

## Cyberaggression and cybervictimisation in school youth - the influence of age and sex

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**ABSTRACT:** The objective of the study was to verify to what extent gender and age intervene in cyberbullying and cybervictimisation in young people between 14 and 17 years of age. It was a descriptive, correlational and predictive quasi-experimental study, based on a quantitative method. The data was obtained through two validated questionnaires, one to measure cyberaggression in young people (CAY) and the other for cybervictimisation in young people (CVY). A total of 472 Spanish youngsters between the ages of 14 and 17 participated in the sample. The results of the study revealed that in relation to sex there are no significant differences in terms of CAY and CVY levels, showing superior results in some dimensions of CAY in boys and CVY in girls, and in relation to age, older youth reach higher levels. High, in both fields, there are correlations in relation to sex and age, in addition to a low predictive factor. These results, together with the discussion of the study, can provide data on the behaviour of young cyberbullies and the profile of young cybervictims in relation to age and sex.

### INTRODUCTION

The continuous development of technological devices and applications for communication with an Internet connection is changing rapidly [1] along with the way young people socialise, being practically universal throughout the world [2-4]. In Spain, in the year 2020, the youngest age group accounted for 97% of people who used the Internet on a daily basis [5]. In addition, the current legislation of this country establishes that access to social platforms and networks may be made from the age of fourteen with their own consent. Although after the Covid-19 pandemic period [6][7] the use of the Internet and social networks has increased [8] and brought benefits in education, these practices are not without risks and problems [9] that cause the appearance of new harassment and crimes through electronic devices [10].

Compared to traditional aggressions, cybernetic aggressions can be perpetrated or received even from homes [11]. This is because the current digital society is changing the forms of crime using different models and can have negative consequences among the victims [12], becoming a serious public health problem that affects adolescents [13][14]. In recent times, cyberaggressions can have consequences that lead to depressive symptoms and suicidal ideation in cybervictims [15][16]. In this line, the non-governmental organisation Save the Children Fund [17] considers cyberaggressions, even in perpetrators, one of the most important risk factors for suicidal behaviour and multiplies by 2.55 the chances of suicide among minors. The psychologist Urrea goes one step further and affirms that cyberbullying, intimidation or mistreatment through technology enter our homes in the most intimate area, and are the main cause of suicide in adolescents [18].

### Factors Involved in Cyberbullying in Young People: Age and Sex

Cyberbullying is a worldwide trend of the misuse of technology [16] carried out in virtual environments to hurt other people [19]. Despite the lack of scientific research on cyberbullying in adolescents [20], victims (CVY) and aggressors (CAY) can be identified, and even bystanders because they observe aggressions in virtual environments [21]. Cybercrimes among young people need to be studied as it is a changing phenomenon that with social and technological development occurs from younger ages [4]. There are many factors that generate cybernetic aggressions and they do not necessarily have the same profile as traditional attackers [22]. These actions may be due to the different characteristics of each person, such as stress, self-concept, anxiety, emotions, gender or age, as well as their sociodemographic environment [23]. Consequently, there are studies that place the general level of CVY above CAY [24][25] and *vice versa* [26]. This is because various external factors influence the personal situations of each individual. In both cases, verbal attacks, impersonalisation and on-line exclusion are more common than phishing and visual cyberbullying [11][13][25][27].

In this study, analysing the use of the Internet according to age and sex provided researchers with information on the profile of the young people who use it [28]. The risks derived from inappropriate use can generate phenomena of

verbal violence in adolescents, such as cyberbullying, grooming, gender-based cyberviolence or sexting, as well as access and consumption of pornography among the underage population [29]. Also, the condition that derives from the circular loop of cyberviolence is added, turning cybervictims into cyberaggressors [9][30]. In the scientific literature, there is a difference according to the prevalence depending on the type of cyberaggressors or cybervictims analysed and psychological factors that predominate. But little is known about the methods or role that age and gender play in cybercrime [31].

