



# Cyberbullying through the lens of social influence: Predicting cyberbullying perpetration from perceived peer-norm, cyberspace regulations and ingroup processes

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## ABSTRACT

In the present research we analyzed the social influence mechanisms that back the relation between peer group norms regarding cyberbullying behaviors and individual cyberbullying perpetration. In a sample of adolescents ( $N = 3511$ , age:  $M = 16.27$ ,  $SD = 1.58$ ), we showed that the relation between perceived peer-norm and cyberbullying perpetration was moderated by two distinct social influence mechanisms. Specifically, when individuals' lack of knowledge regarding appropriate behaviors in cyberspace (i.e., cyberspace regulations), levels of perceived peer-norm regarding cyberbullying behaviors positively influence the participants' engagement in cyberbullying perpetration (i.e., *informational social influence*). Moreover, we showed that the higher the support of perceived peer-norm regarding cyberbullying behaviors the higher the levels of cyberbullying perpetration, especially for the higher (vs. lower) levels of identification with peers as the ingroup; this relation was additionally enhanced at increasing levels of adolescents' *ingroup prototypicality* (i.e., *referential informative social influence*). The results demonstrated that the two social influence mechanisms work independently and likely contribute to predict participants' engagement in cyberbullying perpetration. Results are discussed with respect to the current literature regarding the social influence mechanisms underlying cyberbullying. The implications of these findings for practical interventions are explored.

## 1. Introduction

The use of electronic technologies to communicate (e.g., SMS, email, social networks, digital imaging, and online games) is widely disseminated in Western society (Li, Smith, & Cross, 2012). Although electronic communication might improve individual interactions (Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Kowalski, Limber, & McCord, 2019), it has also offered individuals a virtual arena in which to engage in discriminatory behaviors in general, and cyberbullying in particular (Kowalski et al., 2014; Li et al., 2012). According to Smith et al. (2008, p. 376), cyberbullying refers to “an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him- or herself”. This definition has further been elaborated on in additional theoretical and empirical works. First, although cyberbullying typically occurs via electronic forms of contact, it is not limited to cyberspace and can also involve direct forms of bullying (Beran & Li, 2008; Langos, 2012). Second, while some authors argue

that the repetition of cyberbullying acts is a constituent feature of the definition of cyberbullying (DeSmet et al., 2014; Nocentini et al., 2010; Schultze-Krumbholz et al., 2015), other scholars claim that posting content online, for instance, might be seen *per se* as a form of repetition since this content can be viewed and forwarded repeatedly without the active contribution of the perpetrator (Kowalski, Limber, & Agatston, 2008; Menesini & Nocentini, 2009; Schultze-Krumbholz et al., 2015). Although some authors consider the repetition of cyberbullying an informative element to the perceived gravity of cyberbullying incidents, these scholars do not consider repetition a key feature in the definition of cyberbullying (DeSmet et al., 2014; Kiriakidis & Kavoura, 2010; Tokunaga, 2010). Third, the relationship between the cyberbullying perpetrator and victim is characterized by a power imbalance that sees, at least in certain cases, an advantage of the perpetrator over the victim. However, the power imbalance between the cyberbullying perpetrator and victim also depends on their technical abilities with information communication technologies (e.g., Brighi, Menin, Skrzypiec, & Guarini, 2019; Del Rey et al., 2015; Hinduja & Patchin, 2008; Menesini &

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Nocentini, 2009; Pozzoli & Gini, 2019; Vandebosch & Van Cleemput, 2008). Moreover, the anonymity provided by the electronic technologies can also help create a power advantage for the victims to get revenge on their perpetrators (DeHue, Bolman, & Völlink, 2008; Li, 2007; Schenk & Fremouw, 2012; Ybarra & Mitchell, 2004).

Cyberbullying can take distinct forms, including *harassment* (i.e., sending offensive and vulgar messages to a target), *exclusion* (i.e., marginalizing and/or excluding a target from a group), *impersonation* (i.e., stealing a target's credentials and taking over their profiles), *outing and trickery* (i.e., sharing a target's personal data and information without consent, see Pyżalski, 2012; Willard, 2007).

The prevalence of cyberbullying has been demonstrated in several studies and in different geographical areas (Görzig & Frumkin, 2013; Lobe, Livingstone, Olafsson, & Vodeb, 2011). However, the prevalence of cyberbullying varies across studies depending on the cultural contexts, the characteristics of the research samples (Kowalski et al., 2019), the methodological issues, such as the definition of phenomenon (Brighi, Menin, Skrzypiec, & Guarini, 2019, p. 2), the recall period (e.g., last year vs. last month; Brochado, Soares, & Fraga, 2017, p. 527), the conservative versus liberal criterion employed to estimate the occurrence of cyberbullying (Kowalski et al., 2019), and the assessment instruments (Brochado et al., 2017).

In a recent review across 159 studies, Brochado et al. (2017) demonstrated that rates of the prevalence of cyberbullying perpetration within one year ranged from 3.0% to 39.0%, and the rates of the prevalence of cyberbullying victimization ranged from 1.0% to 61.1% (see, also Arnarsson et al., 2019; Gaffney, Farrington, Espelage, & Ttofi, 2018; Jadambaa et al., 2019; Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014).

Moreover, the National Crime Prevention Council and Harris Interactive have reported that over 40% of American adolescents are the victims of cyberbullying (Bhat, 2008). In the European context, 18% of Internet-using children have experienced cyberbullying and online harassment (Hasebrink, Livingstone, Haddon, & Ólafsson, 2009). The “EU Kids Online” study of over 25,000 young individuals (age range: 9 to 16) in 25 European countries showed that 19% of children reported that they have experienced cyberbullying perpetration (Lobe, Livingstone, Ólafsson, & Vodeb, 2011). In Belgium, one third of the interviewed students indicated that they have been the victims of cyberbullying, and approximately one fifth of students interviewed reported that they have engaged in cyberbullying behaviors (Walrave & Heirman, 2011). Similarly, in the Italian context, which is the setting of the current research, 22.4% of Italian adolescents declared that they have been the victim of cyberbullying at least once (Brighi, Guarini, Melotti, Galli, & Genta, 2012; Genta, Brighi, & Guarini, 2009; Istituto Nazionale di Statistica, 2014).

Given the pervasiveness of cyberbullying, several studies have attempted to better understand the psychological correlates of cyberbullying perpetration and the role of contextual variables in promoting/inhibiting cyberbullying perpetration (Calvete, Orue, Estévez, Villardón, & Padilla, 2010; Fanti, Demetriou, & Hawa, 2012; Ubertini, 2011; Williams & Guerra, 2007). Among the contextual variables, social influence processes in general, and peer group influence in particular have been found to play a pivotal role in promoting cyberbullying behaviors (Duffy & Nesdale, 2009; 2010; Festl, Scharnow, & Quandt, 2013; Hinduja & Patchin, 2013; Pabian & Vandebosch, 2014; Sasson & Mesch, 2014; 2017). Social influence occurs when individuals shape their behaviors, beliefs, and attitudes by complying with group expectations (Deutsch & Gerard, 1955). Research addressing the relationship between social influence and cyberbullying behaviors has shown that adolescents who expect the peer group to condone, rather than condemn cyberbullying (i.e., peer group norm), also display high levels of intention to engage in cyberbullying behaviors (Heirman & Walrave, 2012; Hinduja & Patchin, 2013). Similarly, the stronger the perceived support by the peer group to engage in cyberbullying, the higher the frequency of being involved in cyberbullying acts as

perpetrators (Pabian & Vandebosch, 2014). Together these findings suggested that the peer group norm concerning cyberbullying behaviors shapes the proclivity of adolescents to engage in acts of cyberbullying (Hinduja & Patchin, 2013; Sasson & Mesch, 2017).

