



## Bullying and cyberbullying: Convergent and divergent predictor variables



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### ARTICLE INFO

#### Article history:

#### Keywords:

Cyber-bullying  
Bullying  
School climate  
Empathy  
Internet addiction  
Privacy

### ABSTRACT

There is certain controversy on whether cyber-bullying is a category of bullying as it appears in a very different scenario away from the schools. The objective of this research has been to know if the variables that predict the involvement of youngsters in traditional bullying are also predictor of the appearance of cyber-bullying. Accordingly, we have looked for the similarities and the differences existing in the involvement on these phenomena. The sample is composed by secondary school pupils ( $n = 893$ , 45.9% girls; age  $\bar{x} = 13.80$ ,  $SD = 1.47$ ). The results show that there are multiple relations between the predictor variables of school bullying and the specific variables of virtual environments that predict cyber-bullying. It has been obtained a new model that explains both phenomena which could be a strong evidence to base future interventions to prevent and reduce these problems.

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### 1. Introduction

Although bullying was only described for the first time in the late 1970s (Heinemann, 1972), there now exists a solid corpus of scientific research into the phenomenon (Rigby & Smith, 2011). Taking Olweus' definition of bullying (Olweus, 1999) as a point of departure, and bearing in mind later modifications to that description incorporating moral and practical considerations (Ortega, 2010; Smith & Sharp, 1994), bullying can be described as an essentially psychosocial problem involving the intentional, repetitive harming of another person and the creation of a power imbalance between the victim and the aggressor, with negative consequences for both parties. The consequences for the victim differ from those for the aggressor (Nansel et al., 2001) because the effects of the power imbalance established between the two are of a moral nature (Ortega, 2010). The effects of bullying are also felt in the social circles of those involved: research has shown how the quality of peer network relationships deteriorates when bullying takes place (Ortega & Mora-Merchán, 2008). Indeed, bullying is a complex phenomenon encompassing both the personality and background of those involved and also contextual factors (Law, Shapka, Hymel, Olson, & Waterhouse, 2012) school climate has been described as a factor of risk or protection, depending on its quality (Bear, Gaskins, Blank, & Chen, 2011). In fact prevention

and intervention programs against bullying (Baldry & Farrington, 2004; Gregory et al., 2010) are based on the improvement of the school climate (Haynes, Emmons, & Ben-Avie, 1997), particularly in the configuration of rules, values and expectations of support to deal with this kind of problems (Cohen, McCabe, Michelli, & Pickeral, 2009). In fact evaluation of such bullying prevention and reduction programs has shown significant decreases in levels of both victimization and, albeit to a lesser extent, bullying (Tfofi & Farrington, 2011; Williams & Guerra, 2007).

At the individual level, empathy is considered one of the personality traits which most influence the prevention of involvement in bullying in the aggressor role (Jolliffe & Farrington, 2006a). Likewise, the ability to perceive the moods of others, to acquire both a cognitive and affective awareness of others (Garaigordobil, 2009), to understand the victim's feelings and to realize the potential impact an unjustified attack may have on the victim (Ortega, 2010) are equally important elements in anti-bullying programs insofar that they seem to contribute to reducing problems of unjustified harassment and abuse (Gini, Albiero, Benelli, & Altoè, 2007; Merrell, Gueldner, Ross, & Isava, 2008).

It should be pointed out that the most interesting research into bullying has been undertaken in the psycho-educational field, and that many of the studies carried out have sought to establish preventive and palliative measures to combat the problem. However, as research into bullying has made gradual progress in identifying the key elements of successful action, the nature of the phenomenon itself has changed – thanks above all to the impact of Information and Communications Technologies (ICTs) on interpersonal relationships (Mishna, Cook, Gadalla, Daciuk, & Solomon, 2010).

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Consequently, researchers are also now focusing their attention on bullying perpetrated in the context of social interaction via digital devices (Tokunaga, 2010), resulting in a completely new construct: cyberbullying. Considered an extension of traditional bullying, cyberbullying is defined as aggressive, intentional acts carried out using ICTs and resulting in power imbalance (Beran & Li, 2005; Slonje & Smith, 2008). It seems to be emerging as a form of aggression among school children and young people (Hinduja & Patchin, 2009).