In relation to age, there is no pattern in the scientific literature that associates a certain age with a particular level of CAY or CVY, since the factors and characteristics of adolescents also have an influence. There are studies that affirm that the older the adolescent is within the minority age, the higher the level of cyberaggression [32], however, other studies affirm the opposite [25][30] due to various sociodemographic factors. In relation to sex, studies indicate that the prevalence of cybernetic aggressive behaviours is higher in boys [12], while, within the framework of cybervictims, there are variables, such as social and individual emotions or sexual assaults that are suffered more by adolescent girls than by boys [25][33][34]. However, in adolescents suffering from loneliness, the cybervictims are mostly boys [35]. Verbal CAY and CVY are associated with girls [31][36], whereas boys suffer greater cybervictimisation due to on-line exclusion [37]. On-line sexual cybercrimes in adolescents are less common [32]. There are gender differences in how to interpret CVY, which may be linked to spoofing because young people do not know who the cyberbully is [38].

The findings in this field show a trend towards its growth, with the consequences of the increase in the number of CVY [24]. Young people's social connection can protect the well-being of those who are cyberbullied [39][40], however, social networks are a virtual channel that allows young people to be more active and independent [18]. For this reason, delving into the study of CAY and CVY minors can provide effective intervention strategies and programmes in educational, family and health-related areas in the face of this problem.

## JUSTIFICATION AND OBJECTIVES

The use of electronic tools and devices with an Internet connection from different settings, home or school, has accelerated as a result of the Covid-19 pandemic. However, today's adolescents use the Internet quite frequently and for different purposes [41] with serious consequences for the health of young people. For this reason, this research arises in order to increase knowledge about the typology and degree of CAY and CVY after the pandemic.

The main objective of this study is to verify to what extent gender and age explain cyberaggression and cybervictimisation among young people in school between 14 and 17 years of age. This main objective leads to the formulation of the following specific objectives:

- Study the level of cyberbullying among 14 to 17 year-old adolescents, as aggressors and as victims.
- Identify the influence of sex on cyberaggressions and cybervictimisations in this age group.
- Determine the influence of age on cyberaggressions and cybervictimisations in this age group.
- Define the typology of cyberaggressions and cybervictimisations in this age group.

From these objectives the following research questions (Q) arise:

- Q1: Which of the dimensions analysed have the greatest influence on cyberaggression and cybervictimisation among 14 to 17 year-old adolescents?
- Q2: Does gender influence cyberaggressions and cybervictimisation in these adolescents?
- Q3: Does age influence cyberaggressions and cybervictimisation in these adolescents?

Thus, by way of empirical judgment, the following hypotheses (H) are proposed:

- H1: Cyberaggression is more prevalent than cybervictimisation.
- H2: Boys have a higher average level than girls in cyberaggression and girls have higher levels of cybervictimisation.
- H3: Older adolescents have a higher average of cyberaggression and cybervictimisation than younger ones.

## MATERIALS AND METHODS

The data processing of this research was carried out according to a quasi-experimental descriptive, correlational and predictive study based on a quantitative method [41].

### Participants

The number of young minors participating in this study was 472 (n), with ages between 14 and 17 years, as shown in Table 1, where a greater participation of girls prevails. This age range was chosen considering Spanish law, 14 years as the minimum age to be able to register on social networks without parental authorisation and 17 years because it is the maximum age in Spain that can be considered a young person. When adolescents turn 18, they are of legal age. All the students come from the autonomous city of Ceuta, Spain - a city with more than 85,000 inhabitants and noted

for its linguistic and cultural diversity. The participants studied in seven compulsory secondary education (CSE) institutions in the autonomous city of Ceuta that also offer a Baccalaureate programme, out of a total of 12 existing ones, of which five are public centres and two are subsidised.

Table 1: Young participants in the sample.

Age	Youth (n)	Male (n)	Female (n)
14	72	29	43
15	123	56	67
16	126	51	75
17	151	63	88
Total	472	199	273

## Instrument

After an exhaustive review of the scientific literature, two validated questionnaires were used for this research, one on cyberbullying [4] and another on cybervictimisation [27]. Both instruments were published by a Spanish journal in the Spanish language and were intended for high school students, so it was not necessary to translate or adapt it by any translator or expert. In this case, it is considered appropriate for the studied population.

