omega = .69$ and total $\omega = 0.77$.

As a third tool, we used the Cyberbullying Scale (ECIP-Q) translated into Spanish by Ortega-Ruiz et al. (2016). It evaluates cybervictimisation and cyberaggression behaviours in the adolescent population through 11 items for each profile. All the items are questions with responses on a 5-point Likert scale, where 0 is never and 4 is always. For this study we have chosen 4 items from each profile, selected for being the most common behaviours (see Table 1) (Rey et al., 2018; Whittaker & Kowalski, 2015; Álvarez-García et al., 2017). In the reliability analysis, the cybervictimisation scale shows a McDonald’s Omega coefficient of $\omega = 0.60$, and cyberaggression yields $\omega = 0.74$.

3.1. Analysis

For the analysis of the results using the SPSS program (IBM-SPSS, v.26), an initial univariate and bivariate descriptive analysis of victimization and aggression in cyberbullying was carried out via comparison of means with ANOVA according to the sample’s socio-personal characteristics.

In the second phase, we tested the hypothetical model by applying structural equation model analysis (SEM), since this technique allows multiple dependent variables along with the use of latent variable constructs, which are more reliable than the use of variables observed when including measurement errors. SEM also allows the possibility of reporting multiple measures of goodness of fit. We were thus able to compare the adjustment of certain data with the theoretical model established in the previous section, validating their adjustment via various indicators. Another possibility offered by SEM is to make comparisons between groups, applying the same procedure. Given that we hypothesized a relevant variability in the variables of age, gender, and the age at which the first smartphone was owned, we carried out a multi-group analysis.

Table 1
Latent and observed variables used in the proposed model.

Latent variables		Observed variables	
Description	Label	Description	Label
Victim of cyberbullying	Victim	I have been told bad words or insults on the Internet	V1
		I have been threatened through the Internet	V2
		They have spread rumors about me on the internet	V3
		I have been excluded or ignored from a social network or video game	V4
Aggressor of cyberbullying	Aggressor	I have said bad words or insults on the Internet	A1
		I have threatened someone through the Internet	A2
		I have spread rumors about someone on the Internet	A3
		I have excluded or ignored someone from a social network or video game	A4
Problematic Internet use	PIU	Preference for online friends, making new friends on the Internet	AbuInter
		Need to be online, avoidance of other activities, negative effects	AbuIntra
Cybergossip	Cybergossip	Evaluative comments on other people	CG

Our SEM, designed on the basis of our previous literature review and represented in Fig. 1, was tested using the IBM-SPSS software and its AMOS extension (v.26). The latent and observed variables that appear in it are shown in Table 1, and the relationships between them are shown in Fig. 1. The estimation method chosen to test the measurement model was asymptotically distribution free (ADF), which is recommended for scales that cannot be measured quantitatively and for which multivariate normality cannot be assumed (Brown, 2006; Byrne, 2010). Correlations were initially obtained among all the factorial scores of the variables in the subsamples of girls and boys, as well as in the age group subsamples: 12–14 years old, and 15 years old or more; and the age at which the first smartphone was first owned: 11 years old or less, and more than 11 years old. Then a comparison was made between the subsamples by applying Fisher’s Z transformation of the correlation coefficient.

The model’s goodness of fit was tested using the χ^2 test and the normal relationship and χ^2 /degrees of freedom (CMIN/DF in AMOS), as

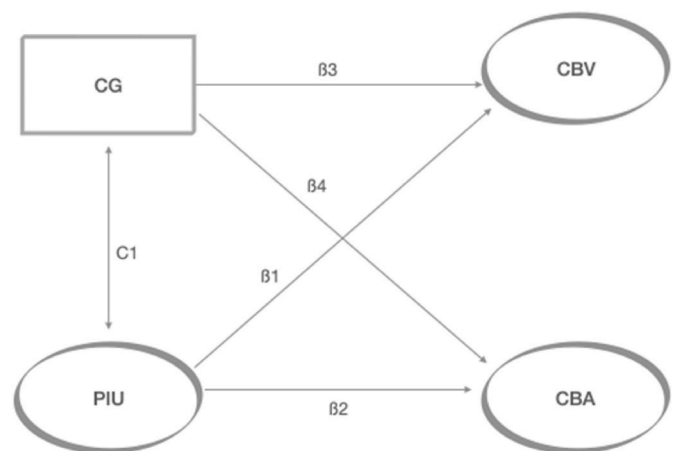


Fig. 1. Hypothetical model: Influence of Internet PIU and cybergossip on cyberbullying victimization and aggression, CG: Cybergossip; PIU: Problematic Internet Use (Internet abuse); CBV: Cyberbullying victimization; CBA: Cyberbullying aggression.

well as using the RMSEA and GFI indicators and their critical levels as indicated by authors such as Schlermelleh-Engel et al. (2003), Vandenberg (2006), and Byrne (2010). We applied multigroup analysis (configural model, therefore for testing configural invariance, Byrne, 2010, p. 218) to verify the hypothesis that the interviewees of different sexes and different age groups would show significant differences in the analysed effects. To make this distinction, we compared a series of models. Then, to contrast the differences between groups, we compared the models by calculating the differences in the Akaike's Information Criterion (AIC) indicator (Byrne, 2010; Hu & Bentler, 1995), assuming a risk level of 0.10 and a 90% confidence interval.

4. Results

4.1. Descriptive analysis

Analysing the relationship between PIU and being a victim, we found a high, positive, statistically significant relationship ($F_{1,983} = 5.593, p < .001, \eta^2 = 0.142$). We likewise found a high, positive, statistically significant relationship ($F_{1,983} = 5.900, p < .001, \eta^2 = 0.148$) between being an aggressor and PIU. The relationship between cybergossip and cyberbullying was even higher, positive, and statistically significant both for victims ($F_{1,983} = 12.202, p < .001, \eta^2 = 0.251$) as well as for aggressors ($F_{1,983} = 12.338, p < .001, \eta^2 = 0.253$). However, for a better understanding of these relationships, it is recommendable to focus on the differences between age, gender, and the age of having had the first smartphone (Table 2). As can be seen, the largest differences can be observed in a greater degree of cybervictimization and aggression in boys and in those aged over 15 (concretely expressed in the form of insults and threats). PIU also seems to be more relevant in those over 15 years old. The age at which the first mobile phone was owned does not seem relevant as an explanatory variable, although we maintained it in our subsequent exploration of the model.

We then calculated the correlations among the variables that make up the model, considering the aforementioned criteria of age and gender, as well as the age at which the first smartphone was owned. In terms of gender, it can be seen that the correlations in the group of girls are significant in all cases. As can be seen in Table 3, all the analysed variables correlated positively, significantly ($p < .001$), and relevantly ($r > 0.3$) in all subgroups, whereby the correlation between being a victim and an aggressor of cyberbullying is especially high. The correlation between cybergossip and being a cyberbullying aggressor stands out in the case of girls ($r = .633^{***}$). In boys, however, the highest correlation is between PIU and being a cyberbullying victim ($r = 0.512^{***}$) or aggressor ($r = 0.556^{***}$). If we compare the correlations between girls and boys, girls attain the highest values in the association between cyberbullying and PIU ($r = 0.624^{***}$ girls vs. $r = 0.556^{***}$ boys)

Table 3
Correlations among variables in the model.