But cyberbullying does have its own identifying characteristics. These include the possible anonymity of the bully, the larger potential audience for the abuse being carried out, the difficulty of disconnecting oneself from the cyber environment (Juvonen & Gross, 2008) and certain emotional considerations stemming from the absence of the direct face to face contact which is present in many types of traditional bullying (Law, Shapka, Domene, & Gagné, 2012; Ortega et al., 2012).

Cyberbullying has the same risk factors found in traditional bullying, but, perhaps thanks to its specific nature, also involves other factors which should not be overlooked. One such factor is the little control exerted over personal information, which may result from ignorance about the risks involved in sharing personal information on Internet (Sengupta & Chaudhuri, 2011; Valcke, De Wever, Van Keer, & Schellens, 2011), sharing passwords, communicating with strangers, openly displaying very personal information such as addresses and telephone numbers (Hinduja & Patchin, 2009). This lack of control, with the associated vulnerability of the victim, can be considered a characteristic feature of cyberbullying. Relationships have also been discovered between cyberbullying and Internet addiction (Ybarra & Mitchell, 2004), the latter being understood as a continuous urge to connect to Internet which restricts forms of entertainment and social relationships, seriously affects an individual's moods and irritability, induces violent, aggressive behavior that makes it impossible to disconnect (Beard & Wolf, 2001) and increases the user's own social isolation and the destruction of their own closest relationships (Del Rey, Casas, & Ortega, 2012; Tsai & Lin, 2001). Excessive use of some technologies predicted cyberbullying beforehand. For instance, variables influencing cyberbullying victimization in a considerably large sample were listed as gender; marital and socioeconomic status; purpose; frequency; location; time and nature of Internet use and language proficiency (Akbulut, Sahin, & Eristi, 2010). Even, psychiatric symptomatology was addressed as a predictor of cyberbullying among university students in another recent study by Aricak (2009). Again, this type of situation shows no behavioral correlation with victims or aggressors in traditional bullying.

As mentioned earlier, however, cyberbullying is still considered a form of bullying despite these differences (Slonje & Smith, 2008). Studies have revealed that individuals involved in traditional forms of harassment also tend to become involved in cyber-harassment (Hemphill et al., 2012): in some cases the rate of overlap has been as high as 80% (Campbell, 2005; Juvonen & Gross, 2008; Riebel, Jäger, & Fischer, 2009). In addition, being a victim in the cyberspace predicted the degree of bullying in a recent study, which further addressed the reasons of cyberbullying among undergraduate students (Akbulut & Eristi, 2011). A high degree of correlation has also been found between cyberbullying and other forms of school violence (Álvarez García et al., 2011).

Such close similarities have led researchers to consider the possibility that the predictor variables identified for traditional bullying may also be used to predict cyberbullying (Pearce, Cross, Monks, Waters, & Falconer, 2011). If this were the case, existing scientific and practical knowledge about the key elements in successful programs for reducing and preventing traditional bullying could be transferred to the field of cyberbullying. To this end, the main predictor variables for traditional bullying, such as school cli-

mate and empathy (Ttofi & Farrington, 2011), and even the relationship between variables in the physical school environment and cyberbullying and the variables associated with ICT usage should be taken into account when developing cyberbullying reduction programs and policies (Stauffer, Heath, Coyne, & Ferrin, 2012), so that prevention programs could be implemented based on evidence collected in the actual physical school environment.

## 2. Research questions

This study poses three questions the answers to which would, in our opinion, help us to further our knowledge of bullying and cyberbullying. The first deals with whether individual aspects like empathy or contextual aspects like the school climate surrounding those involved are still variables capable of predicting traditional bullying.

The second refers to whether cyberbullying has any specific, idiosyncratic predictors not previously analyzed by researchers into traditional bullying, like, for example, control/lack of control over personal information in digital devices used by adolescents or the excessive use of Internet (addiction).

The third question is: are bullying predictor factors also cyberbullying predictor factors?

## 3. Hypothesis

### 3.1. Hypothesis 1

Empathy and perceived school climate are still predictors for bullying. The school climate (Bear et al., 2011; Cohen et al., 2009) and the empathy shown among peers (Jolliffe & Farrington, 2006a) have been considered as two of the main focus of the intervention programs against traditional bullying. Despite of the introduction of the ITCs in the schools, the above-mentioned items can still be connected with existence and prevention of cyberbullying.