The questionnaire on cyberaggression consists of 19 items divided into three dimensions that are *impersonalisation* (CA\_Impersonalisation), *visual-sexual* (CA\_Visual\_sexual\_aggression) and *verbal cyberaggression and exclusion* (CA\_Verbal\_aggression). The cybervictimisation questionnaire consists of 26 items distributed in four dimensions: *verbal written* (CV\_Verbal\_written), *visual* (CV\_Visual), *on-line exclusion* (CV\_Exclusion\_on-line) and *impersonation* (CV\_Impersonation). The different variables were evaluated using a four-point Likert scale (1 - never; 2 - almost never; 3 - almost always; 4 - always). Regarding age and sex, the students were asked to provide these data in writing in the same questionnaire.

## Process and Data Analysis

This study has been approved by the Ethics Committee under code 3008/CEIH/2022 and follows the recommendations contained in the Declaration of Helsinki on good research practices. The students participated in this research anonymously and voluntarily, through an on-line form sent by the educational centres themselves through their official communication channel. Subsequent data processing ensured data protection.

The investigation phase began in January 2022. Initially, authorisation and timely permits were requested from the Provincial Directorate of Education and Vocational Training of Ceuta, dependent on the Ministry of Education in Spain. Subsequently, permits were also requested from the directors of the 12 existing secondary and high school educational centres in Ceuta, seven of which authorised the researchers to carry out this study. Subsequently, the centres themselves, through the centre's information and communication technologies (ICT) coordinator, were in charge of sending the questionnaire through their corporate e-mails to all 3rd- and 4th-year students of CSE and 1st and 2nd year of Baccalaureate. These students who received and completed the questionnaire through Google Forms were between 14 and 17 years of age, although in high school there were 14 students who were already 18 years old or older, and hence were excluded from this study. Finally, once the data was collected, the database was created in the Statistical Package for the Social Sciences (SPSS), version 28.

Basic statistical data, such as mean (M) and standard deviation (SD) were used in the study design. In addition, special tests were carried out to identify the distribution, such as the objective factor (FA) and the Pearson asymmetric coefficient (PAC). The association of variables was performed through the Pearson chi-square test ( $\chi^2$ ), with Cramer's V (V) and the contingency coefficient (Cont) to determine the association strength index [41], since these are parametric variables, whose scores follow a normal score. In addition, a multiple linear regression model was performed to predict the effect of age and gender on cyberbullying and cybervictimisation of students.

## RESULTS

The results obtained by applying various statistical methods are presented below. In a general and descriptive way, in Table 2 the measurements achieved are below two points (out of a maximum of four points). Regarding CAY, the dimension with the highest average is *CA\_Verbal\_aggression* that is, expelling or not accepting another person on different networks or platforms, making calls or writing messages to insult or mock someone, making threatening anonymous calls or post false rumours on social media. On the contrary, the variable that presents the least average is *CA\_Visual\_sexual\_aggression* that is, taking photos or recordings of sexual content without consent and disseminating them, pressuring another person to do unwanted things or hitting someone, recording it and disseminating it.

Within the CVY, the dimension with the highest average is also *CV\_Verbal\_written* that is, copying and sending private conversations and sending it to others, receiving calls to annoy, insult or mock, receiving anonymous messages by

e-mail or threatening social networks or messages with comments sexual. On the contrary, the dimension with the least average is *CV\_Visual* that is, editing photos or videos and uploading them to the networks to hurt or laugh at someone, force them to do something humiliating or hit and record it to later upload it to the networks. In addition, the standard deviation of most of the variables shows that there is a similar tendency when responding by those involved.

Table 2: Descriptive data of the global scores obtained and dimensions in CAY and CVY.

	Parameters			
	M	DT	CAF	Cme
Cyberaggression (CAY)	1.11	0.272	7.52	70.509
Cybervictimisation (CVY)	1.23	0.326	3.24	16.495
CA_Impersonalisation	1.05	0.296	7.45	64.292
CA_Visual_sexual_aggression	1.03	0.250	10.13	110.76
CA_Verbal_aggression	1.19	0.333	4.40	28.572
CV_Verbal_written	1.30	0.406	2.53	8.473
CV_Visual	1.11	0.261	5.73	48.60
CV_Exclusion_on-line	1.25	0.432	2.78	9.916
CV_Impersonation	1.19	0.359	2.99	13.242

\*Note: CAF = asymmetry; Cme = curtosis

In reference to gender, in Table 3, it can be seen that boys present a mean higher than girls in CAY that is not significant. Likewise, girls have a higher mean than boys in CVY, which are very insignificant. However, within the CVY, the dimensions of *CV\_Visual* and *CV\_Exclusion on line* present a higher average for boys than for girls. It is also observed that there are statistically significant differences in the correlation established between gender and the dimensions of *CV\_Verbal\_written* and *CV\_Impersonation*. In this case, women have higher levels than men. In the rest of the dimensions, no statistically significant correlation values were observed. The strength of association is low.

