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# Cyberbullying aggressors among Spanish secondary education students: an exploratory study

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## Abstract

**Purpose** – This paper aims to explore the prevalence rate of adolescents engaging in aggressive behaviours towards their peers using the Internet and mobile phones, while examining the duration and intensity of this cyberbullying, and to analyse differences in cyberbullying behaviours based on gender and age (academic grades). Research on cyberbullying indicates that it is a global problem that is increasing dramatically among adolescents.

**Design/methodology/approach** – The sample was composed of 1,415 Spanish adolescents of both sexes (760 boys and 655 girls) between 12 and 17 years old ( $M = 13.9$  years old;  $SD = 1.4$ ).

**Findings** – The results indicated that the cyberbullying prevalence among adolescents in the past year was 32 per cent. Likewise, the data suggest that boys and students in their fourth year of secondary education (15-17 years old) perpetrated cyberbullying on their peers more than girls and students in lower grades.

**Research limitations/implications** – The results presented in this research should be interpreted with caution due to its cross-sectional nature; a longitudinal study with measurements at different times would help to confirm the results observed here. On the other hand, in this study, the adolescents' responses were obtained through self-reports and, although they could be subject to social desirability effects and biases, as indicated by Flisher *et al.* (2004), the reliability and validity of adolescent self-reports in the measurement of risk behaviours were quite acceptable.

**Practical implications** – It is of crucial importance to develop educational strategies designed to favour the responsible use of the new technologies. In many cases, children and adolescents are not aware of psychological and legal consequences that their cyber-aggressions can have on themselves, on the victims and on their families and social environment.

**Social implications** – The authors feel that this research may contribute to clarifying some crucial issues related to the growing problem of cyberbullying that affects adolescents in many countries of the world. As the present research deals with aspects of interactive technology and smart education, the



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authors believe that the findings reported in the manuscript would be of interest to potential readers of this *Journal*.

**Originality/value** – This paper is an original perspective on cyberbullying aggressors among secondary education students in a Spanish context.

**Keywords** Gender, Adolescents, Age, Prevalence, Cyberbullying, Perpetrators

**Paper type** Research paper

In the past decade, in addition to traditional forms of bullying among peers, mistreatment and intimidation through electronic technologies have increased among adolescents (Pereda *et al.*, 2014; Sakellariou *et al.*, 2012; Vazsonyi *et al.*, 2012). Cyberbullying through new information and communication technologies occurs by using, individually or in a group, electronic devices such as mobile phones, e-mail, chat rooms, social networks, blogs and web pages to deliberately and repeatedly victimize someone through personal attacks, insults and other means (Juvonen and Gross, 2008; Martínez-Pecino and Duran-Segura, 2015; von Marées and Petermann, 2012). Cyberbullying and traditional bullying have some similarities, as they both involve intentional, repetitive and hostile behaviour intended to cause harm (Álvarez-García *et al.*, 2015; Katzer *et al.*, 2009; Slonje *et al.*, 2012). Problems in the school context are frequently transferred to and continue in virtual spaces. In fact, many studies have found a strong relationship between the two types of bullying, observing that many victims/perpetrators of traditional bullying were also victims/perpetrators of cyberbullying (Beltrán *et al.*, 2014; Fanti *et al.*, 2012; Kowalski *et al.*, 2012; Kubiszewski *et al.*, 2015). In this regard, Olweus (2013) has suggested that cyber victimization and cyberbullying are actually part of a general pattern of violence, where the use of electronic devices is another way to intimidate peers. The diverse forms of mistreatment through new technologies, mainly using the Internet and mobile phones, can be classified into various types. Willard (2006, 2007) developed a classification that proposes several main types of cyberbullying behaviours categorized based on the action being carried out by the bully. According to this author, the forms that cyberbullying can adopt are:

- harassment, which includes repeatedly sending offensive, rude and insulting messages;
- cyberstalking, or frequently sending threatening or very intimidating messages;
- denigration, a form of cyberbullying that includes slandering, for example by spreading cruel gossip or nasty rumours about others to ruin their reputations;
- violation of privacy, deceitful libel by spreading secrets or awkward information about someone;
- impersonation (hacking) by getting into someone's private account to send messages to embarrass the victim, put the victim in danger or trouble or harm the victim's reputation and friendships; and
- exclusion, intentionally excluding someone from an online group.