### 3.2. Hypothesis 2

Little control over personal information on Internet and Internet addiction are both predictor factors for cyberbullying. Several studies (Sengupta & Chaudhuri, 2011; Ybarra & Mitchell, 2004) have linked, when using ITCs, these phenomena with the implication in cyberbullying and, particularly, in both victimization and aggression.

### 3.3. Hypothesis 3

Bullying and its predictor variables can, in part, explain cyberbullying. The common characteristics of both phenomena (Slonje & Smith, 2008) may also imply that their predictors present similarities and also some differences.

## 4. Materials and methods

The study was carried out using a transversal, prospective, single-group ex post facto design (Montero & León, 2007).

### 4.1. The sample group

The group comprised 893 students from three secondary schools in the city of Cordoba, Spain. 45.9% were girls between the ages of 11 and 19 ( $M = 13.80$ ;  $DT = 1.47$ ) attending classes in years 1–4 of E.S.O. (Compulsory Secondary Education) (7th to 10th grades).

## 4.2. Instruments

### 4.2.1. Perceived Information Control

The Perceived Information Control scale (Dinev, Xu, & Hart, 2009), comprising 4 Likert type items with seven answer options ranging from Totally Disagree to Very Much Agree ( $\alpha = 0.896$ ).

### 4.2.2. Internet Addiction

The CERI (Cuestionario de Experiencias relacionadas con Internet – Internet-Related Experiences Questionnaire) developed by Beranuy, Chamarro, Graner, and Carbonell-Sánchez (2009), comprising 10 Likert type items with four answer options (1–4) reflecting a degree of behavior frequency ranging from never to quite a lot. This questionnaire has two scales: intrapersonal conflicts, covering criteria regarding substance abuse and addictive/pathological gambling, and interpersonal conflicts, covering key elements in ICT-based interpersonal relationships. Its reliability levels are acceptable ( $\alpha$  total = .78;  $\alpha$  intra = .719;  $\alpha$  inter = .631).

### 4.2.3. Cyberbullying

The Spanish version of the European Cyberbullying Intervention Project Questionnaire (ECIPQ) (Brighi et al., 2012a), comprising 22 Likert scale items with five answer options for frequency ranging from never to more than once a week. This questionnaire has two dimensions – cybervictimization and cyber-aggression – with good reliability levels ( $\alpha$  total = .87;  $\alpha$  victimization = .80;  $\alpha$  aggression = .88).

### 4.2.4. Bullying

The Spanish version of the European Bullying Intervention Project Questionnaire (EBIPQ) (Brighi et al., 2012b), comprising 14 Likert type items with five answer options for frequency ranging from never to yes, more than once a week. This questionnaire has two scales – victimization and aggression – with acceptable reliability levels ( $\alpha$  total = .82;  $\alpha$  victimization = .85;  $\alpha$  aggression = .77).

Both instruments have been validated in six European countries (Spain, Poland, Italy, Germany, the UK and Greece) for their utilization in the evaluation of the impact of the different programs implemented against bullying and cyberbullying.

### 4.2.5. Empathy

The Basic Empathy Scale (Jolliffe & Farrington, 2006b), comprising 20 Likert items with five answer options reflecting level of agreement. This questionnaire has two dimensions – cognitive empathy and affective empathy – with acceptable reliability levels ( $\alpha$  total = .70;  $\alpha$  cognitive = .79;  $\alpha$  affective = .85).

### 4.2.6. School Climate

The School Climate Scale (Brand, Felner, Shim, Seitsinger, & Dumas, 2003), in which we used 5 of the 10 scales included in the original Likert type scale with five answer options: Teacher Support (6 items,  $\alpha = .76$ ); Consistency and Clarity of Rules and Expectations (5 items,  $\alpha = .74$ ); Negative Peer Interactions (5 items,  $\alpha = .73$ ); Positive Peer Interactions (5 items,  $\alpha = .70$ ); Safety Problems (6 items,  $\alpha = .71$ ). In total, 31 items with a total reliability level of ( $\alpha = .71$ ).

## 4.3. Analysis

Data was analyzed using the AMOS 20 module in the SPSS statistics program, Version 18.0. Structural equations were produced using maximum likelihood estimation and to compare the suitability of the models proposed we adhered to the recommendations of Hu and Bentler (1999), combining different indices, such as the chi-squared statistic compared with the model's degrees of freedom with a ratio of less than three, the comparative fit index (CFI), the goodness of fit index (GFI), the adjusted goodness of fit

index (AGFI) and the Tucker Lewis index (TLI) with values above .95. It must also be pointed out that the root mean square error of approximation (RMSEA) was less than .05. For estimation the maximum verisimilitude method was used.