Table 3: Association between gender and the dimensions of CA and CV.

	Gender - mean		Parameters			
	Male	Female	$\chi^2(gl)$	p-value	Cont	V
Cyberaggression (CA)	1.13	1.10	17.087(18)	0.517	0.190	0.187
Cybervictimisation (CV)	1.21	1.25	41.069(37)	0.297	0.283	0.295
CA_Impersonalisation	1.07	1.04	3.420(6)	0.755	0.085	0.085
CA_Visual_sexual_aggression	1.04	1.02	4.565(6)	0.601	0.098	0.098
CA_Verbal_aggression	1.22	1.18	15.734(15)	0.400	0.180	0.183
CV_Verbal_written	1.24	1.34	40.692(25)	0.025	0.282	0.294
CV_Visual	1.13	1.09	10.972(10)	0.360	0.151	0.152
CV_Exclusion_on-line	1.28	1.23	12.178(11)	0.350	0.159	0.161
CV_Impersonation	1.16	1.21	22.694(12)	0.030	0.214	0.219

\*Note:  $\chi^2(gl)$  = chi-square, degrees of freedom; Cont = contingency coefficient; V = V Cramer

In relation to the statistical results referring to age in Table 4, older students that is, 17 years old, show higher mean statistical values in all dimensions, both in CAY and CVY. Although the cybervictimisation dimension corresponding to *CV\_Exclusion\_on-line* shows similar results, especially with 14-year-old students who present the same average.

Table 4: Association between age and CA and CV variables.

	Age - mean				Parameters			
	14	15	16	17	$\chi^2(gl)$	p-value	Cont	V
Cyberaggression (CA)	1.09	1.07	1.10	1.16	62.404(54)	0.202	0.342	0.210
Cybervictimisation (CV)	1.21	1.19	1.23	1.28	98.176(111)	0.803	0.415	0.263
CA_Impersonalisation	1.05	1.03	1.02	1.10	23.765(18)	0.163	0.219	0.130
CA_Visual_sexual_aggression	1.01	1.01	1.01	1.07	22.952(18)	0.192	0.215	0.127
CA_Verbal_aggression	1.16	1.15	1.19	1.25	53.091(45)	0.191	0.318	0.194
CV_Verbal_written	1.29	1.26	1.29	1.35	62.615(75)	0.846	0.342	0.210
CV_Visual	1.08	1.06	1.09	1.17	33.338(30)	0.308	0.153	0.257
CV_Exclusion_on-line	1.26	1.24	1.24	1.26	22.256(33)	0.922	0.212	0.125
CV_Impersonation	1.12	1.14	1.20	1.26	51.541(36)	0.045	0.314	0.191

\*Note:  $\chi^2(gl)$  = chi-square, degrees of freedom; Cont = contingency coefficient; V = V Cramer

The correlation established between age and the dimensions show statistically significant differences in the *CV\_Impersonation* dimension. In this case, the older the student, the higher the value. This shows that, at higher ages, *CV\_Impersonation* occurs more frequently. The strength of association in all of them is medium-low and the rest of the variables do not show statistically significant signs. Finally, in all the multiple linear regression models the model of successive steps has been applied, both for sex and age (Table 5). In the analysis applied to sex, three significant models have been obtained. However, in the analysis applied to age, one significant model has been obtained.

Table 5: Multiple linear regression model by successive steps.