The characteristics of technological devices provide cyberbullying with an even greater potential to cause harm, as they make bullying easier and increase the psychological distress of the adolescent victim (Buelga *et al.*, 2010; Connolly *et al.*, 2014; Davison and

Stein, 2014; Fanti *et al.*, 2012; Navarro *et al.*, 2012; Tokunaga, 2010), turning this type of bullying into an emergent public health problem (Bickham and Rich, 2009; David-Ferdon and Hertz, 2007; Kowalski *et al.*, 2012; Spears *et al.*, 2015).

One topic of interest in the current global research is the prevalence of perpetrators of cyberbullying, as there are fewer studies on this role than on the cyber victims. Thus, with regard to cyberbullies, in Serbia, Popovic-Citic *et al.* (2011) reported that 10 per cent of students from 11 to 15 years old had cyberbullied others online. Harassment and, in second place, denigration were the most frequent forms of cyberbullying reported by these adolescents. Likewise, in the UK, Smith *et al.* (2006) found that 25 per cent of adolescents reported that they had been aggressive towards someone over the Internet once or twice in the past two months, and 16 per cent had done so via the mobile phone. Furthermore, Calvete *et al.* (2010) found that 44 per cent of Spanish adolescents had engaged in some type of cyberbullying. In fact, studies on world-wide cyberbullying trends have produced widely varying results; the prevalence ranges from 6 to 40 per cent (Bauman *et al.*, 2013; Kowalski *et al.*, 2014; Vazsonyi *et al.*, 2012), which makes it difficult to draw comparisons between surveys. This disparity is due to the different definitions and methodologies used in these scientific studies (Buelga *et al.*, 2012; Connolly *et al.*, 2014; Kowalski and Limber, 2007; Navarro *et al.*, 2013).

One recent contribution to the cyberbullying research domain is the proposal by Kowalski *et al.* (2014), who developed the general aggression model (GAM), which provides a comprehensive framework for cyberbullying. This general theoretical model integrates domain-specific theories of aggression (i.e. cognitive-social theories) and focuses on the personal and situational factors related to both victimization and perpetration in cyberbullying. The personal and situational factors influence an individual's cognition, affect and level of arousal, predisposing him/her to aggressive behaviour.

Gender and age are two of the personal variables included by the authors in the GAM. Thus, regarding gender differences in cyberbullying, the results from the studies conducted so far do not coincide either. Some studies have pointed out that boys engage more in cyber aggressions than girls (Popovic-Citic *et al.*, 2011; Sakellariou *et al.*, 2012). Other studies found a difference in the frequency of engaging in aggressive behaviours, with boys being more likely to report frequent cyber aggression and girls being more likely to report occasional cyber aggression (Ybarra and Mitchell, 2007). The same trend towards a higher incidence of boys in the role of severe and moderate bullies is highlighted by Ortega *et al.* (2008). Similarly, Kowalski and Limber (2007) reported that 14 per cent of girls and 10 per cent of boys had bullied their peers occasionally over the Internet during the previous two months, while 1.1 per cent of girls and 2 per cent of boys had engaged in severe bullying. Moreover, other researchers, such as Keith and Martin (2005), found that girls are more likely to be cyberbullies because cyberbullying seems more similar to the relational form of traditional bullying. Finally, other studies reported no gender differences (Schoffstall and Cohen, 2011; Slonje *et al.*, 2012).

Regarding age, the current literature on cyberbullying also reveals differing results. Slonje *et al.* (2012) reported that the greatest incidence of cyberbullying occurs in grades 8 and 9 (usually 14-15 year olds). In Spain, Ortega *et al.* (2008) found no significant differences between the ages of bullies and victims, although they did find a slight trend indicating that the majority of cyberbullies are in the last years of secondary education, while most cyber victims are in the first years of this academic stage (12-14 years old).

Another study conducted by Calvete *et al.* (2010) found a higher frequency of cyberbullies at 13-15 years of age. Likewise, Garmendia *et al.* (2011) suggested that, while severe forms of cyberbullying (more than once a week) are more common in early adolescence, occasional or limited acts of cyberbullying (less than once a week) are more frequent in middle adolescence.

Furthermore, regarding the interaction between age and sex, the meta-analysis published by Barlett and Coyne (2014) found significant differences in cyberbullying. Females use cyberbullying at younger ages to inflict relational or indirect aggression. However, males increase these behaviours during mid-adolescence and overcome them in late adolescence.