## 5. Results

For the sake of clarity the results of this study will be presented in the order of the three research hypotheses established at the outset. First though, the central trend measurements for all the variables in the descriptive analysis are shown in Table 1.

### 5.1. Hypothesis 1

For this hypothesis a structural equation model was created to corroborate the predictive value of the school climate and empathy variables in traditional bullying (see Fig. 1). The model showed that the school climate variables which directly affected bullying were the safety problem ( $\beta = .621$ ;  $p < .001$ ), teacher support ( $\beta = -.29$ ;  $p < .01$ ), positive peer interactions ( $\beta = .08$ ;  $p < .05$ ) and negative peer interactions ( $\beta = .30$ ;  $p < 0.05$ ). The direct effect of empathy ( $\beta = -.105$ ;  $p < .01$ ) on bullying became more specifically visible towards the aggression dimension.

The model's fit indices showed a best fit (Hair, Anderson, Tatham, & Black, 1995; Hu & Bentler, 1999)  $\chi^2 = 15.934$ ,  $\chi^2/DF = 1.449$ ,  $p = .144$ , CFI = .997, GFI = .996, TLI = .990, NFI = .991, RMSEA = .022, RMR = .004. 52% of bullying variable variance was therefore explained both by the direct effect indicated and by the indirect effect of other variables such as, for example, consistency and clarity of rules. More specifically, 15% of aggression variance and 80% of victimization variance were explained. The model also showed that bullying is reciprocally related both to positive peer interactions ( $\beta = -.155$ ;  $p < .001$ ) and negative peer interactions ( $\beta = .28$ ;  $p < .05$ ). These variables are therefore predicted by these relationships and by those affecting empathy and the other school climate variables, thus explaining 28% of the total variance in positive interactions and 51% of that in negative interactions.

### 5.2. Hypothesis 2

The results obtained from the second structural equation model (see Fig. 2) showed that the endogenous cyberbullying variable is affected by Internet addiction ( $\beta = .369$ ;  $p < .001$ ) and perceived

**Table 1**  
Means and typical deviations.

Instruments and dimensions	Group (n = 893)	
	M	DT
Information control <sup>a</sup>	5.370	1.669
Addiction to Internet <sup>b</sup>	1.193	.589
Intrapersonal addiction <sup>b</sup>	.924	.654
Interpersonal addiction <sup>b</sup>	1.464	.666
Cyberbullying <sup>b</sup>	.100	.204
Aggressor cyberbullying <sup>b</sup>	.073	.243
Victim cyberbullying <sup>b</sup>	.117	.264
Bullying <sup>b</sup>	.377	.401
Aggressor bullying <sup>b</sup>	.261	.399
Victim bullying <sup>b</sup>	.501	.602
Empathy <sup>b</sup>	1.866	.319
Cognitive empathy <sup>b</sup>	2.216	.389
Affective empathy <sup>b</sup>	1.575	.454
Safety problem <sup>b</sup>	.312	.407
Consistency and clarity of rules and expectations <sup>b</sup>	3.126	.561
Teacher support <sup>b</sup>	2.498	2.498
Negative peer interactions <sup>b</sup>	1.463	.597
Positive peer interactions <sup>b</sup>	2.756	.589

<sup>a</sup> Scale value 1–7.

<sup>b</sup> Scale value 0–4.