Gender							
Models	R	R2	R2C	SEE	CR2	CF	SCF
1	0.122	0.015	0.013	0.479	0.015	7.067	0.008
2	0.221	0.049	0.045	0.471	0.034	16.835	0.000
3	0.255	0.065	0.059	0.468	0.016	8.150	0.004
Age							
Models	R	R2	R2C	SEE	CR2	CF	SCF
1	0.150	0.022	0.020	1.055	0.022	10.817	0.001

\*Note: SEE = standard error of the estimate; CR2 = changes in R2, CF = changes in F; SCF = significance change in F.

In relation to gender, the dimensions that make up model 3 (Table 6) are *CV\_Written\_verbal*, *CV\_Visual* and *CV\_Exclusion-on-line*. These variables show significant values less than 0.05. These dimensions show predictive values, although their capacity is low. In relation to age, the dimensions that make up model 1 is *CV\_Impersonation*. This dimension shows a significant value less than 0.05. These dimensions show predictive values, although their predictive capacity is low.

Table 6: Coefficients of the multiple linear regression of gender and age.

Gender					
	B	Typical error	Beta	t	Sig.
3 (Constant)	1.710	0.095		17.926	0.000
CV_Verbal_written	0.431	0.078	0.363	5.508	0.000
CV_Visual	-0.346	0.110	-0.188	-3.139	0.002
CV_Exclusion_on-line	-0.202	0.071	-0.182	-2.855	0.004
Age					
	B	Typical error	Beta	t	Sig.
1 (Constant)	2.224	0.169		13.159	0.000
CV_Impersonation	0.445	0.135	0.150	3.289	0.001

## DISCUSSION

There have always been verbal conflicts, exclusions or aggression between young people in face-to-face (F2F) contact. But with the appearance and use of electronic devices with Internet access, this way of socialising has changed. Also, it has opened up new forms of virtual problems, such as on-line exclusion or identity theft. According to Spanish statistics, practically all young people access the Internet and have devices with an on-line connection [5], both from school and at home [2][3][8]. This phenomenon should be studied because it can prevent health problems among young people [14][15] who have had their own phones with Internet connection for ages, even without control [4]. Therefore, the authors proceed to discuss the results of this study in reference to the objectives.

In relation to the first objective, the average of the students in relation to cyberbullying, as aggressors and victims in this study, has been low, although there is a higher level of CVY than CAY, contrary to the study by Sánchez et al [37], which contradicts hypothesis 1. These results provide important information to the family environment and educational policies [4] on factors that can turn future youth into on-line cyberbullies [7][30]. The authors of the article agree with Rojo et al that the development of prevention plans from an early age can make young people confront cyberbullies to reduce this problem. Also, advice to schools can be helpful on how to track mobile phone calls, text messages from different on-line platforms as a means to deter cyberbullying [16].

Regarding the dimensions of CVY, the acts of receiving anonymous messages and calls to mock and insult, posting private conversations on different platforms or receiving threats on social networks, such as verbal and written attacks [11], are the most frequent actions that have the highest score consistent with this study. In addition, according to the results of this study and in line with Álvarez et al, on-line exclusion as victimisation is another dimension considered by adolescents, who admit to having been ignored or expelled from chat rooms, social networks and games without having done nothing wrong. In addition, they have received false complaints in forums and networks to be expelled [4]. These facts, as Santiago affirms, can be linked to the ease of acting from the aggressor's anonymity, however, given the lack of F2F contact between the agents involved, the aggressors are unaware of the consequences on the victims [25].

Regarding the second objective, the results of this research support the study by Cava and Buelga, in which boys have higher levels of cyberbullying than girls [12], and likewise, girls tend to have higher levels of cybervictimisation than boys [25]. Both data confirm hypothesis 2 of this research. Delving into the dimensions related to cyberaggressions, as Aumaitre et al pointed out, boys tend to use verbal aggression, bothering and insulting someone with offensive or insulting comments on social networks, SMS or WhatsApp, making false reports about other people, so that they are kicked out or agree to ignore or post rumours about other people [17], who argue that this is because social media or anonymity make teens more active. On the other hand, at these ages, cyberaggressions for reasons of sexual assault tend to be practically non-existent in both sexes [30] in line with the results of this study, which shows low levels of adolescent participation when it comes to taking photos or videos of sexual content, without consent, sharing or posting compromising audiovisual images without consent or pushing someone to do something humiliating or provocative.