Girls model	PIU	Cybergossip	Cyberbullying Victim	Cyberbullying Aggressor
PIU	1			
Cybergossip	.459***	1		
Cyberbullying Victim	.429***	.374***	1	
Cyberbullying Aggressor	.624***	.633***	.747***	1
Boys model	PIU	Cybergossip	Cyberbullying Victim	Cyberbullying Aggressor
PIU	1			
Cybergossip	.466***	1		
Cyberbullying Victim	.512***	.478***	1	
Cyberbullying Aggressor	.556***	.496***	.854***	1
Model ages 12-14	PIU	Cybergossip	Cyberbullying Victim	Cyberbullying Aggressor
PIU	1			
Cybergossip	.446***	1		
Cyberbullying Victim	.460***	.406***	1	
Cyberbullying Aggressor	.545***	.580***	.801***	1
Model ages 15-18	PIU	Cybergossip	Cyberbullying Victim	Cyberbullying Aggressor
PIU	1			
Cybergossip	.473***	1		
Cyberbullying Victim	.450***	.547***	1	
Cyberbullying Aggressor	.593***	.526***	.670***	1
Model first smartphone at age 11 or under	PIU	Cybergossip	Cyberbullying Victim	Cyberbullying Aggressor
PIU	1			
Cybergossip	.333***	1		
Cyberbullying Victim	.445***	.428***	1	
Cyberbullying Aggressor	.309***	.556***	.744**	1
Model first smartphone after the age of 11	PIU	Cybergossip	Cyberbullying Victim	Cyberbullying Aggressor
PIU	1			
Cybergossip	.475***	1		
Cyberbullying Victim	.509***	.501	1	
Cyberbullying Aggressor	.605***	.568	.807***	1

***p < .001.

Table 2

Descriptive analysis of the variables used in the model. Percentage and level of significance by age group, gender, and age group of having had the first smartphone.

	Sex		Age group				Age group first smartphone		
	Girls	Boys	p	12-14	15-18	p	11 or less	11+	p
% of incidence at least "sometimes"									
V1. I have been told bad words or insults on the Internet	10.0	16.1	**	11.1	15.0	*	12.8	12.6	
V2. I have been threatened through the Internet	2.6	8.6	***	3.9	7.2	*	7.0	4.4	
V3. They have spread rumors about me on the internet	8.4	10.4		7.0	12.7	**	10.2	8.9	
V4. I have been excluded or ignored from a social network or video game	8.2	8.1		8.5	7.7		10.2	7.3	
A1. I have said bad words or insults on the Internet	6.1	13.8	***	8.2	11.5		11.5	8.6	
A2. I have threatened someone through the Internet	1.9	5.4	**	2.5	5.0	*	5.1	2.7	*
A3. I have spread rumors about someone on the Internet	3.9	4.1		4.7	2.7		4.8	3.6	
A4. I have excluded or ignored someone from a social network or video game	5.6	6.1		5.2	6.7		6.7	5.4	
PIU	Mean (1-4)								
AbuInter	1.86	1.91		1.81	2.00	***	1.87	1.89	
AbuIntra	2.16	2.15		2.13	2.19		2.20	2.14	
Cybergossip	Mean (1-4)								
Cybergossiping	1.66	1.59		1.61	1.66		1.67	1.61	

and in cyberbullying and cybergossip, where the values are significantly different ($r = .633^{***}$ girls vs $r = 0.496^{***}$ boys; $Z = 3.19$, $p = -0.0007$). In boys, however, these cyberbehaviours are more strongly associated with cybervictimisation, differing significantly in their relationship with cybergossip ($r = 0.478^{***}$ boys vs $r = 0.374^{***}$ girls, $Z = -2.0$, $p = .0228$). By age, the highest correlation level is between cybergossip and being an aggressor among those who are 14 and younger ($r = 0.580^{***}$ 12-14 vs $r = .526^{***}$ 15+), and between problematic use of the Internet and being a cyberbullying aggressor among those who are 15-18 ($r = 0.593^{***}$ 15+ vs $r = .545^{***}$ 12-14). Regarding victimization, the strong association with cybergossip stands out in older adolescents, differing significantly from the 12-14-year-old group ($r = 0.547^{***}$ 15+ vs $r = 0.406^{***}$ 12-14; $Z = 2.84$, $p = .0023$). Finally, for those possessed a smartphone at a younger age, the highest correlation is between cybergossip and being an aggressor ($r = 0.556^{***}$ 11), and, for those who had their first mobile phone after the age of 11, between PIU and being a cyberbullying aggressor ($r = 0.605^{***}$ 11+). It is also notable that the correlation in both sexes and age groups between cybergossip and PIU is likewise similarly pronounced, and the same applies to those who had their first mobile phone after the age of 11.

4.2. Multigroup structural model analysis

As different results were noted based on sex, age and, more slightly, on the age at which the first mobile was owned, we carried out a multigroup comparison of structural models according to those variables, to see which data were more adjusted to the hypothetical model. We tested 9 models for each variable and compared them with one another. Since the differences between CMIN/DF did not provide significant results (Byrne, 2010), we used Akaike’s Information Criterion (AIC), which is an adequate indicator for comparison among models (Hu & Bentler, 1995). Based on the more restrictive model (“structural weights”), we modified a series of restrictions on the effects. Thus, by sex, the model with the most optimal fit was Model C5 (Equal β_2 ; β_3 , CMIN/DF = 2.220; $p < .0001$; GFI = 0.916; RMSEA = 0.035; AIC = 283.135), in other words, the model in which the effects of PIU in aggressors (β_2) and cybergossip in victims (β_3) were equal for boys and girls (Table 4). In the multigroup comparison of the “age group” variable, the model that presented the best fit was Model C8 (Equal β_2 ; CMIN/DF = 2.611; $p < .0001$; GFI = 0.903; RMSEA = 0.040; AIC = 316,512), that is, the model in which all the effects were different taking the age group into account, except the influence of PIU on being a cyberbullying aggressor (β_2) (Table 5). Considering the variable “age group of having the first smartphone”, the model with the best fit was C6 (Equal β_1 , CMIN/DF = 2.227; $p < .0001$; GFI = 0.916; RMSEA = 0.035; AIC = 283,556), in which all the effects were different, except the influence of PIU on being a victim of cyberbullying (β_1) (Table 6).

4.2.1. Structural model of the influence of PIU and cybergossip in cyberbullying victimization and aggression by sex

Analysing the results of the three models, and starting with model C5

Table 4
Fit indices for structural equation models (multigroup analysis by sex).