Despite these findings testifying to the role of peer group norms in determining cyberbullying perpetration, the aforementioned studies failed to highlight the psychological processes that may account for the relation between peer group norms and cyberbullying. The current research intends to fill this gap by addressing the specific social and cognitive underpinnings of the relation between cyberbullying peer group norms and adolescents' tendency to engage in cyberbullying behaviors.

### 1.1. Mechanisms of social influence

Accumulated evidence in social psychology has demonstrated that at least two mechanisms could account for the impact of group norms on one's own behavior, namely the *informational* and *referential informative social influence* (Abrams & Hogg, 1990; Deutsch & Gerard, 1955).

To navigate the social environment, individuals may experience subjective uncertainty concerning the correctness of their attitudinal and behavioral position, especially when they come across situations that involve a different degree of ambiguity. In such situations, individuals likely engage in social comparisons with others to verify the correctness of their attitudes (Cialdini, 1993; Festinger, Schacter, & Back, 1950). This process of social comparison is backed by the individuals' motivation to gain accurate beliefs about social reality. In such a case, individuals may take on the group norm as a way to gain an appropriate appraisal of a given attitudinal object. This process is referred to as informational social influence. The informational social influence is driven by individuals' beliefs in the validity of the views of others, and by a subjective and genuine reason to agree with others' attitudinal positions (Abrams & Hogg, 1990). In sum, informational social influence claims that individuals adopt others' beliefs and behaviors because they consider others' attitudes, beliefs and behaviors as a valid interpretation of reality. The reason to agree with the source of influence is especially enhanced when the individual target of influence lacks personal knowledge regarding a given attitudinal object (Allen, 1965; French & Raven, 1959).

Another psychological process that may account for the social influence of group norms on individuals' behaviors is the referential informative social influence (Abrams & Hogg, 1990; Hogg, Abrams, Otten, & Hinkle, 2004), which stems from the Self-Categorization Theory (i.e., SCT, Turner, 1985; 1991). SCT suggests that individuals constantly categorize themselves and derive self-representation from the representation of the category in which the self is included, namely the ingroup. By categorizing the self into an ingroup, the representation of the self shifts from an individual-based identity (i.e., the individual as a unique person in comparison to other individuals) to a group-based identity, also referred to as social identity (i.e., the part of the individual's self-concept that derives from membership in a significant social group). The referential informative social influence considers the social influence process as an intra-group outcome. Specifically, the referential informative social influence claims that social identity allows one to discover the ingroup norms through observation, interaction with other ingroup members, and assignment of the ingroup norms to the self. In so doing, group members adopt the ingroup norms as valid standards to shape one's own attitudes, beliefs, and behaviors. Moreover, adopting the ingroup norms allows members to be truly recognized as members of that group by external observers (Carnaghi & Yzerbyt, 2006; 2007).

The referential informative social influence is moderated by two psychological factors, namely ingroup prototypicality and ingroup identification. Despite ingroup prototypicality and ingroup identification representing two different constructs of social identity (Kashima,

Kashima, & Hardie, 2000), they jointly contribute to align group members' behaviors with ingroup norms (Goode, Balzarini, & Smith, 2014; Jetten & Spears, 2003; Jetten, Spears, & Manstead, 1997). First, the ingroup prototypicality of a given member refers to the position that an individual holds within the ingroup, thus reflecting the extent to which the member is a *central* or *peripheral* member (Jetten et al., 1997; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987; Turner, 1991). Central members, more so than peripheral members are motivated to comply with and thus support the ingroup norms by behaving accordingly (Hogg, 2007; Jetten et al., 1997). In a relevant study, Duffy and Nesdale (2010; see also Duffy & Nesdale, 2009) experimentally manipulated the adolescent ingroup norms (aggression vs. helping behaviors), adolescents' ingroup prototypicality (central vs. peripheral) and assessed participants' aggressive intention. Results showed that compared to peripheral participants, central participants reported more aggressive intention only when the ingroup norms promoted aggression. Together these findings indicated that central members are motivated to maintain the ingroup norms and are more likely to engage in ingroup normative behaviors compared to peripheral members.

Second, ingroup identification is defined as the importance of the ingroup to define one's self-representation, the sense of connectedness one feels towards other members, and the affective reactions triggered by belonging to this ingroup (Jetten et al., 1997; Turner, 1991; Turner et al., 1987). Empirical evidence has shown that increased levels of ingroup identification are associated with stronger ingroup normative behaviors. For instance, Terry and Hogg (1996) showed that participants' behavioral intentions are more aligned with the perceived ingroup norms (i.e., frequency of physical exercise per week), when participants display high, compared to low levels of ingroup identification (for similar results, see also Schmitt & Branscombe, 2001).

The current research recasts the analysis of cyberbullying within the frame of social influence theory, thus broadening the understanding of the manner in which peer group norms contribute to the emergence and enactment of cyberbullying behaviors. Specifically, and in line with the two different social influence mechanisms discussed above, we first analyzed cyberbullying perpetration as a potential product of the *informational social influence* as well as of the *referential informative social influence* mechanism. Based on these analyses, we derived specific hypotheses concerning the manner in which peer norms concerning cyberbullying are associated with personal engagement in cyberbullying acts.

### 1.2. Social processes in the context of cyberbullying

The significance of the group norm in regards to the perpetration of cyberbullying can be derived by two distinct models of social influence. First, and in line with the *informational social influence* mechanism, it might be plausible that when adolescents lack knowledge about appropriate behavior in cyberspace, such as the laws ruling the use of cyberspace, they might experience a certain degree of uncertainty in regard to acceptable behaviors in such a virtual environment. In this situation, adolescents could rely on the group peer norms about cyberbullying acts and behave accordingly. If this is the case, it could be possible that the stronger the support of the group peer norms to cyberbullying behaviors, the higher the engagement in cyberbullying perpetration, accompanied by decreased levels of knowledge about laws ruling the use of cyberspace. Second, and consistent with the *referential informative social influence* mechanism, it might be plausible that the stronger the support of the group peer norms to cyberbullying behaviors, the stronger the participants' engagement in cyberbullying perpetration, and this association could be moderated by participants' level of ingroup identification and ingroup prototypicality. Specifically, higher levels of ingroup identification could strengthen the association between cyberbullying group norms and participants' engagement in cyberbullying perpetration, and this association would be enhanced at increasing levels of ingroup prototypicality.

Moreover, cyberbullying is a multidimensional social process which theoretically and empirically comprises both cyber-perpetration and cyber-victimization (Baldry, Farrington, & Sorrentino, 2015; Del Rey et al., 2015; Festl, Vogelgesang, Scharnow, & Quandt, 2017; Kowalski et al., 2014; Rice et al., 2015; Schultze-Krumholz et al., 2015; Smith et al., 2008; Ybarra & Mitchell, 2004). Indeed, individuals who are the perpetrator can also be the victim of cyberbullying, and vice versa (Espelage & Swearer, 2003; Gradinger, Strohmeier, & Spiel, 2009; Kowalski et al., 2014; Li, 2007; Smith et al., 2008; Walrave & Heirman, 2011; Yang & Salmivalli, 2013; Ybarra & Mitchell, 2004).

The analysis of the bystander perspective is of particular importance with respect to the emergence of the peer norms, and contributes to gaining a broader understanding of the social influence processes within the group of peers. Indeed, the cyberbullying does not occur in isolation but may, at least in certain cases, extend outside the perpetrator and victim setting and may include the bystander. Individual members typically discover and then endorse group norms by comparing their attitudinal positions and behaviors with peers' attitudes and behaviors (Abrams & Hogg, 1990; Hogg et al., 2004; Pozzoli & Gini, 2010). Hence, witnessing cyberbullying behaviors, as in the case of the bystander, may contribute to the discovery and then the endorsement of the peer group norm concerning cyberbullying. Also, and by behaving according to the group norm (e.g., do not intervene and allow cyberbullying aggression to continue), the bystander plays a significant role in maintaining and reinforcing bullying behaviors in general (Craig, Pepler, & Atlas, 2000; DeSmet et al., 2014; Oh & Hazler, 2009; O'Connell, Pepler, & Craig, 1999; Salmivalli, 1999) and cyberbullying in particular (Bastiaensens et al., 2016).