In sum, given the increasing importance of understanding the worrisome phenomenon of cyberbullying, and the lack of studies about cyberbullies compared to the numerous studies about cyber victims, the present study explored the prevalence rate of Spanish adolescents involved in aggressive behaviours towards their peers using the Internet and mobile phones, as well as the intensity and duration of these behaviours (data infrequently reported in the relevant literature). Likewise, related to this objective, differences in gender and academic level according to the type of cyber aggression were also analysed in the large sample of adolescents considered in the present study.

## Method

### *Participants*

Participants in the study were 1,415 Spanish adolescents attending secondary school at the time of the study (there are four levels in obligatory secondary education – first to fourth year of ESO – in Spain). Ages ranged from 12 to 17 years old ( $M = 13.9$ ,  $SD = 1.4$ ), distributed similarly by sex in the sample: 53 per cent were boys, and 47 per cent were girls. In addition, 27 per cent were in their first year of secondary education, 29 per cent were in their second year, 20 per cent in their third year and 24 per cent in their fourth year. Nine schools from Valencia, Alicante and Castellon (Spain) participated in the study, based on availability and the staff's willingness to participate voluntarily. Finally, 61 classrooms, with an average of 23 students each, participated in this study.

### *Measures*

Cyberbullying Aggressive Behaviours Scale (CABS), developed to fulfil the objectives of this study, was based on the validated Adolescent Victimization through Mobile Phone and Internet Scale (CYBVIC: Buelga *et al.*, 2010; Buelga *et al.*, 2012). The CABS comprises ten items taken from the CYBVIC scale and adapted to the specific role of perpetrators of behaviours that involve aggression in the form of harassment, cyberstalking, denigration, violation of privacy, impersonation (hacking) and exclusion.

The scale used a five-point Likert-type scale (1 = *never*, 2 = *once or twice*, 3 = *three to five times*, 4 = *six to ten times* and 5 = *more than ten times*) to measure the aggressions committed by the adolescent during the past 12 months via the mobile phone and Internet. The internal reliability of the 10 items was calculated using Cronbach's alpha, with the overall alpha being 0.88.

Furthermore, two other items were developed by the first author, based on the existing literature, to examine the duration and intensity of the cyberbullying. Participants responded to the question: How long and how often have you bothered or intimidated others with this behaviour?

The duration of technological cyberbullying in the past year is assessed on a five-point Likert-type scale (1 = *never*, 2 = *one month [or less]*, 3 = *three to six months*, 4 = *six to twelve months*, 5 = *one year [or more]*).

The intensity of cyberbullying in the past year is rated on a five-point Likert-type scale (1 = *never*, 2 = *two or three times*, 3 = *once or twice a month*, 4 = *once or twice a week* and 5 = *every day or nearly every day*). The first two affirmative response options indicate moderate cyberbullying (less than once a week), and the latter two represent severe cyberbullying (more than once a week) (Smith *et al.*, 2006).

### *Procedure*

Prior to the research, the study was approved by the relevant research ethics committee. To obtain permission from the schools, letters were sent to each of the schools that had been randomly selected to participate in the investigation. After permission had been given, a seminar was held with the principals and teachers to provide information about the study goals and procedure, and parental authorizations were then obtained. Students filled out the battery of instruments individually and anonymously in their classrooms in the presence of a trained researcher during regular school hours.

### *Data analysis*

To analyse the prevalence of cyberbullies, contingency analyses were performed, and the Pearson correlation coefficients of the variables in this study were calculated. In the questionnaire on the intensity of cyberbullying, the percentages of the responses given to the variables “*two or three times*” and “*once or twice a month*” were grouped in the variable “*moderate cyberbullying*” (less than one aggressive behaviour a week), and the percentages of the responses obtained on the variables “*once or twice a week*” and “*every day or nearly every day*” were grouped in the variable “*severe cyberbullying*” (more than one aggressive behaviour a week).

Subsequently, a multivariate analysis of variance was performed, MANOVA  $2 \times 4$ , between gender (male, female) and academic grade level (first to fourth year of ESO) in the aggressive behaviour variables. With no statistically significant differences found in the interaction between gender and grade level ( $\Lambda = 0.97$ ;  $F(6, 4,104) = 1.13, p > 0.05$ ), the univariate main effects of both factors were analysed. In cases where significant differences were observed in the main effect of grade level, post hoc tests were applied using the Tukey procedure.