Model	Model description	CMIN	DF	P	CMIN/DF	GFI	RMSEA	AIC
A	Measurement weights	191.338	85	.000	2.251	.917	.035	285.338
B	Structural weights	198.012	89	.000	2.225	.914	.035	284.012
C1	Model 1 (Equal β_1 ; β_3 ; β_4)	196.546	88	.000	2.233	.915	.035	284.546
C2	Model 2 (Equal β_1 ; β_2 ; β_3)	196.815	88	.000	2.237	.915	.035	284.815
C3	Model 3 (Equal β_1 ; β_3)	194.299	87	.000	2.233	.916	.035	284.299
C4	Model 4 (Equal β_1 ; β_2)	194.876	87	.000	2.240	.915	.035	284.876
C5	Model 5 (Equal β_2; β_3)	193.135	87	.000	2.220	.916	.035	283.135
C6	Model 6 (Equal β_1)	192.604	86	.000	2.240	.916	.035	284.604
C7	Model 7 (Equal β_3)	191.505	86	.000	2.227	.917	.035	283.505
C8	Model 8 (Equal β_2)	194.741	86	.000	2.264	.915	.035	286.741
C9	Model 9 (Equal β_4)	192.052	86	.000	2.233	.917	.035	284.052

according to gender, we can see that there is a significant difference in the influence of PIU on being a victim of cyberbullying: it is higher in the case of boys ($\beta_{1\text{boys}} = .409^{***}$) (see Table 9). On the other hand, the influence of PIU on being an aggressor is similar and very high in both sexes ($\beta_{2\text{girls}} = 0.430^{***}$; $\beta_{2\text{boys}} = 0.429^{***}$); the same applies to the influence of cybergossip on being a victim ($\beta_{3\text{girls}} = 0.267^{***}$; $\beta_{3\text{boys}} = 0.249^{***}$). In the case of cybergossip, its influence is notably much higher on the fact of being aggressors in girls ($\beta_{4\text{girls}} = 0.435^{***}$) (Table 7). This model explains 22.9% of the variance for victims and 54.8% for aggressors in the case of girls, and 32.1% for victims and 37.2% for aggressors in the case of boys (Table 10).

4.2.2. Structural model of the influence of PIU and cybergossip in cyberbullying victimization and aggression by age group

By age (model C8), there are no significant differences between the two groups in the effect of PIU on becoming an aggressor, both of which are highly relevant (β_2), but the effect of PIU on becoming a victim is higher and more significant in the youngest group ($\beta_{1\text{12-14}} = 0.334^{***}$). In contrast, the coefficient of the effect of cybergossip on being a victim of cyberbullying is higher among those over 15 years of age ($\beta_{3\text{15+}} = 0.507^{***}$) as well as on being an aggressor of cyberbullying in the 12-14-year-old group ($\beta_{4\text{12-14}} = 0.462^{***}$) (Table 8). This model explains 23.8% of the variance for victims and 60.9% for aggressors in the 12-14-year-old group, and 38.8% and 33.7%, respectively, for the 15- to 18-year-old group (Table 10).

4.2.3. Structural model of the influence of PIU and cybergossip in cyberbullying victimization and aggression by age group of having had the first smartphone

Finally, considering the age at which young people owned their first mobile (model C6), we see that the influence of PIU on being a victim of cyberbullying is similar in both groups ($\beta_{1\text{-11}} = 0.349^*$; $\beta_{1\text{11+}} = 0.350^{***}$). However, it is higher in the case of aggressors for those who had a mobile phone only after the age of 11 ($\beta_{2\text{11+}} = 0.433^{***}$). Cybergossip also has different effects taking each group into account, since it exerts a greater influence on the fact of becoming a victim of cyberbullying in those who had their first smartphone later ($\beta_{3\text{11+}} = 0.334^{***}$), and on being an aggressor in those who had it at age 11 or earlier ($\beta_{4\text{-11}} = 0.570^{***}$). This model explains 19.1% of the variance for victims and 56.7% for aggressors in the group having had a smartphone at age 11 or earlier, and 34.5% and 46.7%, respectively, for the group of those who had a smartphone after the age of 11 (Table 10).

5. Discussion and conclusions

Addressing the phenomenon of cyberbullying in adolescence comes with the understanding that it is not isolated from other widespread risky cyberactivities such as cyberbullying and problematic Internet use; however, few studies have been carried out in this domain until now. Hence, the present study makes it possible for research to advance in the identification of cyberactivities that can potentially explain

Table 5
Fit indices for structural equation models (multigroup analysis by age group).

Model	Model description	CMIN	DF	P	CMIN/DF	GFI	RMSEA	AIC
A	Measurement weights	224.446	85	.000	2.641	.903	.040	318.446
B	Structural weights	232.514	89	.000	2.613	.900	.040	318.514
C1	Model 1 (Equal β_1 ; β_3 ; β_4)	230.961	88	.000	2.625	.900	.040	318.961
C2	Model 2 (Equal β_1 ; β_2 ; β_3)	232.463	88	.000	2.642	.900	.040	320.463
C3	Model 3 (Equal β_1 ; β_3)	230.020	87	.000	2.644	.901	.040	320.020
C4	Model 4 (Equal β_1 ; β_2)	231.011	87	.000	2.655	.900	.040	321.011
C5	Model 5 (Equal β_2 ; β_3)	229.523	87	.000	2.638	.901	.040	319.523
C6	Model 6 (Equal β_1)	229.119	86	.000	2.664	.901	.041	321.119
C7	Model 7 (Equal β_3)	228.698	86	.000	2.659	.901	.041	320.698
C8	Model 8 (Equal β_2)	224.512	86	.000	2.611	.903	.040	316.512
C9	Model 9 (Equal β_4)	224.615	86	.000	2.612	.903	.040	316.615

Table 6
Fit indices for structural equation models (multigroup analysis by age group of having first smartphone).

Model	Model description	CMIN	DF	P	CMIN/DF	GFI	RMSEA	AIC
A	Measurement weights	191.522	85	.000	2.253	.916	.035	285.522
B	Structural weights	198.329	89	.000	2.228	.913	.035	284.329
C1	Model 1 (Equal β_1 ; β_3 ; β_4)	197.237	88	.000	2.241	.913	.035	285.237
C2	Model 2 (Equal β_1 ; β_2 ; β_3)	196.982	88	.000	2.238	.913	.035	284.982
C3	Model 3 (Equal β_1 ; β_3)	194.427	87	.000	2.235	.915	.035	284.427
C4	Model 4 (Equal β_1 ; β_2)	193.639	87	.000	2.226	.915	.035	283.639
C5	Model 5 (Equal β_2 ; β_3)	196.459	87	.000	2.258	.914	.035	286.459
C6	Model 6 (Equal β_1)	191.556	86	.000	2.227	.916	.035	283.556
C7	Model 7 (Equal β_3)	193.452	86	.000	2.249	.915	.035	285.452
C8	Model 8 (Equal β_2)	193.448	86	.000	2.249	.915	.035	285.448
C9	Model 9 (Equal β_4)	192.508	86	.000	2.238	.915	.035	284.508

Table 7
Structural model of the influence of PIU and cybergossip in cyberbullying victimization and aggression. Standardized coefficients and level of significance by sex.