### 1.3. The present study

In the current study, given the dynamic and social nature of cyberbullying, we assessed the *cyberbullying perpetration*, *cyber-victim perspective*, and the *cyber-bystander perspective*. Moreover, and given the focus of the current research on the effect of group norms on group members' behavior, participants' perception of the extent to which ingroup friends accepted and promote cyberbullying behaviors was assessed (i.e., *peer norm*). Previous research measuring the ingroup norm typically presented participants with a list of behaviors relevant to the research aim, and asked participants about the extent to which these behaviors were approved of by the ingroup (Baker & White, 2010; Hamilton & White, 2008; Louis, Taylor, & Douglas, 2005; White, Hogg, & Terry, 2002; White, Smith, Terry, Greenslade, & McKimmie, 2009). It is worth noting that this measure allows researchers to adjust the type of ingroup according to the referent group under investigation, that being friends, for example (Baker & White, 2010; Hamilton & White, 2008; Sasson & Mesch, 2014; 2017) parents (Liu, Fang, Deng, & Zhang, 2012; Malcolm et al., 2013). Also, the selected behaviors entered in the perceived peer-norm measure were the same as those used to assess participants' personal engagement in those behaviors (i.e., cyberbullying perpetration). This procedure is required when intending to assess the relation between ingroup norm and personal behaviors (Terry & Hogg, 1996). Different studies have adopted this procedure concerning the assessment of the ingroup norm related to specific behaviors and participants' engagement in these behaviors (Baker & White, 2010; Hamilton & White, 2008; White et al., 2009), thus attesting to the robustness of this assessment procedure.

Moreover, and in line with our claim that adolescents may rely on peer norms concerning cyberbullying behaviors, especially when they lack knowledge about appropriate behavior in a virtual environment in general, and about the laws ruling the use of cyberspace in particular (i.e., *informational social influence*), in the current study we assessed participants' knowledge regarding the laws ruling the use of cyberspace (i.e., *cyberspace regulations*). In particular, participants were presented with behaviors which take place in cyberspace and they were asked to indicate whether, in their view, each of the behaviors was legal or



illegal according to Italian law. Hence, we *ad hoc* created the *cyberbullying regulations* measure. Taking into account that, at least from a socio-cognitive perspective, social knowledge is typically structured upon content and evaluative components (Dovidio, Evans, & Tyler, 1986; Fiske, 1982), we assessed participants' knowledge to correctly detect illegal cyberbullying behaviors (i.e., content-based component) and the anticipated seriousness of the outcome related to engaging in such behaviors (evaluative components).

In line with the informational social influence mechanism (Abrams & Hogg, 1990) we hypothesized a *significant perceived peer-norm by cyber-space regulations interaction in predicting cyberbullying perpetration* (i.e., the outcome variable). Specifically, we hypothesized that *the higher the level of perceived peer-norm, the higher the level of cyber-bullying perpetration at decreasing levels of cyberspace regulations* (Hypothesis 1).

Moreover, we assert that, and in line with the *referential informative social influence* mechanism, two important indicators of social identity may moderate the relationship between peer norm and cyber bullying behaviors, namely *ingroup prototypicality* and *ingroup identification*. These variables are of particular importance since the *referential informative social influence* suggests that the compliance with the peer norm is a product of intra-group dynamics, whereby ingroup members endorse the peer norm to the extent to which they identify with the ingroup and occupy a central role within the ingroup. Hence, the assessment of *ingroup prototypicality* and *ingroup identification* appears to be necessary in order to analyze the validity of the *referential informative social influence* mechanism in accounting for *cyberbullying perpetration*. Specifically, individuals' self-perception of their representative position within the peer group was measured to assess participants' ingroup-perceived level of prototypicality (i.e., *ingroup prototypicality*). In social psychology, the ingroup-perceived level of prototypicality was assessed by a single item developed by Jetten et al. (1997) and subsequently used in various social psychology studies (see also Easterbrook & Vignoles, 2013; Méndez, Gómez, & Tropp, 2007). The psychometric validation of this single item measure of prototypicality has been supported by various studies (Easterbrook & Vignoles, 2013; Jetten et al., 2007; Méndez et al., 2007; Obst, White, Mayor, & Baker, 2011). Indeed, previous studies that relied on the single item measure showed that ingroup-perceived level of prototypicality was positively associated with the relevant dimension of the social identity (e.g., cognitive centrality, Obst, White, Mavor, & Baker, 2011).

Moreover, two indicators of ingroup identification were also employed in the current study. Specifically, we assessed two relevant dimensions of ingroup identification, namely cognitive identification (i.e., the overlapping of the self with the peer group) and affective identification (i.e., the feelings of belongingness to the peer group). In particular, the Inclusion of the Other in the Self scale (i.e., IOS; Aron, Aron, & Smollan, 1992) was used in the current research as a cognitive-based identification measure. The rationale that backs this measure is that the cognitive representation of the self can be socially expanded to other individuals (Aron, Aron, Tudor, & Nelson, 1991). This assumption has been further elaborated by social psychologists working in the SIT (Tajfel & Turner, 1979) and SCT (Turner et al., 1987). Indeed, and according to these theories, the self can be expanded at various levels of inclusion, spanning from the individual to the group level. As far as the group level is concerned, the self is defined as similar and equivalent to a given group (i.e., ingroup) in contrast to an alternative group (i.e., outgroup; Turner et al., 1987). In agreement with, Tropp and Wright (2001) suggested the Inclusion of the Ingroup in the Self (i.e., IIS; Tropp & Wright, 2001) as an adapted version of the IOS. The psychometric validation of this single item measure of ingroup identification has been supported by other studies (Schubert & Otten, 2002; Tropp & Wright, 2001). Specifically, IIS was found to be significantly correlated with the similarity of descriptive characteristics attributed to the self and to the ingroup (Tropp & Wright, 2001). In a discriminant analyses, Schubert and Otten (2002) showed that the IIS was a valid tool to assess the cognitive, but not the evaluative, component of the general construct of

ingroup identification, which, in the quoted research, was assessed with a traditional self-reported measure of ingroup identification (Klink, Mummendey, Mielke, & Blanz, 1998).

As previously mentioned, the general construct of ingroup identification is multidimensional, as it includes both the cognitive and affective components. Hence, we decided to rely also on an affective-based identification measure, given that the IIS scale was specifically tied to assess the cognitive component of ingroup identification. In this respect, the ingroup identification scale developed by Kiesner, Cadinu, Poulin, and Bucci (2002) meets our requirement to adopt an assessment tool of the affective-based ingroup identification.

Grounded in the referential informative social influence mechanism (Abrams & Hogg, 1990; Hogg et al., 2004), which stems from Self Categorization Theory (Turner, 1985; 1991) we hypothesized a *significant interaction between perceived peer-norm, ingroup identification and ingroup prototypicality in predicting cyberbullying perpetration*. Specifically, we hypothesized that *the higher the level of perceived cyber friend norm, the higher the level of cyberbullying perpetration at increasing levels of ingroup identification and ingroup prototypicality* (Hypothesis 2).

Finally, habits regarding Smartphone/Internet use and demographic measures (i.e., gender, age, and parents' level of education) were assessed in the current study and then employed as control variables in the statistical analyses, since previous theoretical and empirical efforts have suggested that these variables are relevant when analyzing the predictors of cyberbullying.

As for habits regarding Smartphone/Internet use, previous studies showed that the higher the frequency of Smartphone/Internet use, the higher the probability of engaging in cyberbullying behaviors (Mishna, Khoury-Kassabri, Gadalla, & Daciuk, 2012; Rice et al., 2015; Ybarra & Mitchell, 2004).