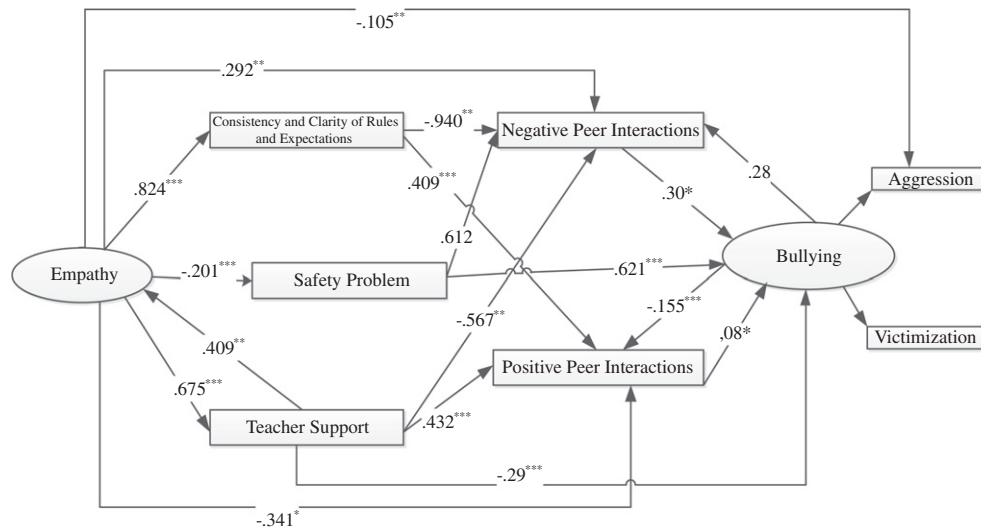


Fig. 1. Equation model for hypothesis 1.

control over information ( $\beta = -.121$ ;  $p < .05$ ). The direct effect of the two variables explains 34% of the aggression variance in cyberbullying and 41% of the victimization variable, representing total cyberbullying variability of 55.2%. The model's fit indices showed a very acceptable fit (Anderson & Gerbing, 1988)  $\chi^2 = 23.893$ ,  $\chi^2/DF = 1.493$ ,  $p = .092$ , CFI = .997, GFI = .994, TLI = .995, NFI = .992, RMSEA = .023, RMR = .014.

5.3. Hypothesis 3

Finally, a structural equation model was created (see Fig. 3) to find out if bullying and its associated variables are predictors for cyberbullying. This was done by interrelating the two models created earlier (see Figs. 1 and 2) for bullying and cyberbullying. The relationships between these two models produced a new model with a fit that was acceptable taking into account the number of variables involved and their complexity (Hu & Bentler, 1999), with indices  $\chi^2 = 79.389$ ,  $\chi^2/DF = 1.846$ ,  $p = .001$ , CFI = .988, GFI = .988, TLI = .974, NFI = .974, RMSEA = .030, RMR = .011.

The new model explained 62% of cyberbullying variance. More specifically, it explained 69% of cybervictimization variance and 19% of cyber-aggression variance. It also explained 81% of variability in traditional bullying: 16% in aggression and 52% in victimization. The model thus showed how school climate variables which predict bullying – that is to say, awareness of a safety problem at school ( $\beta = .691$ ;  $p < .05$ ) and positive peer interactions ( $\beta = -.107$ ;  $p < .01$ ) – also predict cyberbullying. The predictive effect of negative peer interactions ( $\beta = .089$ ;  $p < .05$ ) became more specifically visible towards the cyber-aggression dimension. Consistency and clarity of rules and teacher support were shown to

have a spurious relationship with cyberbullying through positive and negative peer interactions. Other important cyberbullying predictors were traditional bullying itself ( $\beta = 1.396$ ;  $p < .05$ ) and empathy ( $\beta = -.07$ ;  $p < .05$ ), the latter tending to predict cyber-aggression. As in the second model, Internet addiction was specified as a predictor ( $\beta = .116$ ;  $p < .001$ ) for the cyber-aggression dimension, and control over information was specified as a predictor ( $\beta = -.618$ ;  $p < .01$ ) for cyber-victimization.

Regardless of cyberbullying prediction *per se*, this model produced results with considerable predictive relevance to the variables involved in the analysis. One notable example was the prediction of Internet addiction by the teacher support ( $\beta = -.115$ ;  $p < .01$ ) and empathy ( $\beta = -.041$ ;  $p < .05$ ) variables. Positive peer interactions were predicted by the control over information variable ( $\beta = -.107$ ;  $p < .01$ ), and negative peer interactions were partially predicted by Internet addiction ( $\beta = .89$ ;  $p < .05$ ).

Finally, predictive values for control of personal information on Internet and aggression in traditional bullying were found in bullying ( $\beta = -.117$ ;  $p < .05$ ) and Internet addiction ( $\beta = .210$ ;  $p < .001$ ), respectively.