	Variables	β	Girls	Boys
Victim	<— Abuse	β_1	.292***	.409***
Aggressor	<— Abuse	β_2	.430***	.429***
Victim	<— Cybergossip	β_3	.267***	.249***
Aggressor	<— Cybergossip	β_4	.435***	.281***

***p < .001; GFI = 0.92; RMSEA = 0.035 [0.02, 0.041]; CFI = 0.90, TLI = 0.87; CMIN/DL = 2.22.

Table 8
Structural model of influence of PIU and cybergossip on cyberbullying victimization and aggression. Standardized coefficients and level of significance by age group.

	Variables	β	12–14	15–18
Victim	<— Abuse	β_1	.334***	.192*
Aggressor	<— Abuse	β_2	.458***	.377***
Victim	<— Cybergossip	β_3	.238***	.507***
Aggressor	<— Cybergossip	β_4	.462***	.390***

*p < .05; ***p < .001; GFI = 0.90; RMSEA = 0.040 [0.034, 0.046]; CFI = 0.90, TLI = 0.85; CMIN/DL = 2.61.

cyberaggression and victimization in adolescents, while likewise taking into account the differentiating role of sex, age group and the age at which the first mobile was owned. This should allow researchers and educators to deal with this problem by developing new preventive and educational approaches.

Cyberbullying is a social reality in which age and gender present inconsistent results. In our work, boys tend to be cyberbullies and tend to be cybervictimised to a greater extent than girls, whereby insults and threats are the most common forms in both cyberbullying profiles, as also found in previous studies (Festl et al., 2017; Mishna et al., 2010). On the other hand, cybervictimisation could become significantly higher as

Table 9
Structural model of influence of PIU and cybergossip on cyberbullying victimization and aggression. Standardized coefficients and level of significance by age group of having had the first smartphone.

	Variables	β	11 years old or less	Over 11 years old
Victim	<— Abuse	β_1	.349*	.350***
Aggressor	<— Abuse	β_2	.326***	.433***
Victim	<— Cybergossip	β_3	.165***	.334***
Aggressor	<— Cybergossip	β_4	.570***	.362***

*p < .05; ***p < .001; GFI = 0.92; RMSEA = 0.035 [0.028, 0.041]; CFI = 0.90, TLI = 0.85; CMIN/DL = 2.23.

Table 10
Level of variance explained by each model.

Model	Victim of Cyberbullying	Aggressor of Cyberbullying
<i>By sex (model C5)</i>		
Girls	22.9%	54.8%
Boys	32.1%	37.2%
<i>By age (model C8)</i>		
12–14	23.8%	60.9%
15–18	38.8%	43.7%
<i>By age of first smartphone (model C6)</i>		
11 of before	19.1%	56.7%
Above 11	34.5%	46.7%

adolescents get older (although we should take this result carefully, considering the underrepresentation of this age group). From the age of 15, they report on being cybervictims by indirect and direct means; when they attack someone, they use threats in a more significant way. Furthermore, in the cyberaggression variable in our study, the age at which a smartphone was owned is relevant, since those who had one before the age of 11 double the number of cyberattacks via threats compared to those who only started owning one when they were older. This is in line with research that shows a greater participation of boys in cyberbullying (Bae, 2021; Wong et al., 2018) and cybervictimisation

(Gómez-Guadix et al., 2014; Yang et al., 2014), as well as with studies showing that cybervictimisation increases with age (Rey et al., 2018).

On the other hand, the relationships among cybergossip, problematic Internet use, and cyberbullying profiles are positive, with medium-high values, thus confirming hypotheses H1 and H2. These results highlight the need to promote ethical and responsible behaviour on the part of both sexes whenever they make comments about other people on social networks. From these relationships, the data show that cyberbullying and problematic Internet use are highly associated with the cyberaggression of girls and with the cybervictimisation of boys. On the other hand, with regard to age, early adolescents (12–14 years) tend to be more frequently attacked by cybergossip, and are cybervictimised to a greater extent by problematic Internet use. However, the data suggest that the trend changes as they grow older, from the age of 15, with cyberaggression being associated to a greater extent with their maladaptive use of the Internet, while they are more victimized by the evaluative comments made about them in social networks. These results expand the existing literature regarding relationships between cyberbullying and cybergossip (Falla et al., 2021; Romera et al., 2018), as well as between cyberbullying and problematic Internet use (Brighi et al., 2019; Chang et al. 2015; Gómez-Guadix et al., 2016; Yudes-Gómez et al., 2018) thereby confirming these relationships and qualifying them in terms of age and gender.

It is additionally relevant that, in both girls and boys, the relationship between cybergossip and problematic use is significant, maintaining a similar strength at all ages, and thus confirming hypothesis H6. This could indicate that evaluative comments about other people on the Internet are related to a greater problematic use of the Internet in both sexes and age groups; thus, in addition to cyberbullying, cybergossiping could also be potentiating the effects associated with problematic Internet use (Yudes-Gómez et al., 2018; Subrahmanyam et al., 2008; Romera et al., 2021), such as loneliness (Ang et al., 2012) and higher levels of fear of missing out on something (Santana-Vega et al., 2019). It seems plausible that cybergossip can be related to other behaviours that imply a risk, such as problematic use of the Internet and cyberbullying, since one of the explanatory mechanisms of relationships through screens is disinhibition (Suler, 2004), which can promote impulsivity; the latter, in turn, is associated with problematic Internet use (Chen et al., 2017; Meerkerk et al., 2010) and cyberbullying (Kowalski et al., 2019; Rial et al., 2018). In addition, it is difficult to attempt to control the dissemination in instant messaging groups of comments about third parties; thus, someone with the intention of doing harm has easy access to information that helps spread malicious rumors. They can easily take such information out of context with the idea of harming a certain person's reputation, and even discriminating or stigmatizing them. On the other hand, social media applications allow multiple options to save, forward, and edit information from private and public conversations on the Internet, all of which can favour cybergossip. This greater degree of public exposure may make some adolescents more vulnerable: as a compensation, they may take refuge in a maladjusted use of the Internet, and they may become subject to victimization. However, further research is needed to test whether these characteristics can mediate between cybergossip and problematic Internet use, as well as cyberbullying.

Problematic Internet use and cybergossip emerge as cyberbehaviours that should be prevented through education, as in both sexes and at all ages they explain a great degree of variability in the prediction of cyberaggression and cybervictimisation. In the case of cyberaggression exerted by girls, generally by children aged 12–14, and by minors who had a smartphone before the age of 11, they exceed 50% of variance explanation. In the models, significant differences were found by sex and age in the influence of problematic Internet use and cybergossip on cyberbullying, thus verifying hypotheses H3 and H4.