As for the association between participants' gender and cyberbullying perpetration, research in the international (Aricak et al., 2008; Smith, 2012; Walrave & Heirman, 2011; Wang, Iannotti, & Nansel, 2009) as well as in the Italian context (Baroncelli & Ciucci, 2014; Guarini, Passini, Melotti, & Brighi, 2012; Palermi, Servidio, Bartolo, & Costabile, 2017) has found that boys engage in cyberbullying behaviors as perpetrators more than girls. However, other results did not show any significant association between participant gender and cyberbullying perpetration (DeHue et al., 2008; Griesel, Finger, Bodkin-Andrews, Craven, & Yeung, 2012; Hinduja & Patchin, 2008; Menesini, Nocentini, & Camodeca, 2013; Smith et al., 2008; Williams & Guerra, 2007; Ybarra & Mitchell, 2004). Taking into consideration that research findings on this issue were not entirely coherent (Baroncelli & Ciucci, 2014; DeHue et al., 2008; Griesel et al., 2012; Guarini et al., 2012; Hinduja & Patchin, 2008; Menesini et al., 2013; Palermi et al., 2017; Smith, 2012; Smith et al., 2008; Walrave & Heirman, 2011; Wang et al., 2009; Williams & Guerra, 2007; Ybarra & Mitchell, 2004), we explored the association between gender and cyberbullying perpetration.

As far as the relation between participants' age and participants' engagement in cyberbullying perpetration was concerned, empirical evidence has shown that the older the participants, the higher the probability of engaging in cyberbullying behaviors (Hinduja & Patchin, 2008; Kowalski & Limber, 2007; Ybarra, Mitchell, Finkelhor, & Wolak, 2007; Ybarra, Mitchell, Wolak, & Finkelhor, 2006). However, additional research has shown that younger adolescents were more frequently inclined to engage in cyberbullying behaviors than older adolescents (DeHue et al., 2008; Ševčíková & Šmahel, 2009). Given the alternative patterns of the association between participants' age and participants' engaging in cyberbullying perpetration, the current research explored whether the two variables were or were not significantly associated (Patchin & Hinduja, 2008; Smith et al., 2008), and if a significant association occurred, whether an increased level of participants' age corresponded to either increased (Hinduja & Patchin, 2008; Kowalski & Limber, 2007; Walrave & Heirman, 2011; Ybarra et al., 2006, 2007; Ybarra & Mitchell, 2004) or decreased (DeHue et al., 2008; Ševčíková & Šmahel, 2009) levels of cyberbullying perpetration.

Finally, participants were asked to report their parents' level of education. In a few studies, this variable was assessed to describe the sample but was not used as a predictor of cyberbullying perpetration, namely the outcome variable (Brighi et al., 2012). Additional studies showed that parental level of education did not affect cyberbullying behaviors (Makri-Botsari & Karagianni, 2014), while other findings showed that participants with at least one parent with a higher level of education, were less often perpetrators than students whose parents do not have a high degree of education (Låftman, Modin, & Östberg, 2013). Given the limited evidence on the relation between parents' level of education and cyberbullying perpetration, we made an exploratory test of the association between these two variables, knowing that previous research suggested that either no association occurred between parents' level of education and cyberbullying perpetration or if enhanced levels of parent's education corresponded lower levels of engagement in cyberbullying perpetration.

## 2. Method

### 2.1. Participants

We recruited  $N = 3511$  students ( $n = 1916$  female students,  $n = 1489$  male students,  $n = 106$  did not report their gender) from nineteen high schools in north Italy that voluntarily took part in the research. Participants' age ranged from 13 to 22 ( $M = 16.27$ ,  $SD = 1.58$ ;  $n = 150$  did not report their age). Moreover, 28,3% of participants were first-year students (year 10 in the English Education System), 16,7% of respondents were second-year students, 35,2% of participants were third-year students, and 16,5% of respondents were fourth-year students. Finally, 3,4% of respondents did not report their year.

### 2.2. Procedure

This study received ethical approval from the University Ethics Committee. Secondary schools were contacted and consent was obtained from the school board. The study was presented as a research on 'the use of new media and social behaviors'. Parental consent was given before students' participation in the study. The study was organized in a computer classroom within the school. Data were collected through anonymous self-report questionnaire during school hours via a Web survey (i.e., SurveyMonkey). Participants were asked to fill in the questionnaire individually after providing their informed written consent. The questionnaire took approximately 30 min to administer.

### 2.3. Measures

**Cyberbullying perpetration.** The cyberbullying perpetration measure comprised five statements that described five distinct forms of cyberbullying behaviors (all items are given in the Appendix). For instance, participants were asked how often in the last year, via Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social networks (e.g., Facebook, Instagram, Snapchat), they: a) sent offensive and/or vulgar messages to somebody, b) published someone's personal details without consent. Participants rated their answers on a 5-point scale, ranging from 1 (= *never*) to 5 (= *always*). Higher scores on this measure were related to a higher frequency of cyberbullying perpetration. Participants' ratings on cyberbullying perpetration measure reached a good level of reliability:  $\alpha = 0.69$ .

**Cyber-victim perspective.** The same five items of cyberbullying perpetration were adapted to assess the frequency of being cyberbullied via instant messaging, email and social networks (e.g., I have received offensive and/or vulgar messages from someone; Someone published my personal details without my consent; all items are presented in the Appendix). Participants rated their answers on a 5-point scale, ranging from 1 (= *never*) to 5 (= *always*). Participants' ratings on the cyber-

victim perspective reached a good level of reliability:  $\alpha = 0.70$ .

**Cyber-bystander perspective.** As for cyber-bystander perspective, the five items of cyberbullying perpetration were adapted to assess the frequency of witnessing cyberbullying behaviors via instant messaging, email and social networks. (e.g., I have read offensive and/or vulgar messages addressed to someone who was not me; I have read details on the private life of someone who was not me; all items are reported in the Appendix). Participants rated their answers on a 5-point scale, ranging from 1 (= *never*) to 5 (= *always*). Participants' ratings on cyber-bystander perspective reached a good level of reliability:  $\alpha = 0.77$ .

**Perceived peer-norm.** We measured the perceived peer-norm by using a scale that comprised five items (for a similar measure, see Sasson & Mesch, 2017; all items are reported in the Appendix). Specifically, we presented participants with exactly the same behaviors as those employed in cyberbullying perpetration, the cyber-victim perspective and cyber-bystander perspective, and asked them to indicate the extent to which these behaviors were approved of by their friends, with whom participants were in contact via instant messages, email and social network (e.g., 'How many of your friends approve of/tolerate someone who posts personal details online of someone else using a Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social network (e.g., Facebook, Instagram, Snapchat)?'; How many of your friends approve of/tolerate someone who send an offensive and vulgar message to somebody using a Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social network (e.g., Facebook, Instagram, Snapchat)?' Participants reported their answers on a 5-point scale, ranging from 1 (= *none of my friends*) to 5 (= *all of my friends*). Higher values indicated higher perceived acceptance of cyberbullying behaviors by the peer group. Participants' ratings on perceived peer-norm reached a good level of reliability:  $\alpha = 0.78$ .