## **Results**

### *Prevalence of cyberbullying, intensity and duration*

The results indicated that 68 per cent ( $n = 964$ ) of the total sample had never cyberbullied others through the mobile phone or Internet (Table I). Nearly one-third of the adolescents in the sample, 32 per cent ( $n = 451$ ), had bullied their peers in the past year. Aggressive behaviour by the majority of these adolescents lasted less than a month (25 per cent,  $n = 349$ ), with aggressions being of moderate intensity (26.8 per cent,  $n = 382$ ). A very significant decrease was observed in the prevalence of adolescents who had bullied their peers for over a month. Thus, 4 per cent of these adolescents ( $n = 60$ ) had bullied from three to six months, 2.6 per cent ( $n = 36$ ) between six and twelve months and 0.4 per cent ( $n = 6$ ) for more than a year.

With regard to the intensity of cyberbullying, 26.8 per cent ( $n = 382$ ) of the aggressors bullied moderately, while 5.2 per cent ( $n = 69$ ) did so in a severe way. The

data indicated that 2.4 per cent ( $n = 29$ ) of the severe perpetrators had bullied their peers for a month or less, 1.4 per cent ( $n = 20$ ) from three to six months, 1.1 per cent ( $n = 16$ ) from six to twelve months and 0.4 per cent ( $n = 4$ ) for more than one year.

A significant relationship was also observed between the intensity of the aggressive behaviours and their duration, as a longer duration of the cyberbullying was related to a higher intensity of this activity ( $r = 0.85, p < 0.01$ ).

#### *Cyberbullying behaviours by gender and grade level*

Results revealed statistically significant gender differences in half of the aggressive behaviours studied, while in the rest of the aggressions, these differences were not significant (Table II). For all the harassment and cyberstalking behaviours, results indicated that boys had statistically higher scores than girls. Harassment behaviours showed statistically greater differences between gender groups: "I insulted or ridiculed someone with messages or telephone calls" ( $F(1, 1,415) = 13.50, p < 0.001$ ), and "I sent messages that were scary or of a horrible sexual nature" ( $F(1, 1,415) = 12.35, p < 0.001$ ). There were also significant differences between boys and girls in persecution behaviours "I've forced someone to do things by using threats" ( $F(1, 1,415) = 5.50, p < 0.05$ ), and "I threatened other people to scare or intimidate them" ( $F(1, 1,415) = 8.80, p < 0.05$ ). Regarding aggressions involving violation of privacy, the data also showed that boys scored higher than girls on "I sent or manipulated videos or images of someone without his/her permission" ( $F(1, 1,415) = 7.81, p < 0.05$ ). There were also significant differences between boys and girls on aggression "I got into the messenger or private accounts of others without them being able to do anything" ( $F(1, 1,415) = 3.63, p < 0.05$ ).

For the remaining aggressive behaviours, although the trend indicated that boys scored higher than girls on all types of aggression, except social exclusion where girls had higher average scores than boys, the results showed no statistically significant differences between sexes.

With regard to the differences between grade levels, the data indicated that the fourth year of secondary education obtained the highest scores on seven out of the ten aggressive behaviours evaluated (Table III). The differences mainly lie between this year and the third year of secondary education. There were significant differences between the fourth year and the third year on denigration "I told lies, spread false rumours or gossiped about someone" ( $F(3, 1,415) = 3.84, p < 0.05$ ), on violation of privacy, for the behaviours "I told embarrassing secrets about others to annoy them" ( $F(3, 1,415) = 3.66, p < 0.05$ ) and for the form of hacking (impersonation) "I got into the

Intensity	Duration				Total
	One month (or less)	Three to six months	Six to twelve months	One year (or more)	
Never	–	–	–	–	964 (68.0)
Moderate	320 (22.6)	40 (2.6)	20 (1.5)	2 (0.1)	382 (26.8)
Severe	29 (2.4)	20 (1.4)	16 (1.1)	4 (0.3)	69 (5.2)
Total	349 (25)	60 (4.0)	36 (2.6)	6 (0.4)	1415 (100)