In relation to the cybervictimisation dimension, although in this study the general mean levels are usually higher in girls than in boys in line with Cebollero et al, they stand out in regard to impersonating others identities or publishing secret conversations, including sexual comments [31]. However, in regard to receiving strong and unpleasant videos through Internet devices, posting photos of young people without permission to be mocked or being ignored and expelled from social networks, in this study, it is the boys who present the highest levels of cybervictimisation. In this case, the research by Borraccino et al associates it with loneliness in adolescent males [33].

The results of the third objective are supported by the study by Álvarez et al which indicates that older youth (17 years old) are more prone to cyberbullying and being cybervictims [32]. In contrast, the study by Jiménez et al indicates that older adolescents are less likely to cyberbully or be cybervictims because they are more aware of the danger and consequences [30]. Although, in this study, in the age range between 14 and 16 years, the youngest present higher levels in relation to sending and receiving insults, even being excluded by platforms and social networks. This disparity of variables in terms of age confirms the theory of Donoso et al that in addition to age, many factors are involved in this field [21].

To end the discussion and in relation to the last objective of the study, to know the typology of CAY and CVY, this study reveals that in the case of cyberaggression, verbal aggressions are the most frequent, while in the case of cybervictimisation, the dimension that occurs the most is the verbal-written dimension, with visual-sexual aggression being the one that occurs the least in both cases. These results coincide with Rojo et al and Álvarez et al, who stated that in both cases (CAY and CVY) verbal aggression, impersonalisation, and on-line exclusion are more frequent than identity theft and visual cyberaggression [11][27]. It is important to highlight that this study confirms that both gender and age have dimensions with predictive factors only in cybervictimisation - in relation to gender *CV\_Verbal\_written*, *CV\_Visual* and *CV\_exclusión\_on-line* [17] and in relation to age, *CV\_Impersonation* [30]. These data could be indicators of adolescents who are cybervictims and in the future become cyberbullies [7][28][29].

## CONCLUSIONS

The levels of CVY are higher than those of CAY among adolescents between 14 and 17 years of age, in both cases, with verbal messages, insults or teasing being the main form, both in senders and receivers, these data, which contradicts hypothesis 1 of the study. In addition, boys hardly have higher rates of cyberaggression than girls, who have a higher level of cybervictimisation in a very insignificant way. These results confirm hypothesis 2 of the study. The type of cyberaggression that predominates in boys is harassing, insulting, making offensive comments, making anonymous calls to threaten, publishing rumours by phone or through social networks, such as Instagram, Twitter, Facebook or WhatsApp. The cybervictimisation that prevails among adolescent girls in these ages is consistent with the data on cyberbullies, but they are the ones who receive it, including unwanted sexual comments over the Internet. Finally, the higher the age within adolescence, the higher the levels of cyberaggression and cybervictimisation among young people in all the dimensions studied, such as impersonalisation, verbal, sexual, and visual aggressions in the field of cyberaggression, in addition to verbal and visual, on-line exclusion or identity theft of the victims - these data confirm hypothesis 3 of the study.

As a limitation to determine the results of the study, the authors state that the sample was drawn from adolescents who are in school. In Spain, schooling is compulsory up to the age of 15, while after the age of 16 this is no longer the case, so the sample is conditioned to the fact that young people aged 16 and 17 who continue studying at school are in the centre of this study. However, a large part of the population of that age that discontinued schooling was excluded, and those adolescents may have other sociodemographic profiles.

In short, this study is novel work on cyberbullying that provides suggestions on the psychological profile of school adolescents in relation to age and sex, but above all on the behaviour of cyberbullying adolescents, that very few investigations have focused on so far. The findings can also inform psychological adjustment. Deepening the understanding of cyberbullying can help to design more effective prevention and intervention strategies and programmes in the face of this problem, which is growing in the society and is of great educational, clinical and social relevance and concern. It is necessary to intervene in secondary education, and inform and train students and families on the way in which the aggressors act and the negative consequences that cyberaggression can have on the victims, to prevent these pathologies from being transferred to adult life.

## ACKNOWLEDGEMENTS

The main author thanks the co-authors for their involvement in this research, which is part of the Doctoral Programme of the University of Granada, Spain. In addition, these authors confirm that this research did not receive external funding.

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