6. Discussions

With respect to the first of the hypotheses on which this study was based – which stated that empathy and perceived school climate continue to be valid predictors for bullying – we can conclude that, regardless of the changes in the behavior patterns analyzed attributable to ICT usage, empathy and perceived school climate

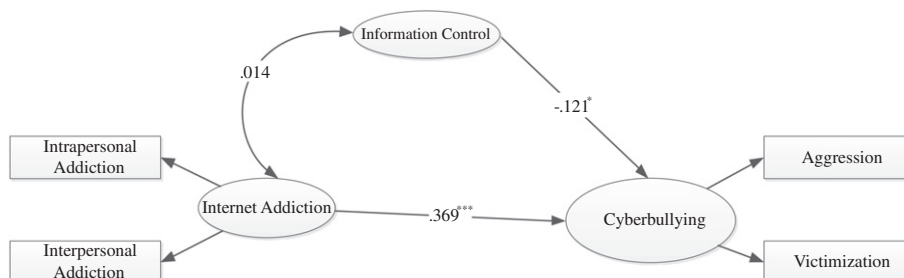


Fig. 2. Equation model for hypothesis 2.

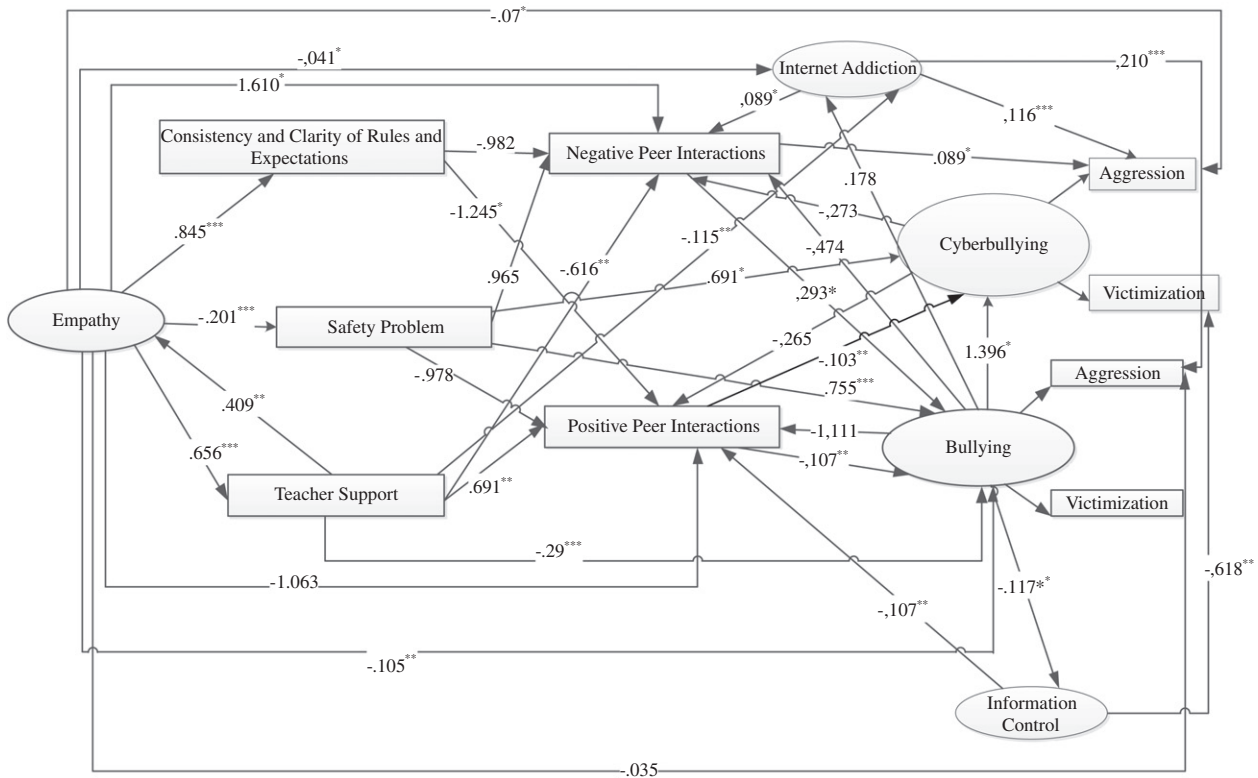


Fig. 3. Equation model for hypothesis 3.