**Note:** Frequency (percentage)

**Table I.**  
Cyberbullying  
according to  
intensity and  
duration of  
behaviour

**Table II.**  
Differences between  
genders in  
cyberbullying  
behaviours

	<i>F</i>	<i>p</i>	$\eta^2$	Contrasts	Means
During the past 12 months, by cell phone or Internet, to harm another person					
<i>Harassment</i>					
1. I insulted or ridiculed someone with messages or telephone calls	$F(1, 1415) = 13.50$	<0.001	0.009	M > F	1.67 > 1.49
8. I sent messages that were scary or of a horrible sexual nature to scare or annoy	$F(1, 1415) = 12.35$	0.003	0.009	M > F	1.29 > 1.16
<i>Cyberstalking</i>					
2. I've forced someone to do things by using threats (bring money, do homework, sex)	$F(1, 1415) = 5.50$	0.034	0.004	M > F	1.12 > 1.07
7. I threatened other people to scare or intimidate them	$F(1, 1415) = 8.80$	0.011	0.006	M > F	1.33 > 1.22
<i>Denigration</i>					
4. I told lies, spread false rumours or gossiped about someone	$F(1, 1415) = 1.83$	0.067	<0.001		
<i>Violation of privacy</i>					
5. I told embarrassing secrets about others to annoy them	$F(1, 1415) = 0.12$	0.461	<0.001		
6. I sent or manipulated videos or images of someone without his/her permission	$F(1, 1415) = 7.81$	0.019	0.006	M > F	1.24 > 1.14
<i>Exclusion</i>					
3. I made calls and I did not respond or say anything when he/she connected and I did not reply	$F(1, 1415) = 0.35$	0.554	<0.001		
<i>Impersonation (hacking)</i>					
9. I got into the messenger or private accounts of others without them being able to do anything	$F(1, 1415) = 3.63$	0.047	0.003	M > F	1.38 > 1.30
10. I pretended like I was another person to say or do bad things on the telephone or online	$F(1, 1415) = 1.57$	0.209	<0.001		
<b>Notes:</b> <i>F</i> = Snedecor <i>F</i> ; <i>p</i> = significance level; $\eta^2$ = effect size; contrasts = significant comparisons; F = female; M = male					



During the past 12 months, by cell phone or Internet, to harm another person	<i>F</i>	<i>p</i>	$\eta^2$	Contrasts	Means
<i>Harassment</i>					
1. I insulted or ridiculed someone with messages or telephone calls	<i>F</i> (3, 1415) = 3.82	0.010	0.008	4th > 1st	1.72 > 1.51
8. I sent messages that were scary or of a horrible sexual nature to scare or annoy	<i>F</i> (3, 1415) = 1.66	0.173	0.004		
<i>Cyberstalking</i>					
2. I've forced someone to do things by using threats (bring money, do homework, sex)	<i>F</i> (3, 1415) = 1.59	0.195	0.003		
7. I threatened other people to scare or to intimidate	<i>F</i> (3, 1415) = 2.69	0.045	0.006		
<i>Denigration</i>					
4. I told lies, spread false rumours or gossiped about someone	<i>F</i> (3, 1415) = 3.84	0.009	0.008	4th > 3rd	1.56 > 1.36
<i>Violation of privacy</i>					
5. I told embarrassing secrets about others to annoy them	<i>F</i> (3, 1415) = 3.66	0.012	0.006	4th > 3rd	1.41 > 1.24
6. I sent or manipulated videos or images of someone without their permission	<i>F</i> (3, 1415) = 7.04	<0.001	0.015	4th > 1st 4th > 2nd 4th > 3rd	1.33 > 1.16 1.33 > 1.16 1.33 > 1.11
<i>Exclusion</i>					
3. I made calls and I did not respond or say anything when he/she connected and I did not reply	<i>F</i> (3, 1415) = 9.81	<0.001	0.020	4th > 1st 4th > 2nd 4th > 3rd	1.62 > 1.34 1.62 > 1.41 1.62 > 1.29
<i>Impersonation (hacking)</i>					
9. I got into the messenger or private accounts of others without them being able to do something	<i>F</i> (3, 1415) = 4.07	0.009	0.007	4th > 3rd	1.44 > 1.26
10. I pretended I was another person to say or do bad things on the telephone or online	<i>F</i> (3, 1415) = 5.92	<0.001	0.008	4th > 2nd 4th > 3rd	1.38 > 1.20 1.38 > 1.17

**Notes:** *F* = Snedecor *F*; *p* = significance level;  $\eta^2$  = effect size; contrasts = significant comparisons; years of compulsory secondary education (ESO): 1st = first year ESO, 2nd = second year ESO, 3rd = third year ESO, 4th = fourth year ESO

**Table III.**  
Differences between  
grades in  
cyberbullying  
behaviours

messenger or private accounts of others without them being able to do anything" ( $F(3, 1,415) = 4.07, p < 0.05$ ).