In this sense, our results reveal that cybergossip has a more pronounced influence on the prediction of cyberaggressions exerted by girls, and generally by children in the 12–14 age group. Social networks

are platforms that help adolescents establish new relationships and strengthen existing ones, but there are gender differences in their use, with girls being the ones who spend more time on social networks as well as sending text messages (Twenge & Martin, 2020; Álvarez-García et al., 2017). The results of the present study suggest that these spaces can lead to aggression due to evaluative comments about third parties not present. This seems reasonable if we consider that violence in girls tends to be more indirect and relational (Festl et al., 2017; Martínez-Monteagudo et al., 2019). On the other hand, cybergossip is a behaviour that is carried out in a group and has group cohesion functions. Acting under peer group pressure can be very a very prominent behaviour at the beginning of adolescence (Steijn, 2014); cyberchatting can thus serve as a channel to maintain one's membership in a group. Fear of being excluded and competition for reputation among peers can lead to aggressive behaviour. In fact, negative gossip is used with increasing intentionality in these processes (Kisfalusi et al., 2019).

Our results also suggest that problematic Internet use predicts cybervictimization, especially in boys and generally in children ages 12–14. An effect associated with problematic use is low self-esteem (Mei et al., 2016; Mo et al., 2020), which, in turn, is a risk factor for cybervictimization (Kowalski et al., 2019). This result could also be related to the pronounced gender difference observed when it comes to adolescent use of the Internet. In most European countries, boys invest three times more than girls in online gambling (Smahel et al., 2020, pp. 1–47), which, in turn, more likely leads to a problematic use of the Internet (Gunuc, 2015), which is an antecedent of cybervictimization (Chang et al., 2015; Yudes-Gómez et al., 2018; Machimbarrena's et al., 2018, 2021). On the other hand, certain studies have suggested that, in adolescents aged 11–13 years, the problematic use of social networks is related to greater victimization (Martínez-Ferrer et al., 2018); thus it could be suspected that a similar pattern could occur in the virtual environment, given that bullying and cyberbullying coexist (Baldry et al., 2016; Ortega-Ruiz et al., 2016).

Results indicate that from the age of 15, cybergossip increases its influence on the prediction of cybervictimization. Among adolescents there is a great need for belonging to a group and for a sense of identity (Allen et al., 2014), which can lead to a greater risk of suffering negative consequences during socialization on the Internet. It is thus possible that adolescents who participate more frequently in social networks and in online communication to strengthen friendships and create new bonds may be more prone to becoming cybervictims due to cyberjacking. Tsitsika et al. (2015) have indeed shown that adolescents who use the Internet and social networks for two or more hours a day are more exposed to risks of cybervictimisation.

Finally, our results are revelatory on the subject of the possession of a mobile phone at an early age, suggesting that cyberaggression among those who had one before the age of 11 is also explained in more than half of its variability by cybergossip and problematic use. This means that having a smartphone at an early age enhances cyber risks; hypothesis H5 is thus confirmed. The possession of a smartphone implies that one is able to participate in the harassment of others, while at the same time being uninterruptedly exposed to the same kind of harassment. Indeed, a study carried out by Gül et al. (2019) shows that access to the Internet through mobile phones is significantly associated with participation in cyberbullying episodes.

Our study has a series of limitations that need to be taken into account. In the first place, relatively low reliability indices of the Internet-Related Experiences (CERI) Questionnaire and Cyberbullying Scale (ECIP-Q) measures means to consider the results cautiously. Moreover, although the sample is relatively large, it belongs to a single geographic region; thus, it would be necessary to explore these relationships among participants from other regions and cultures for a greater generalization of our results. In addition, our study includes measurements carried out at one point in time, so that it is not possible to establish causal relationships between the study variables. Future research would require a longitudinal design that would allow for the exploration of the study

variables' causal nature. Finally, the limitation of the type of instruments used in this study – e.g., self-report scales – must be taken into consideration due to the desirability associated with them and the fact that they need to be complemented with qualitative evaluations. Further inquiry into the role of the peer group in cyberbehaviours would be required. It would likewise be of interest to explore the different motivations and personal variables (including emotional aspects) that lead boys and girls to problematic use of the Internet and cyberbullying.

Despite these limitations, these findings can be considered significant, taking into account the differences found between gender, age group and age of owning the first smartphone, and these relationships need to be further explored in future research.

The observed relationship between cybergossip, problematic Internet use, and cyberbullying has important educational implications. With special emphasis on early adolescence, it would be relevant to educate youngsters about favourable behaviours and attitudes that can be developed within the peer group, such as making positive comments on the Internet, helping to interpret message content, and not attributing hostile and discriminatory intentions in online interaction – particularly in the case of those boys and girls who are starting to establish and maintain interpersonal relationships through a smartphone. Encouraging moral sensitivity, responsibility, and critical thinking in the use of the Internet is as important as promoting its instrumental use. On the other hand, our results could guide the design of cyberaggression and cybervictimisation prevention programs that draw youngsters' attention to the danger of widespread behaviours such as cyberraiding (as Feijoo et al., 2021 remark), early detection and intervention of PIU might serve as a cyberbullying prevention strategy, especially for pure bullies and bully-victim), while promoting a more respectful and healthy use of the Internet taking gender and age into account. Given that those responsible for teaching and promoting communication and digital skills among adolescents are the school as well as the family, these programs should involve both. As such, it is important to consider the possible negative effects of evaluative comments on other people in order to ultimately improve health, interpersonal relationships among schoolchildren, and cyber-coexistence, while avoiding the risk of engaging in cyberbullying or similar discriminatory scenarios. It would be necessary to incorporate a transversal prevention approach based on education in values, balanced use of the Internet, and life skills.

In short, access to the Internet does not always lead to cyberaggression and cybervictimization behaviours, but its widespread presence has made it a breeding ground for many risky practices, such as problematic use and cyberbullying. In view of this study's results, educating children and youngsters to make proper use of communication devices and prevent problematic use of the Internet in both sexes from an early age is key to achieving positive cyber-coexistence.

Credit author statement

Ana Cebollero-Salinas: Conceptualization, Investigation, Writing – original draft preparation, Writing- Reviewing and Editing. **Santos Orejudo:** Supervision, Project administration, Conceptualization, Writing – original draft preparation. **Jacobo Cano-Escoriaza:** Supervision, Project administration, Conceptualization, Writing – original draft preparation. **Tatiana Íñiguez-Berrozpe:** Methodology, Formal analysis, Writing – original draft, Writing- Reviewing and Editing.

References

Allen, K. A., Ryan, T., Gray, D. L., McInerney, D. M., & Waters, L. (2014). Social media use and social connectedness in adolescents: The positives and the potential pitfalls. *Australian Educational and Developmental Psychologist*, 31(1), 18–31. <https://doi.org/10.1017/edp.2014.2>

Álvarez-García, D., Barreiro-Collazo, A., & Núñez, J. C. (2017). Cyberaggression among adolescents: Prevalence and gender differences. *Comunicar*, 25(50), 89–97. <https://doi.org/10.3916/C50-2017-08>

Ang, R. P., Chong, W. H., Chye, S., & Huan, V. S. (2012). Loneliness and generalized problematic Internet use: Parents' perceived knowledge of adolescents' online

activities as a moderator. *Computers in Human Behavior*, 28(4), 1342–1347. <https://doi.org/10.1016/j.chb.2012.02.019>

Ang, R. P., Huan, V. S., & Florell, D. (2014). Understanding the relationship between proactive and reactive aggression, and cyberbullying across United States and Singapore adolescent samples. *Journal of Interpersonal Violence*, 29(2), 237–254. <https://doi.org/10.1177/0886260513505149>

Ansary, N. S. (2020). Cyberbullying: Concepts, theories, and correlates informing evidence-based best practices for prevention. *Aggression and Violent Behavior*, 50, Article 101343. <https://doi.org/10.1016/j.avb.2019.101343>

Authors (2021).