**Cyberspace regulations.** Participants were presented with nine behaviors which take place in cyberspace and they were asked to indicate whether, as far as they knew, each behavior was legal or illegal according to Italian law. For each behavior, participants were asked to provide their answers by means of a binary-choice format: *no, it is not legal* vs. *yes, it is legal*. Among these behaviors, six were illegal in the Italian contexts. Importantly, among these six behaviors, three concerned cyberbullying behaviors (e.g., Gaining access to the credentials of someone without permission and acquiring their profiles; i.e., *legal knowledge of cyberbullying behaviors*). The other three behaviors employed as control variables, were also illegal but not related to cyberbullying and instead associated with other domains of the Web (e.g., Downloading books from the Internet without paying royalties; i.e., *legal knowledge of Internet behaviors*). Finally, three behaviors which were not illegal (e.g., Writing a slur word on social networks). All items are presented in the Appendix. Importantly, these three items were entered as filler items and were not further considered in the analyses. For both scale measuring participants' *legal knowledge of cyberbullying behaviors* and *legal knowledge of Internet behaviors*, we assigned the value 1 to participants' correct answer and the value 0 to wrong answers. By summing participants' correct identification of knowledge of cyberbullying behaviors as illegal, scores can range from zero to three (i.e., higher scores indicated higher levels of legal knowledge of cyberbullying behaviors). Similarly, by summing participants' correct identification of knowledge regarding Internet behaviors as illegal, scores ranged from zero to three (i.e., higher scores pointed to higher levels of legal knowledge regarding Internet behaviors).

Finally, participants were asked to indicate the level of anticipated seriousness regarding engaging in the above-mentioned nine behaviors (all items are presented in the Appendix). Participants rated their answers on a 4-point scale, ranging from 1 (= *not at all serious*) to 4 (= *very serious*). Participants' ratings of the level of anticipated seriousness of the outcome related to engaging in cyberbullying behaviors ( $\alpha = 0.71$ ) as well as to Internet behaviors ( $\alpha = 0.71$ ) reached a reasonable level of reliability.

The correlation between the legal knowledge of cyberbullying

behaviors and the anticipated seriousness of the outcome related to engaging in cyberbullying behaviors as well as the correlation between the legal knowledge of Internet behaviors and the anticipated seriousness of the outcome related to engaging in Internet behaviors were positive and significant (see Table 2). We *z*-transformed the above-mentioned measures. We then averaged the legal knowledge of cyberbullying behaviors and the anticipated seriousness of the outcome related to engaging in cyberbullying behaviors thus forming a unique index of *cyberspace regulations*. Higher values indicated higher levels of participants' knowledge of *cyberspace regulations*. Also, we averaged the legal knowledge of Internet behaviors and the anticipated seriousness of the outcome related to engaging in Internet behaviors thus forming a unique index of *Internet regulations*. Higher values indicated higher levels of participants' knowledge of *Internet regulations*. The Internet regulations measure was employed as a control variable.

**Ingroup prototypicality.** The ingroup prototypicality with respect to friends, with whom participants were in contact via instant messages, email and social networks, as the ingroup, was measured using a single item (for a similar measure, see Jetten et al., 1997): 'Think of your group of friends with whom you are in contact through Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social networks (e.g., Facebook, Instagram, Snapchat). How much do you feel typical (i.e., characteristic) of this group of friends with whom you are in contact through Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social networks (e.g., Facebook, Instagram, Snapchat)?'. Participants rated their answers by using a 4-point scale, ranging from 1 (= *not at all typical*) to 4 (= *very much typical*). Higher values on this variable indicated higher levels of ingroup prototypicality.

**Ingroup identification.** Ingroup identification with friends as the ingroup was assessed using two measures. To assess cognitive identification, we relied on the Inclusion of the Ingroup in the Self (IIS; Tropp & Wright, 2001) single-item measure. The IIS displays seven Venn-like diagrams depicting increasing degrees of overlap between circles; one circle is labeled as representing the self, the other circle is labeled as representing the ingroup, which is the participants' friends. Participants chose the picture which best described the level of closeness with friends with whom they were in contact through Smartphone and Internet. The scale was scored from 1 (= *no overlap*) to 7 (= *almost complete overlap*).

To assess the affective ingroup identification, participants were asked to respond to eight statements assessing their level of identification with friends with whom they are in contact through Smartphone and Internet (e.g., "Is it important for you to belong to this group?", "Are you happy to be described as a member of this group?"; Kiesner et al., 2002). Participants rated their answer on 7-point scales, ranging from 1 (= *no, not at all*) to 7 (= *yes, very much*). Furthermore, participants' ratings on the affective ingroup identification reached a good level of reliability ( $\alpha = .88$ ). Since the two measures of identification were significantly and positively correlated (see Table 2), and following the procedures outlined by Tuscherer and Hugenberg (2014), the scores obtained by the IIS and affective ingroup identification measures were *z*-transformed and then averaged together, forming a unique index of *ingroup identification*.

**Habits regarding Smartphone/Internet use.** Participants were asked to indicate whether or not they have a Smartphone (i.e., *Yes* or *No*), whether or not they send or receive messages using a) a Smartphone, and b) Internet (i.e., *Yes* or *No*), and whether they were part of a group via a) Smartphone, and b) Internet (i.e., *Yes* or *No*). More importantly, and in line with the procedures outlined by Campfield (2008) participants were asked to report how often they used a) a Smartphone, and b) Internet on a weekly basis (e.g., *never, rarely, 1–3 times a week, 4–6 times a week, almost every day, every day*). Also, and separately for the Smartphone and Internet, participants reported the number of hours they used a) a Smartphone and b) the Internet daily (e.g., *never, less than an hour a day, 2–3 h a day, 4–6 h a day, more than 6 h a day*). First,

coherently with the contents of the measures pertaining to cyberbullying perpetration, cyber-victim and cyber-bystander perspective, which assessed cyberbullying via Smartphone together with Internet, participants' usage of a Smartphone on a daily basis and participants' usage of the Internet on a daily basis were averaged to obtain an overall assessment of the usage these devices per day. In a similar vein, by averaging the participants' usage of a Smartphone on a weekly basis and participants' usage of the Internet on a weekly basis, we obtained an overall assessment of the usage of these devices per week. According to participants' self-reports of Smartphone and Internet use, 96.5% of students reported owning a Smartphone, and 96.8% of the students in our sample send and receive text messages via Smartphone. Moreover, 89.5% of adolescents were part of a group via Smartphone. Furthermore, 88.9% of adolescents reported sending and receiving text messages via Internet and 62.2% of students were part of a group via Internet.

**Demographic measures.** Participants reported their gender, age, nationality, native language, the type of secondary school in which they were enrolled, the geographic location of the school (province), their class, and parents' level of education.

Except for the habits regarding Smartphone/Internet use and demographic measures that were always presented last, all the other measures were presented in a random order.

#### 2.4. Statistical approach

To test the tenability of the two hypotheses we carried out a series of multiple group path-analyses, within the framework of the *lavaan* package (Rosseel, 2012) for the R statistical program (R Core Team, 2018).<sup>1</sup> We implemented a Full Information Maximum Likelihood estimation with robust standard errors (Huber, 1967; White, 1980), and scaled test statistics (Yuan & Bentler, 1998). Goodness-of-fit indices are reported for model evaluation, and these indices were: Comparative Fit index – CFI (Bentler, 1990), Root Mean Square Error of Approximation –RMSEA (Schermelleh-Engel, Moosbrugger, & Müller, 2003; Steiger & Lind, 1980), and Standardized Root Mean Square Residual –SRMR. Excellent fitting models were indicated by  $CFI \geq .95$ ,  $RMSEA \leq .05$  (90th confidence interval  $< 0.07$ ), and  $SRMR \leq .08$  (Hu & Bentler, 1998; 1999). Chi-square difference tests ( $\chi^2_d$ ) were used to assess statistical significance between nested models resulting from the restrictions on selected parameters (Satorra & Bentler, 2001; 2010).

### 3. Results

#### 3.1. Descriptive results

Means and standard deviations, numbers of items, and Cronbach's alpha for the measures employed in the current research are shown in Table 1. Intercorrelations between the variables are presented in Table 2. Table 3 showed the frequency of cyberbullying perpetration, cyber-victim perspective, and cyber-bystander perspective. In general, 34.2% of the students reported that they had bullied someone at least sometimes in the last year, 38.3% of participants responded that they were bullied at least sometimes in the last year, and 77.1% of the students reported that they had witnessed cyberbullying behaviors at least sometimes in the last year.