Additionally, for the form of hacking "I pretended I was another person to say or do bad things on the telephone or online" ( $F(3, 1,415) = 5.92, p < 0.05$ ), students in the fourth year of ESO scored higher than students in the third year and the second year of ESO. Additionally, scores were statistically higher for the fourth year of secondary education, compared to all the other academic years of ESO, on the exclusion aggression "I made calls, and I did not respond or say anything when it connected, and I did not reply" ( $F(3, 1,415) = 9.81, p < 0.001$ ). Differences were also observed between these levels in the behaviour "I sent or manipulated photos or videos of someone without their permission" ( $F(3, 1,415) = 7.04, p < 0.01$ ). Finally, for the type of harassment, "I insulted or ridiculed someone with messages or phone calls", statistically significant differences appear between the fourth-year and first-year students ( $F(3, 1,415) = 3.82, p < 0.05$ ).

### Discussion and implications

The first aim of this research was to analyse the prevalence of adolescent aggressors who use new information and communication technologies (mobile phone and the Internet), taking into account the duration and intensity of the cyberbullying. The study's second objective was to determine whether there were significant differences in the aggression perpetrated by the adolescents depending on their gender and academic year in secondary education.

Results indicated that in the past year, 32 per cent of the Spanish students had bullied their peers through new technologies, with the duration of the cyberbullying for the vast majority of the perpetrators being less than a month. Furthermore, related to the intensity of the cyberbullying, the data also suggest that the prevalence of cyberbullies was nearly 27 per cent for moderate cyberbullying, and up to five per cent for severe cyberbullying. These findings are consistent with the study by [Smith et al. \(2006\)](#), and they are also in line, although to a lesser degree, with results obtained in Spain by [Calvete et al. \(2010\)](#). These authors found that 44 per cent of the adolescents had carried out some aggressive cyberbullying behaviours. These high rates of cyberbullying in Spain are strikingly higher than the 9.6 per cent per cent reported by [Slonje et al. \(2012\)](#) in Sweden, and the 8.5 per cent reported in Australia by [Sakellariou et al. \(2012\)](#).

As the International Telecommunications Union indicates ([UIT, 2013](#)), in the year 2012, 85 per cent of Spanish young people were already digital natives, which could explain the fact that this new generation of young people who were born and bred connected to the Internet and engage in digital diversion are exposed to greater risks ([Chóliz, 2010](#)). According to the National Statistics Institute ([INE, 2013](#)), 92 per cent of the population of Spanish children between 10 and 15 years old use the Internet, and 91 per cent of 15-year-olds have a mobile phone. The possibility of accessing the Internet, with increasing frequency, from mobile devices (telephones, iPod, Tablet, etc.), could also explain the high prevalence of cyberbullying found in our study. It is also true that, with the establishment of these mobile technologies, parents and adults find it increasingly difficult to supervise young people in cyberspace.

Moreover, as mentioned previously, one problem found in the research on cyberbullying has to do with the lack of consensus about measuring cyberbullying.

Thus, as Kowalski *et al.* (2014) suggest, the prevalence estimates for cyberbullying range between approximately 6 per cent and 40 per cent. Hence, for example, some researchers evaluate the rate of prevalence of cyberbullying with a single item, while others use multi-item behavioural checklists to evaluate different forms of electronic bullying behaviour. One of the immediate challenges in the cyberbullying research domain is to reach a consensus regarding this measurement problem. Kowalski *et al.* (2014) suggest, for example, that future research on cyberbullying may be well-suited to using multi-item behavioural checklists that share a response scale, as we do in our study, and to utilizing the same reporting time frame (e.g. the past six months).

In addition, as we indicated in previous sections, the recent GAM by Kowalski *et al.* (2014) responds to another problem that existed until now in the research, the lack of a solid theoretical base with which to understand the phenomenon of cyberbullying. The model helps to understand the personal and situational factors at play in cyberbullying, including gender and age among the individual factors. With regard to gender differences, our results, as well as those found in the literature, were heterogeneous (Barlett and Coyne, 2014; Kowalski *et al.*, 2012; Patchin and Hinduja, 2010; Tokunaga, 2010). The data suggested that there was a higher incidence of several aggressive behaviours among boys, but they also indicated that there were no statistically significant differences between sexes for other types of aggression. The gender differences are consistent with findings obtained in recent investigations (Popovic-Citic *et al.*, 2011; Yilmaz, 2011). An interesting finding in our study was that boys seemed to bully more by using direct aggressive behaviours related to harassment and persecution, such as sending disturbing or threatening messages through direct communication with the victim and spreading images that are humiliating to the victim. This idea is consistent with the literature on traditional bullying, where boys are more involved in direct and physical aggression, and girls participate more in indirect and relational aggression (Barlett and Coyne, 2014; Buelga *et al.*, 2010; Hinduja and Patchin, 2010; Kowalski and Limber, 2007; Povedano *et al.*, 2012; Tapper and Boulton, 2004).