Bae, S. M. (2021). The relationship between exposure to risky online content, cyber victimization, perception of cyberbullying, and cyberbullying offending in Korean adolescents. *Children and Youth Services Review*, 123, Article 105946. <https://doi.org/10.1016/j.childyouth.2021.105946>

Baldry, A. C., Farrington, D. P., & Sorrentino, A. (2016). Cyberbullying in youth: A pattern of disruptive behaviour. *Psicologia Educativa*, 22(1), 19–26. <https://doi.org/10.1016/j.pse.2016.02.001>

Bauman, S. (2010). Cyberbullying in a rural intermediate school: An exploratory study. *The Journal of Early Adolescence*, 30(6), 803–833. <https://doi.org/10.1177/0272431609350927>

Baumeister, R. F., Zhang, L., & Vohs, K. D. (2004). Gossip as cultural learning. *Review of General Psychology*, 8(2), 111–121. <https://doi.org/10.1037/1089-2680.8.2.111>

Brighi, A., Menin, D., Skrzypiec, G., & Guarini, A. (2019). Young, bullying, and connected. Common pathways to cyberbullying and problematic internet use in adolescence. *Frontiers in Psychology*, 10(JULY), 1–14. <https://doi.org/10.3389/fpsyg.2019.01467>

Brody, N., & Vangelisti, A. L. (2017). Cyberbullying: Topics, strategies, and sex differences. *Computers in Human Behavior*, 75(June 2017), 739–748. <https://doi.org/10.1016/j.chb.2017.06.020>

Caplan, S. E. (2010). Theory and measurement of generalized problematic internet use: A two-step approach. *Computers in Human Behavior*, 26(5), 1089–1097. <https://doi.org/10.1016/j.chb.2010.03.012>

Chang, F. C., Chiu, C. H., Miao, N. F., Chen, P. H., Lee, C. M., Chiang, J. T., & Pan, Y. C. (2015). The relationship between parental mediation and Internet addiction among adolescents, and the association with cyberbullying and depression. *Comprehensive Psychiatry*, 57, 21–28. <https://doi.org/10.1016/j.comppsy.2014.11.013>

Chen, S.-K., Lo, M.-T., & Lin, S. S. J. (2017). Impulsivity as a precedent factor for problematic Internet use: How can we be sure? *International Journal of Psychology*, 52(5), 389–397. <https://doi.org/10.1002/ijop.12231>

Falla, D., Ortega-Ruiz, R., & Romera, E. M. (2021). Mechanisms of moral disengagement in the transition from cybergossip to cyberaggression: A longitudinal study. *International Journal of Environmental Research and Public Health*, 18(3), 1–12. <https://doi.org/10.3390/ijerph18031000>

Feijóo, S., Foody, M., O'Higgins Norman, J., Pichel, R., & Rial, A. (2021). Cyberbullies, and problematic internet use: Some reasonable similarities. *Psicothema*, 33(2), 198–205. <https://doi.org/10.7334/psicothema2020>

Festl, R., Vogelgesang, J., Scharkow, M., & Quandt, T. (2017). Longitudinal patterns of involvement in cyberbullying: Results from a latent transition analysis. *Computers in Human Behavior*, 66, 7–15. <https://doi.org/10.1016/j.chb.2016.09.027>

Fletcher, A., Fitzgerald-Yau, N., Jones, R., Allen, E., Viner, R. M., & Bonell, C. (2014). Brief report: Cyberbullying perpetration and its associations with socio-demographics, aggressive behaviour at school, and mental health outcomes. *Journal of Adolescence*, 37(8), 1393–1398. <https://doi.org/10.1016/j.adolescence.2014.10.005>

Gómez-Guadix, M., Borrajo, E., & Almendros, C. (2016). Risky online behaviors among adolescents: Longitudinal relations among problematic Internet use, cyberbullying perpetration, and meeting strangers online. *J. Behav. Addict.*, 5(1), 100–107. <https://doi.org/10.1556/2006.5.2016.013>

Gómez-Guadix, M., Villa-George, F., & Calvete, E. (2014). Psychometric properties of the cyberbullying questionnaire (CBQ) among Mexican adolescents. *Violence & Victims*, 29(2), 232–247. <https://doi.org/10.1891/0886-6708.VV-D-12-00163R1>

Garaigordobil, M. (2015). Ciberbullying en adolescentes y jóvenes del País Vasco: Cambios con la edad. *Anales de Psicología*, 31(3), 1069–1076. <https://doi.org/10.6018/analesps.31.3.179151>

George, M. J., & Odgers, C. L. (2015). Seven fears and the science of how mobile technologies may be influencing adolescents in the digital age. *Perspectives on Psychological Science*, 10(6), 832–851. <https://doi.org/10.1177/1745691615596788>

Giménez Gualdo, A. M., Hunter, S. C., Durkin, K., Arnaiz, P., & Maquillón, J. J. (2015). The emotional impact of cyberbullying: Differences in perceptions and experiences as a function of role. *Computers & Education*, 82, 228–235. <https://doi.org/10.1016/j.compedu.2014.11.013>

Grosser, T. J., Lopez-Kidwell, V., & Labianca, G. (2010). A social network analysis of positive and negative gossip in organizational life. *Group & Organization Management*, 35(2), 177–212. <https://doi.org/10.1177/1059601109360391>

Gül, H., Firat, S., Sertçelik, M., Gül, A., Gürel, Y., & Kılıç, B. G. (2019). Cyberbullying among a clinical adolescent sample in Turkey: Effects of problematic smartphone use, psychiatric symptoms, and emotion regulation difficulties. *Psychiat. Clinical Psychopharmacol.*, 29(4), 547–557. <https://doi.org/10.1080/24750573.2018.1472923>

Gunuc, S. (2015). Relationships and associations between video game and Internet addictions: Is tolerance a symptom seen in all conditions. *Computers in Human Behavior*, 49, 517–525. <https://doi.org/10.1016/j.chb.2015.03.063>

Guo, S. (2016). A meta-analysis of the predictors of cyberbullying and perpetration and victimization. *Psychology in the Schools*, 53(4), 432–453. <https://doi.org/10.1002/pits.21914>