#### 3.2. Multiple group path-analyses

In the first multiple groups model, based on three groups of cyberspace regulations, we regressed cyberbullying perpetration (i.e., the

<sup>1</sup> The authors preliminarily approached statistical analyses with hierarchical regression models and PROCESS (Hayes, 2013) available as supplementary material, replicating the results hereby presented.



**Table 1**  
Number of items, means, standard deviations, and alpha of the measures used in the study.

	N Items	$\alpha$	M	SD
Cyberbullying perpetration	5	.69	1.46	0.52
CYB_P1			1.82	0.97
CYB_P2			1.40	0.76
CYB_P3			1.49	0.75
CYB_P4			1.37	0.76
CYB_P5			1.23	0.60
Cyber-victim perspective	5	.70	1.52	0.56
CYB_V1			1.82	0.97
CYB_V2			1.44	0.78
CYB_V3			1.53	0.85
CYB_V4			1.56	0.87
CYB_V5			1.23	0.61
Cyber-bystander perspective	5	.77	2.24	0.76
CYB_B1			2.81	1.11
CYB_B2			2.14	1.09
CYB_B3			2.36	1.06
CYB_B4			2.17	1.09
CYB_B5			1.74	0.94
Perceived peer-norm	5	.78	1.84	0.69
NORM1			1.82	0.96
NORM2			1.73	0.92
NORM3			2.10	1.05
NORM4			2.02	0.94
NORM5			1.56	0.82
Cyberspace regulations				
legal knowledge of cyberbullying behaviors - legal/illegal	3	–	2.73	0.68
REGCYB_L1			–	–
REGCYB_L2			–	–
REGCYB_L3			–	–
legal knowledge of Internet behaviors - legal/illegal	3	–	2.38	0.69
REGINT_L1			–	–
REGINT_L2			–	–
REGINT_L3			–	–
legal knowledge of cyberbullying behaviors - anticipated seriousness	3	.71	3.62	0.52
REGCYB_S1			3.66	0.63
REGCYB_S2			3.52	0.68
REGCYB_S3			3.67	0.62
legal knowledge of Internet behaviors - anticipated seriousness	3	.71	2.38	0.69
REGINT_S1			2.14	0.89
REGINT_S2			2.66	0.83
REGINT_S3			2.33	0.88
Ingroup prototypicality	1	–	2.66	0.84
PROT1			2.66	0.84
Ingroup identification				
cognitive identification	1	–	4.68	1.70
IDENT_IIS			4.68	1.70
affective identification	8	.88	4.41	1.33
IDENT_A1			4.91	1.78
IDENT_A2			3.35	2.04
IDENT_A3			5.42	1.61
IDENT_A4			5.03	1.74
IDENT_A5			3.45	1.95
IDENT_A6			5.11	1.64
IDENT_A7			2.84	1.87
IDENT_A8			5.18	1.70
Habits regarding Smartphone/Internet use				
Habits of Smartphone/Internet use during the week	2	–	5.08	1.15
HAB_SW			5.57	0.99
HAB_IW			4.58	1.68
Habits of Smartphone/Internet use during the day	2	–	3.23	1.05
HAB_SD			3.40	1.07
HAB_ID			3.05	1.20

outcome variable) on the perceived peer-norm, ingroup prototypicality, ingroup identification (i.e., the predictors), and on control variables (i.e., the cyber-victim and cyber-bystander perspective, habits regarding Smartphone/Internet use during the week, habits regarding Smartphone/Internet use during the day, Internet regulations, parents' level of education, participants' age and participants' gender). Initially,

beta coefficients were freely estimated across three groups of cyberspace regulations (i.e., cyberspace regulations groups: LOW:  $< -1SD$ ; HIGH:  $> +1SD$ ;  $-1SD \leq MED \leq +1SD$ ). Next, we constrained beta coefficients to be equal across cyberspace regulation groups separately for each predictor and control variable. Among these nested models, constraining equal effects on cyberbullying perpetration across cyberspace regulation groups showed a significant worst fit only for perceived peer-norm,  $\chi^2_d(2) = 14.37, p < .001$ , whose coefficients varied substantially and significantly among cyberspace regulation groups. The same cross-cyberspace regulation equivalence led to a lesser change in chi-square rising for all the other predictors and control variables, and was therefore retained. The obtained final model provided an excellent fit,  $\chi^2(20) = 49.25, p = < .001$ ; CFI = 0.976; RMSEA = 0.035 (0.024, 0.047); SRMR = 0.013; Table 4 shows standardized solutions. Noteworthy, the beta coefficient magnitude was greater for the perceived peer-norm and significantly decreased from lower levels to higher levels of cyberspace regulations. The user defined parameter estimates feature found in the *lavaan* package allowed us to estimate the conditional effect of perceived peer-norm on cyberbullying perpetration as a function of cyberspace regulations levels (1SD below the mean:  $\hat{\beta} = .332, p < .001$ , at the mean:  $\hat{\beta} = .270, p < .001$ , and 1SD above the mean:  $\hat{\beta} = .208, p < .001$ ; see Fig. 1). In line with Hypothesis 1, results indicated that the higher the levels of the perceived peer-norm, the higher the levels of cyberbullying perpetration at decreasing levels of cyberspace regulations. The second multiple group path-analysis considered changes in perceived peer-norm  $\times$  ingroup identification interaction effects within three increasing levels of ingroup prototypicality (Hypothesis 2). Particularly, we reframed the previous model by considering continuous interaction terms between peer-norm and cyberspace regulations. Furthermore, we entered the interaction term between peer-norm and ingroup identification along with the remaining control variables. Initially, coefficients were freely estimated in the three groups of ingroup prototypicality (LOW = 1 "not at all typical"; MED = 2–3; HIGH = 4 "very much typical"). Then, we proceeded to impose equality constraints across groups of ingroup prototypicality for each of the main effects and interaction terms of the model. In line with Hypothesis 1, peer-norm  $\times$  cyberspace regulations interaction term could not be excluded from the model without loss of fit,  $\chi^2_d(2) = 8.98, p = .011$ , and importantly, peer-norm  $\times$  cyberspace regulations interaction term can be constrained in the three groups of ingroup prototypicality,  $\chi^2_d(2) = 0.29, p = .865$ .

As regarding Hypothesis 2, the estimated change in the interaction term between peer-norm and ingroup identification as a function of ingroup prototypicality could neither be constrained,  $\chi^2_d(3) = 10.98, p = .012$ , nor neutralized,  $\chi^2_d(3) = 46.64, p < .001$ . Restrictions applied to other remaining predictors and control variables did not significantly affect the chi-square test, and these variables were retained in the final model, which was characterized by an excellent fit,  $\chi^2(24) = 39.14, p = .026$ ; CFI = 0.985; RMSEA = 0.024 (0.012, 0.034); SRMR = 0.013. Table 5 shows standardized solutions. Results revealed that the interactive effect of perceived peer-norm and ingroup identification in predicting cyberbullying perpetration was significant at higher and moderate levels of ingroup prototypicality. It is worth noting that increasing levels of ingroup prototypicality enhanced the size of the moderating role of ingroup identification on the relation between perceived peer-norm and cyberbullying perpetration.