However, in the case of cyberbullying, the present findings revealed that there were no gender differences in more indirect and relational behaviours that do not involve direct communication with the victim. Data suggested that both boys and girls were involved in cybernetic behaviours, such as spreading lies, rumours, confidential information and exclusion, to comparable degrees. In fact, this result is consistent with previous studies that found no gender differences in the use of cyber aggression (Hinduja and Patchin, 2008; Schoffstall and Cohen, 2011; Slonje *et al.*, 2012).

An unexpected result of our study was the increase in aggressive behaviour in the fourth year of secondary education. Statistically significant differences were particularly relevant between years 3 and 4 of secondary education, with slightly lower levels of aggression in the third year with respect to the first and second years, and a clear rise in aggressive behaviours in the fourth year (15-16 years old). Although this finding does not coincide with some studies that found that cyberbullying is more prevalent in early adolescence, with a decrease in mid-adolescence (Kowalski and Limber, 2007), it seems to support the data of Slonje *et al.* (2012) showing that “the older pupils cyberbully others to a much higher extent

compared to the younger students” (p. 252). On the other hand, *Ortega et al. (2008)* found no significant differences in the ages of cyberbullies, although the majority of the aggressors were in their last two years of secondary education. However, *Calvete et al. (2010)* concluded that in the second and third years of secondary education, there is a higher incidence of cyberbullying than in the first and fourth years.

*Implications for school practitioners, allied professionals, parents and adolescents*

In summary, the findings of the present research indicate that a significant number of Spanish students are involved in cyberbullying as perpetrators, using electronic devices to bully other students. To reduce and prevent this problem, which is increasing among children and adolescents in all developed countries, the involvement of school practitioners, parents, children, adolescents and allied professionals is necessary.

Indeed, it is of crucial importance to develop educational strategies designed to favour the responsible use of the new technologies. In many cases, children and adolescents are not aware of the psychological and legal consequences that their cyber-aggressions can have for them, the victims and their families and social environment.

What begins as a game or a way to have fun can end up in court with an accusation of intimacy violations (i.e. when the adolescent has spread a personal message about the victim in a social network). Moreover, it can end tragically with the victim's suicide, as occurred in September 2013 in the USA with 12-year-old Rebecca Ann Sedwick, and in August in the United Kingdom with 14-year-old Hannah Smith.

In addition to information and a clear awareness about the nature of cyberbullying and its consequences in children and adolescents, there has to be zero tolerance by the school and family members to any form of face-to-face or virtual aggression.

Furthermore, adults should also increase their knowledge about the new technologies because adolescents (and even children) know more than the adults do, which affects their daily lives. This digital generation gap keeps many parents from properly controlling the cybernetic activity of their children, and this knowledge is necessary to reduce the incidence of cyberbullying (*Navarro et al., 2012; Popovic-Citic et al., 2011; Sakellariou et al., 2012*).

In conclusion, as in any scientific research, this study has some limitations. On one hand, it is important to note that the results presented in this research should be interpreted with caution due to its cross-sectional nature; a longitudinal study with measurements at different times would help to confirm the results observed here. On the other hand, in our study, the adolescents' responses were obtained through self-reports and, although they could be subject to social desirability effects and biases, as indicated by *Flisher et al. (2004)*, the reliability and validity of adolescent self-reports in the measurement of risk behaviours have been quite acceptable. Despite these limitations, the present study provides new findings using a large sample of adolescents. Specifically, it offers data about the prevalence of cyberbullies and the gender and age differences related to aggressive behaviour in Spanish adolescents. Future studies, taking these data into account, should analyse,

as Kowalski *et al.* (2014) propose in their GAM, the role of gender and sex, as well as other personal and situational factors involved in the aggressive behaviour of cyberbullying.

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