- Hinduja, S., & Patchin, J. W. (2008). Cyberbullying: An exploratory analysis of factors related to offending and victimization. *Deviant Behavior*, 29(2), 129–156. <https://doi.org/10.1080/01639620701457816>
- Hinduja, S., & Patchin, J. W. (2019). Connecting adolescent suicide to the severity of bullying and cyberbullying. *Journal of School Violence*, 18(3), 333–346. <https://doi.org/10.1080/15388220.2018.1492417>
- Kisfalusi, D., Takács, K., & Pál, J. (2019). Gossip and reputation in adolescent networks. In F. Giardini, & R. Wittek (Eds.), *The Oxford Handbook of gossip and reputation* (pp. 358–379). Oxford University Press. <https://doi.org/10.1093/oxfordhdb/9780190494087.013.19>
- Ko, C.-H., Liu, T.-L., Wang, P.-W., Chen, C.-S., Yen, C.-F., & Yen, J.-Y. (2014). The exacerbation of depression, hostility, and social anxiety in the course of internet addiction among adolescents: A prospective study. *Comprehensive Psychiatry*, 55(6), 1377–1384. <https://doi.org/10.1016/j.comppsych.2014.05.003>
- Kowalski, R. M., Giumetti, G. W., Schroeder, A. N., & Lattanner, M. R. (2014). Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. *Psychological Bulletin*, 140(4), 1073–1137. <https://doi.org/10.1037/a0035618>
- Kowalski, R. M., Limber, S. P., & McCord, A. (2019). A developmental approach to cyberbullying: Prevalence and protective factors. *Aggression and Violent Behavior*, 45, 20–32. <https://doi.org/10.1016/j.avb.2018.02.009>
- Kuss, D., Griffiths, M., Karila, L., & Billieux, J. (2014). Internet addiction: A systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design*, 20(25), 4026–4052. <https://doi.org/10.2174/13816128113199990617>
- Kwan, I., Dickson, K., Richardson, M., MacDowall, W., Burchett, H., Stansfield, C., Brunton, G., Sutcliffe, K., & Thomas, J. (2020). Cyberbullying and children and young people's mental health: A systematic map of systematic reviews. *Cyberpsychology, Behavior, and Social Networking*, 23(2), 72–82. <https://doi.org/10.1089/cyber.2019.0370>
- Larrañaga, E., Navarro, R., & Yubero, S. (2018). Socio-cognitive and emotional factors on perpetration of cyberbullying. *Comunicar*, 26(56), 19–28. <https://doi.org/10.3916/C56-2018-02>
- Litman, J. A., & Pezzo, M. V. (2005). Individual differences in attitudes towards gossip. *Personality and Individual Differences*, 38(4), 963–980. <https://doi.org/10.1016/j.paid.2004.09.003>
- López-Pradas, I. C., Romera, E. M., Casas, J. A., & Ortega-Ruiz, R. (2017). Cybergossip and cyberbullying during primary school years. *Psicología Educativa*, 23(2), 73–80. <https://doi.org/10.1016/j.pse.2017.05.007>
- Machimbarrena, J. M., Calvete, E., Fernández-González, L., Álvarez-Bardón, A., Álvarez-Fernández, L., & González-Cabrera, J. (2018). Internet risks: An overview of victimization in cyberbullying, cyber dating abuse, sexting, online grooming and problematic internet use. *Int. J. Environ. Res. Public Health*, 15(11), 24–71. <https://doi.org/10.3390/ijerph1511247>
- Machimbarrena, J. M., González-Cabrera, J., Montiel, I., & Ortega-Barón, J. (2021). An exploratory analysis of different problematic internet use profiles in cybervictims, cyberbullies, and cyberbully victims. *Cyberpsychology, Behavior, and Social Networking*, 24(10), 664–672. <https://doi.org/10.1089/cyber.2020.0545>
- Marín-López, I., Zych, I., Ortega-Ruiz, R., Monks, C. P., & Llorent, V. J. (2020). Empathy online and moral disengagement through technology as longitudinal predictors of cyberbullying victimization and perpetration. *Children and Youth Services Review*, 116, Article 105144. <https://doi.org/10.1016/j.childyouth.2020.105144>
- Martínez-Ferrer, B., Moreno, D., & Musitu, G. (2018). Are adolescents engaged in the problematic use of social networking sites more involved in peer aggression and victimization? *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.00801>
- Martínez-Monteagudo, M. C., Delgado, B., García-Fernández, J. M., & Rubio, E. (2019). Cyberbullying, aggressiveness, and emotional intelligence in adolescence. *International Journal of Environmental Research and Public Health*, 16(24). <https://doi.org/10.3390/ijerph16245079>
- Meerkerk, G.-J., van den Eijnden, R. J. J. M., Franken, I. H. A., & Garretsen, H. F. L. (2010). Is compulsive internet use related to sensitivity to reward and punishment, and impulsivity? *Computers in Human Behavior*, 26(4), 729–735. <https://doi.org/10.1016/j.chb.2010.01.009>
- Mei, S., Yau, Y. H., Chsi, J., Guo, J., & Potenza, M. N. (2016). Problematic Internet use, well-being, self-esteem and self-control: Data from a high-school survey in China. *Addictive Behaviors*, 61, 74–79. <https://doi.org/10.1016/j.addbeh.2016.05.009>
- Mishna, F., Cook, C., Gadalla, T., Daciuk, J., & Solomon, S. (2010). Cyber bullying behaviors among middle and high school students. *American Journal of Orthopsychiatry*, 80(3), 362–374. <https://doi.org/10.1111/j.1939-0025.2010.01040.x>
- Mishna, F., Khoury-Kassabri, M., Gadalla, T., & Daciuk, J. (2012). Risk factors for involvement in cyber bullying: Victims, bullies and bully-victims. *Children and Youth Services Review*, 34(1), 63–70. <https://doi.org/10.1016/j.childyouth.2011.08.032>
- Mo, P. K. H., Chan, V. W. Y., Wang, X., & Lau, J. T. F. (2020). Gender difference in the association between internet addiction, self-esteem and academic aspirations among adolescents: A structural equation modelling. *Computers & Education*, 155, Article 103921. <https://doi.org/10.1016/j.compedu.2020.103921>
- Moore, P. M., Huebner, E. S., & Hills, K. J. (2012). Electronic bullying and victimization and life satisfaction in middle school students. *Social Indicators Research*, 107(3), 429–447. <https://doi.org/10.1007/s11205-011-9856-z>
- Müller, K. W., Dreier, M., Beutel, M. E., Duven, E., Giral, S., & Wölfling, K. (2016). A hidden type of internet addiction? Intense and addictive use of social networking sites in adolescents. *Computers in Human Behavior*, 55, 172–177. <https://doi.org/10.1016/j.chb.2015.09.007>
- Ortega-Ruiz, R., Del Rey, R., & Casas, J. A. (2016). Evaluar el bullying y el cyberbullying validación española del EBIP-Q y del ECIP-Q. *Psicología Educativa*, 22(1), 71–79. <https://doi.org/10.1016/j.pse.2016.01.004>