To gain a better understanding of this interaction, we estimated the conditional effect of the perceived peer-norm on cyberbullying perpetration as a function of ingroup identification (1SD below the mean, at the mean, and 1SD above the mean) at different levels of ingroup prototypicality (1SD below the mean and 1SD above the mean, see Fig. 2) by means of user defined estimates of the *lavaan* package. As far as the lower levels of ingroup prototypicality were concerned, the stronger the perceived peer-norm, the higher the frequency of cyberbullying perpetration, at higher,  $\hat{\beta} = .307, p < .001$ , compared to the

**Table 2**  
Intercorrelations of the measures used in the study.

Measures	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Cyberbullying perpetration														
2. Perceived peer-norm	.48**													
3. Legal knowledge of cyberbullying behaviors	-.13**	-.09**												
4. The anticipated seriousness of the outcome related to the engagement in cyberbullying behaviors	-.22**	-.15**	.25**											
5. IIS	.05**	-.05**	.01	.05**										
6. Affective ingroup identification	.08**	-.07**	.01	.07**	.35**									
7. Ingroup prototypicality	.14**	.03	.01	.06**	.34**	.354**								
8. Cyber-victim perspective	.46**	.42**	-.01**	-.07**	-.01	-.002	.03							
9. Cyber-bystander perspective	.44**	.43**	-.07**	-.02	.03	.05**	.11**	.49**						
10. Habits of smartphone/internet use during the week	.14**	.01	.01	.06**	.18**	.16**	.19**	.06**	.18**					
11. Habits of smartphone/internet use during the day	.17**	-.01	-.08**	-.06**	.11**	.11**	.11**	.12**	.14**	.57**				
12. Legal knowledge of internet behaviors	-.14**	-.06**	.29**	.19**	-.03*	-.03	.002	-.07**	-.06**	-.02	-.11**			
13. The anticipated seriousness of the outcome related to the engagement in Internet behaviors	-.17**	-.11**	.09**	.30**	-.04*	-.01	-.04*	-.03	-.08**	-.11**	-.08**	.34**		
14. Parents' education	-.01	.05**	.08**	.11**	.01	.01	.06**	-.006	.05**	.06**	-.09**	.06**	.03	

Note: \*p < .05, \*\*p < .01.

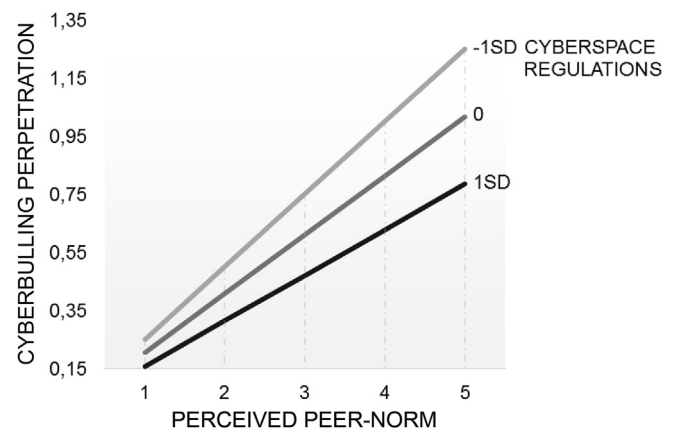
**Table 3**  
Frequencies and percentages of students who were not involved or involved few times (i.e., answering “never” or “few times”), and who were perpetrators, victims and bystanders of cyberbullying at least sometimes (i.e., answering “sometimes”, “often” or “always”) for each item. Frequencies and percentage of missing values were also reported.

	Not involved or involved few times		Involved at least sometimes		Missing	
	N	%	N	%	N	%
<b>Cyberbullying perpetration</b>						
CYB_P1	2792	79.5	701	20.0	18	0.5
CYB_P2	3174	90.4	312	9.0	25	0.7
CYB_P3	3137	89.3	350	9.9	24	0.7
CYB_P4	3197	91.1	294	8.3	20	0.6
CYB_P5	3309	94.2	174	5.0	28	0.8
<b>Cyber-victim perspective</b>						
CYB_V1	2723	77.6	748	21.3	40	1.1
CYB_V2	3117	88.7	349	10.0	45	1.3
CYB_V3	3052	86.9	423	12.0	36	1.0
CYB_V4	3005	85.5	465	13.2	41	1.2
CYB_V5	3309	94.2	166	4.8	36	1.0
<b>Cyber-bystander perspective</b>						
CYB_B1	1368	39.0	2105	60.0	38	1.1
CYB_B2	2310	65.8	1158	33.0	43	1.2
CYB_B3	1989	56.6	1479	42.2	43	1.2
CYB_B4	2277	64.9	1185	33.8	49	1.4
CYB_B5	2811	80.1	653	18.7	47	1.3

**Table 4**  
Standardized solution for the multiple group informational social influence model with cyberbullying perpetration as the outcome variable.

Path terms	Cyberspace Regulations group	Estimate	Significance	CI.lower	CI.upper
Perceived peer-norm	Low	.425	< .001	.296	.555
	Med	.346	< .001	.290	.402
	High	.155	< .001	.108	.202
Ingroup identification	constrained equal	.046	< .001	.018	.074
Ingroup prototypicality	constrained equal	.049	< .001	.022	.076
Cyber-victim perspective	constrained equal	.226	< .001	.183	.27
Participants' gender <sup>a</sup>	constrained equal	.164	< .001	.113	.214
Cyber-bystander perspective	constrained equal	.149	< .001	.116	.182
Habits of smartphone/internet use during the day	constrained equal	.076	< .001	.044	.108
Habits of smartphone/internet use during the week	constrained equal	.038	.015	.007	.069
Participants'age	constrained equal	.014	.078	-.002	.031
Parents' education	constrained equal	-.011	.573	-.047	.026
Internet regulations	constrained equal	-.070	< .001	-.097	-.043

Note: a 0 = Female, 1 = Male.



**Fig. 1.** Cyberbullying perpetration as a function of perceived peer-norm and cyberspace regulations.

mean,  $\hat{\beta} = .231, p < .001$ , and to lower levels of ingroup identification,  $\hat{\beta} = .154, p < .001$ . As for the higher levels of ingroup prototypicality, again, the stronger the perceived peer-norm, the higher the frequency of cyberbullying perpetration at higher,  $\hat{\beta} = .360, p < .001$ , compared to the mean,  $\hat{\beta} = .283, p < .001$ , and to lower levels of ingroup identification,  $\hat{\beta} = .207, p < .001$ .

As regarding control variables, cyber-victim perspective was a positive predictor of cyberbullying perpetration,  $\hat{\beta} = .221, p < .001$ . Moreover, the participants' gender significantly predicted

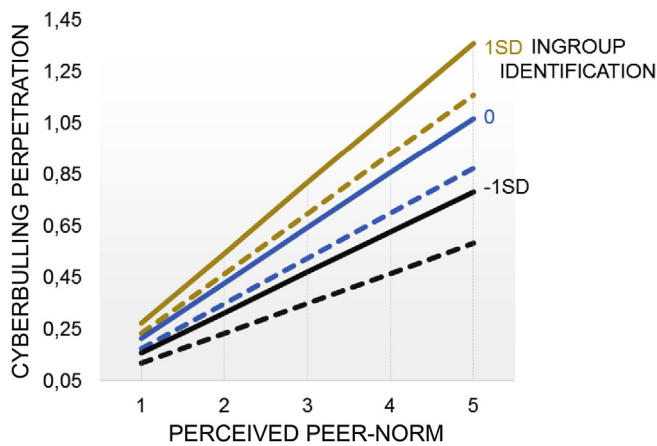


**Table 5**

Standardized solution for the multiple group model combining (H1) informational social influence and (H2) referential informative social influence path, with cyberbullying perpetration as the outcome variable.

Path terms	Ingroup Prototypicality	Estimate	Significance	CI.lower	CI.upper
Perceived peer-norm	constrained equal	.269	< .001	.226	.313
Cyberspace regulations	constrained equal	-.092	< .001	-.125	-.060
(H 1) Perceived peer-norm X Cyberspace regulations	constrained equal	-.062	< .001	-.099	-.026
Ingroup identification	constrained equal	.048	< .001	.019	.078
(H2) Perceived peer-norm X Ingroup identification	High	.190	< .001	.082	.297
	Med	.040	.167	-.017	.096
	Low	.086	< .001	.034	.138
Cyber-victim perspective	constrained equal	.221	< .001	.177	.265
Participants' gender <sup>a</sup>	constrained equal	.176	< .001	.120	.233
Cyber-bystander perspective	constrained equal	.167	< .001	.131	.202
Habits of smartphone/internet use during the day	constrained equal	.084	< .001	.050	.118
Habits of smartphone/internet use during the week	constrained equal	.036	.031	.003	.069
Participants' age	constrained equal	.016	.054	.000	.033
Parents' education	constrained equal	-.029	.143	-.068	.010
Internet regulations	constrained equal	-.079	< .001	-.108	-.050

Note: a 0 = Female, 1 = Male.