do indeed continue to be valid predictors for bullying. That is to say, the actual events which take place in the physical school environment and the relationships established there significantly influence the appearance and/or prevention of problems like bullying, as has been described in different scientific studies in recent years (Bear et al., 2011). The elements most widely considered as being crucial to school climate and *convivencia* (harmony) have traditionally been teacher support (Haynes et al., 1997), consistency of rules (Cohen et al., 2009) and school safety problems (Astor, Benbenishty, Zeira, & Vinokur, 2002). These are vital for predicting bullying, and although both positive and negative interactions at school may to some extent be conducted using digital devices (Helweg-Larsen, Schütt, & Larsen, 2012), the quality of relationships, the clarity of the rules and safety in the school community continue to act either as catalysts or preventive factors with regard to the possible appearance of school bullying problems. One important aspect which should not be overlooked is empathy. As has been shown in other studies (Jolliffe & Farrington, 2011; McLaughlin, 2009), this too is closely linked with traditional bullying, and directly related to aggression. It can be said that this study confirms the predictive value of empathy with respect to the appearance and evolution of bullying (Gini et al., 2007).

ICTs have not substantially altered the relationship between school climate, empathy and bullying, but the work that has been carried out to date (Ttofi & Farrington, 2011) to analyze and combat the negative consequences of school bullying should nevertheless be continued. Although antibullying programs are not totally satisfactory, they do show that reducing aggressive conduct is a very complicated affair (Williams & Guerra, 2007) and that measures taken to improve school climate and/or empathy are almost the only way significantly to reduce or prevent victimization among schoolchildren. The results obtained in this study's first structural equation model reinforce this approach, the model's main function being to predict victimization roles in traditional bullying more clearly. On the basis of the empirical evidence ob-

tained, it is reasonable to assume that action taken to improve the key elements of school climate and *convivencia* is orientated more towards reducing or preventing victimization, as has been the case in the principal initiatives carried out to date (Ttofi & Farrington, 2011). However, the key aspects associated with reducing aggression in traditional bullying still need to be explored in greater depth.

With regard to the second hypothesis, in which perceived control over information on Internet and addiction to activities carried out in virtual environments are proposed as predictors for cyberbullying, our results confirmed our initial supposition. Cognitive distortion produced by excessive, impulsive or addictive use of Internet tends to increase episodes of violence (Beard & Wolf, 2001; Ybarra & Mitchell, 2004). The direct effect of addictive behavior on the aggression dimension in cyberbullying tallies to a certain extent with the results of studies which have found a relationship between violent conduct in traditional bullying and drug consumption or substance abuse (Torres, Cangas, García, Langer, & Zárate, 2012) and studies linking substance consumption to criminal or antisocial behavior (Bennett, Holloway, & Farrington, 2008). These results show that although Internet addiction has not been considered a psychopathological disorder (Block, 2008) comparable to psychoactive substance abuse or problem gambling, it is also closely and significantly related to cyberbullying. The relationship between substance abuse or addiction and the emergence of violence and behavioral problems has been extensively studied (Stone, Becker, Huber, & Catalano, 2012). In our opinion, research in this field should also address Internet addiction and the excessive use of digital devices as possible causes of violence in virtual environments.

Control of personal information on Internet, another of the aspects included in this second hypothesis, was shown to be a fundamental predictor of cyberbullying. Control of personal data is linked to high risk behavior online insofar that confidential information or compromising images may become accessible to exces-

sively large audiences. This aspect is usually overlooked in studies into traditional bullying, in which the impact of the personal information the victim makes available to the aggressor is largely uncontrollable. In the virtual environment, however, and especially in popular social networks, young people may easily prioritize their desire for popularity at the expense of their privacy. The continuous sharing of personal information, images, videos and other data has become an important part of cyber-behavior which is only now beginning to be studied and which would seem to explain why young people do not adopt safety measures to protect themselves from online attacks (Gradinger, Strohmeier, Schiller, Stefanek, & Spiel, 2012). To judge from our results, and as has also been observed in other studies (Sengupta & Chaudhuri, 2011), such lack of control over personal information acts a strong predictor of cyberbullying, and measures should be implemented to raise young Internet users' awareness of the consequences of using personal information inappropriately or making it accessible to too many people online.