- Palermi, A. L., Servidio, R., Bartolo, M. G., & Costabile, A. (2017). Cyberbullying and self-esteem: An Italian study. *Computers in Human Behavior*, 69, 136–141. <https://doi.org/10.1016/j.chb.2016.12.026>
- Park, S., Na, E. Y., & Kim, E. mee (2014). The relationship between online activities, netiquette and cyberbullying. *Children and Youth Services Review*, 42, 74–81. <https://doi.org/10.1016/j.childyouth.2014.04.002>
- Pharo, H., Sim, C., Graham, M., Gross, J., & Hayne, H. (2011). Risky business: Executive function, personality, and reckless behavior during adolescence and emerging adulthood. *Behavioral Neuroscience*, 125(6), 970–978. <https://doi.org/10.1037/a0025768>
- Rey, L., Quintana-Orts, C., Mérida-López, S., & Extremera, N. (2018). Emotional intelligence and peer cybervictimisation in adolescents: Gender as moderator. *Comunicar*, 26(56), 9–18. <https://doi.org/10.3916/C56-2018-01>
- Rial, A., Golpe, S., Isorna, M., Braña, T., & Gómez, P. (2018). Minors and problematic Internet use: Evidence for better prevention. *Computers in Human Behavior*, 87, 140–145. <https://doi.org/10.1016/j.chb.2018.05.030>
- Romera, E. M., Camacho, A., Ortega-Ruiz, R., & Falla, D. (2021). Cybergossip, cyberaggression, problematic internet use and family communication. *Comunicar*, 67, 61–71. <https://doi.org/10.3916/C67-2021-05>
- Romera, E. M., Herrera-López, M., Casas, J. A., Ruiz, R. O., & Del Rey, R. (2018). How much do adolescents cybergossip? Scale development and validation in Spain and Colombia. *Frontiers in Psychology*, 9(FEB), 1–10. <https://doi.org/10.3389/fpsyg.2018.00126>
- Santana-Vega, L. E., Gómez-Muñoz, A. M., & Feliciano-García, L. (2019). Adolescents problematic mobile phone use, Fear of Missing Out and family communication. *Comunicar*, 27(59), 39–47. <https://doi.org/10.3916/C59-2019-04>
- Sarmiento, A., Zych, I., Herrera-López, M., Delgado Sánchez, U., & Oksanen, A. (2021). *Cyberpsychology, behavior, and social networking (online)* (pp. 108–116). <https://doi.org/10.1089/cyber.2020.0046>
- Smahel, D., Zlamal, R., MachackovaHanaAbramczuk, K., Ólafsson, K., & Staksrud, E. (2020). *EU Kids online 2020*. Technical report (pp. 1–47). <https://doi.org/10.21953/lse.47fdeqj010fo>
- Smith, P. K., Mahdavi, J., Carvalho, M., Fisher, S., Russell, S., & Tippett, N. (2008). Cyberbullying: Its nature and impact in secondary school pupils. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, 49(4), 376–385. <https://doi.org/10.1111/j.1469-7610-2007.01846.x>
- Sorrentino, A., Baldry, A., Farrington, D. P., & Blaya, C. (2019). Epidemiology of cyberbullying across Europe: Differences between countries and genders. *Educational Sciences: Theory and Practice*, 2(19). <https://doi.org/10.12738/estp.2019.2.005>
- Steijn, W. M. P. (2014). A developmental perspective regarding the behaviour of adolescents, young adults, and adults on social network sites. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 8(2). <https://doi.org/10.5817/CP2014-2-5>
- Subrahmanyam, K., Reich, S., Waechter, N., & Espinoza, G. (2008). Online and offline social networks: Use of social networking sites by emerging adults. *Journal of Applied Developmental Psychology*, 29(6), 420–433.
- Suler, J. (2004). The online disinhibition effect. *CyberPsychology and Behavior*, 7(3), 321–326. <https://doi.org/10.1089/1094931041291295>
- Swearer, S. M., & Hymel, S. (2015). Understanding the psychology of bullying: Moving toward a social-ecological diathesis-stress model. *American Psychologist*, 70(4), 344–353. <https://doi.org/10.1037/a0038929>
- Tokunaga, R. S. (2010). Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers in Human Behavior*, 26(3), 277–287. <https://doi.org/10.1016/j.chb.2009.11.014>
- Tsitsika, A., Janikian, M., Wójcik, S., Makaruk, K., Tzavela, E., Tzavara, C., Greydanus, D., Merrick, J., & Richardson, C. (2015). Cyberbullying victimization prevalence and associations with internalizing and externalizing problems among adolescents in six European countries. *Computers in Human Behavior*, 51, 1–7. <https://doi.org/10.1016/j.chb.2015.04.048>
- Twenge, J. M., & Martin, G. N. (2020). Gender differences in associations between digital media use and psychological well-being: Evidence from three large datasets. *Journal of Adolescence*, 79, 91–102. <https://doi.org/10.1016/j.adolescence.2019.12.018>
- van Velthoven, M. H., Powell, J., & Powell, G. (2018). Problematic smartphone use: Digital approaches to an emerging public health problem. *DIGITAL HEALTH*, 4. <https://doi.org/10.1177/2055207618759167>, 2055207618759167.
- Walrave, M., & Heirman, W. (2011). Cyberbullying: Predicting victimisation and perpetration. *Children & Society*, 25(1), 59–72. <https://doi.org/10.1111/j.1099-0860.2009.00260.x>
- Wang, Y., Wu, A. M. S., & Lau, J. T. F. (2016). The health belief model and number of peers with internet addiction as inter-related factors of Internet addiction among secondary school students in Hong Kong. *BMC Public Health*, 16(1), 272. <https://doi.org/10.1186/s12889-016-2947-7>
- Whittaker, E., & Kowalski, R. M. (2015). Cyberbullying via social media. *Journal of School Violence*, 14(1), 11–29. <https://doi.org/10.1080/15388220.2014.949377>
- Wong, R. Y. M., Cheung, C. M. K., & Xiao, B. (2018). Does gender matter in cyberbullying perpetration? An empirical investigation. *Computers in Human Behavior*, 79, 247–257. <https://doi.org/10.1016/j.chb.2017.10.022>
- Wright, M., Aoyama, I., Kambale, S., Li, Z., Soudi, S., Lei, L., & Shu, C. (2015). Peer attachment and cyber aggression involvement among Chinese, Indian, and Japanese adolescents. *Societies*, 5(2), 339–353. <https://doi.org/10.3390/soc5020339>

- Yang, S. C., Lin, C.-Y., & Chen, A.-S. (2014). A study of Taiwanese teens' traditional and cyberbullying behaviors. *Journal of Educational Computing Research*, 50(4), 525–552. <https://doi.org/10.2190/EC.50.4.e>
- Yudes-Gómez, C., Baridon-Chauvie, D., & González-Cabrera, J.-M. (2018). Cyberbullying and problematic Internet use in Colombia, Uruguay and Spain: Cross-cultural study. *Comunicar*, 26(56), 49–58. <https://doi.org/10.3916/C56-2018-05>
- Zych, I., Farrington, D. P., & Ttofi, M. M. (2019). Protective factors against bullying and cyberbullying: A systematic review of meta-analyses. *Aggression and Violent Behavior*, 45, 4–19. <https://doi.org/10.1016/j.avb.2018.06.008>