Similarly, although some researchers have concluded that cyberbullying has little in common with traditional bullying because certain predictors are not shared by both forms of abuse (Hemphill et al., 2012; Law, Shapka, Domene, et al., 2012; Ortega et al., 2012), the results obtained in the structural equation model we created to corroborate the third hypothesis (that predictor variables for bullying and cyberbullying may be interrelated) suggested a close relationship between the two. The scientific debate over whether cyberbullying is actually just another form of traditional bullying (Law, Shapka, Hymel, et al., 2012; Slonje & Smith, 2008) was therefore revived, since our results showed how direct predictor variables for cyberbullying conducted via electronic channels are predicted by involvement in traditional bullying or by the school climate in which the social interaction takes place. One example is the way teacher support and perceived safety problems predict involvement in cyberbullying. It can therefore be argued that young people's online behavior is no different from their conduct in their offline lives, as has been indicated in other studies (Subrahmanyam, Reich, Waechter, & Espinoza, 2008), and that boys and girls involved in bullying are very highly likely to become involved in cyberbullying – although this does not occur the other way round (Del Rey, Elipe, & Ortega, 2012). Traditional bullying evidently tends to “occupy” other scenarios, such as the virtual environment, whereas, in contrast, involvement in cyberbullying does not seem to “evolve” towards involvement in traditional bullying. One possible explanation for this is that cyberbullying situations coexist and evolve in parallel with situations of traditional bullying, whereas traditional bullying do not necessarily extend beyond the actual school environment (Wang, Iannotti, Luk, & Nansel, 2010). The influence of cyberbullying in offline life should not, however, be overlooked (Gradinger, Strohmeier, & Spiel, 2009), because involvement in cyberbullying predicts negative interactions at school. While the school environment influences young people's behavior online, it has been shown that online conduct also has its consequences in their positive and negative interactions at school, as reported by (Smahel, Brown, & Bliska, 2012).

Like the first two models, our third model also indicated a greater predictive relevance of victimization. Indeed the interacting factors and variables analyzed in this study could be said to offer a greater insight into victimization and cyber-victimization than into aggression, whether in traditional bullying or cyberbullying. All this concurs with the results obtained in the most successful anti-bullying programs, which achieve significant reductions in victimization (Ttofi & Farrington, 2011) but not in aggression. To predict aggression and cyber-aggression it may be necessary to include more personality-related variables in research design. In fact our results identified empathy and Internet addiction as variables with

direct predictive value regarding aggression. Personality variables like empathy have been shown to be closely linked to certain impulsive personality traits (Oliva, Parra, & Sánchez-Queija, 2008), and certain personality patterns can therefore be considered indicators of risk and should be taken into account when attempting to prevent or alleviate aggressiveness in bullying or cyberbullying (Fanti, Demetriou, & Hawa, 2012).

This study's main limitations stem from the transversal nature of the analysis, which to a certain extent restricts causal inferences, although the reliability and validity of the predictive analyses we used could only have been improved using longitudinal studies (Wang, Iannotti, & Luk, 2012). The use of self-report questionnaires may produce a certain amount of social desirability bias when addressing violent conduct, but some studies have demonstrated the validity of data gathered in this manner. Nevertheless, we should not overlook the serious limitations of such questionnaires (Rosenbaum, 2009).

## 7. Conclusion

Having carried out this study we can conclude that bullying, whether traditional or perpetrated using digital devices, is strongly influenced by direct personal and contextual factors. This is true in both the physical school environment and in virtual environments, and there is a clear overlap between these two areas. Although the models described very effectively explain victimization in both types of abuse, the evidence we found of interconnections between the two leads us to assume that educational programs aimed at preventing bullying may also play an important role in preventing cyberbullying, since the different factors involved – personality (empathy), contextual (school climate) and roles (victimization/aggression) – are closely interlinked in both types of phenomena. This does not mean that there is no need to design, implement and evaluate specific programs aimed at preventing cyberbullying (Del Rey, Casas, et al., 2012; Pearce et al., 2011) it merely indicates that the positive effect of measures which have proved effective in preventing and alleviating traditional bullying – above all programs affecting school environments – are equally positive as a means of preventing cyber-victimization.

## Acknowledgments

This work was produced as part of the projects:

- “Cyberbullying in adolescence: investigation and intervention in six European Countries” (JLS/2008/CFP1DAP12008-), funded by European Union, DAPHNE III Program.
- VIEJUCO: “Violencia Escolar y Juvenil: riesgos del cortejo violento, la agresión sexual y el cyberbullying (“School and Juvenile Violence: risks of violent dating, sexual aggression and cyberbullying”) (I+D+D-2010-17246 – National R&D Plan, Spain).
- CYBERCOPING “Coping with Cyberbullying: Analysis of Strategies used and their Impact assessment” (Excelencia Junta Andalucía SEJ-6156). The authors would like to thank these agencies for their funding.

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