**Fig. 2.** Cyberbullying perpetration as a function of perceived peer-norm, ingroup identification (-1, 0, +1SD), at -1SD (dotted line) and at +1SD (solid line) of ingroup prototypicality.

cyberbullying perpetration,  $\hat{\beta} = .176, p < .001$ . The cyber-bystander perspective was also a significant predictor of cyberbullying perpetration,  $\hat{\beta} = .167, p < .001$ . Internet regulations significantly reduced cyberbullying perpetration,  $\hat{\beta} = -.079, p < .001$ . Finally, the amount of usage of Smartphone/Internet during the day was positively associated with the criterion,  $\hat{\beta} = .084, p < .001$ .

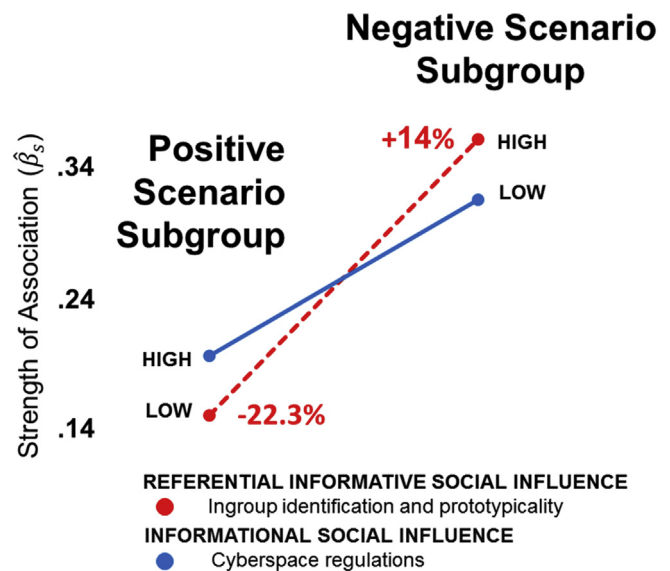
**3.3. Ancillary analyses**

As for the informational social influence findings (i.e., perceived peer-norm and cyberspace regulation interaction), two subgroups can be identified as a function of the strength of association ( $\hat{\beta}_s$ , user-defined within *lavaan*) between the perceived peer-norm and cyberbullying perpetration. Specifically, participants with higher vs. lower levels of cyberspace regulations, the former being less sensitive to the perceived peer-norm influence (i.e., positive scenario subgroup,  $\hat{\beta}_s = .199, p < .001$ ) than the latter (i.e., negative scenario subgroup,  $\hat{\beta}_s = .315, p < .001$ ). A similar procedure was applied to the results pertaining to the referential informative social influence findings (i.e., perceived peer-norm, ingroup identification, and ingroup prototypicality interaction). Specifically, participants with lower vs. higher levels of ingroup identification and ingroup prototypicality, the former being less sensitive to the perceived peer-norm (i.e., positive scenario subgroup,  $\hat{\beta}_s = .154, p < .001$ ) than the latter (i.e., negative scenario subgroup,  $\hat{\beta}_s = .360, p < .001$ ). The comparison between the negative

scenario subgroup in the referential informative social influence to the negative scenario subgroup in the informational social influence indicated an increased amount of predicted cyberbullying perpetration equal to 14% ( $\hat{\beta}_s$  ratio = 1.140,  $SE = 0.153, p < .001$ ; see Fig. 3). The comparison between the positive scenario subgroup in the referential informative social influence to the positive scenario subgroup in the informational social influence indicated a decreased amount of predicted cyberbullying perpetration equal to 22% ( $\hat{\beta}_s$  ratio = 0.777,  $SE = 0.227, p < .001$ ).

**4. Discussion**

Driven by previous evidence showing that peer group expectations regarding cyberbullying behaviors influence individual cyberbullying perpetration, the current study aims to deepen the understanding of such a relationship. Specifically, we recast the association between the perceived peer group norms concerning cyberbullying behaviors and adolescents' tendency to engage in cyberbullying behaviors within the broader theoretical frame of social influence. Taking advantage of two distinct, albeit not mutually exclusive social influence mechanisms, namely the *informational social influence* and the *referential informative*



**Fig. 3.** Beta effects of perceived peer-norm on cyberbullying perpetration in different sub-groups characterized according to specific social influence mechanisms.

social influence, we tested two different predictions.

First, in line with the *informational social influence* mechanism (*Hypothesis 1*), we found that the higher the levels of perceived peer-norm, the higher the level of cyberbullying perpetration at decreasing levels of cyberspace regulations. In other words, results indicated that the higher the levels of peer group norms supporting cyberbullying behaviors, the higher the levels of cyberbullying perpetration and that such a relationship is enhanced at decreasing levels of knowledge regarding the laws governing the use of cyberspace. In line with the *informational social influence* mechanism, adolescents likely rely on the perceived group norms to guide their cyberbullying behaviors, especially when they lack knowledge regarding appropriate behavior in cyberspace. It is worth noting that even at high levels of cyberspace regulations, the association between the perceived peer-norm and cyberbullying perpetration was positive and statistically significant. This pattern of results indicates that higher levels of cyberspace regulations weaken but do not eliminate the association between perceived peer-norm and cyberbullying perpetration.

Second, and according to the prediction derived from the *referential informative social influence* mechanism (*Hypothesis 2*), the higher the levels of perceived peer-norm, the higher the levels of cyberbullying perpetration at increased levels of ingroup identification and ingroup prototypicality. Said otherwise, the results showed that the higher the support of group peer norms to cyberbullying behaviors, the stronger the likelihood that participants would engage in cyberbullying perpetration, and this association was moderated by participants' level of ingroup identification and ingroup prototypicality. Specifically, we showed that the higher the level of ingroup identification and the higher the support of the group peer norms to cyberbullying behaviors, the higher the levels of adolescents' tendency to engage in cyberbullying behaviors; this relation was even enhanced at increasing levels of ingroup prototypicality. This pattern of findings provides evidence in favor of framing cyberbullying as a byproduct of a social identity-related process. Indeed, the relation between the perceived peer-norm and cyberbullying perpetration is rooted in the importance that adolescents attributed to the ingroup as an identity-defining device as well as to the roles endorsed by the adolescents within the ingroup dynamics, these being either central or peripheral members. This pattern of findings is coherent with predictions derived from the *referential informative social influence* mechanism.

Together these findings attest to the two types of social influence mechanisms, *informational* and *referential informative social influence* at work independently in shaping adolescents' cyberbullying behaviors. Given the co-occurrence of these two types of social influence mechanisms, the ancillary analyses provide significant information for practical intervention. Indeed, at least in our sample, subgroups characterized as positive and negative based on the two models of social influence showed that the referential informative social influence is stronger than the informational social influence in both positive and negative effects. Said otherwise, successful interventions aimed at contrasting the referential informative social influence would weaken the association between perceived peer-norm and participants' cyberbullying perpetration to a greater extent than successful interventions aimed at contrasting the informational social influence. In addition, failing to address the referential informative social influence would boost the association between perceived peer-norm and participants' cyberbullying perpetration to a greater extent than failing to counteract informational social influence.

Furthermore, the current study replicates previous findings stemming from research addressing cyberbullying. First, being the victim of cyberbullying is associated with a high probability of engaging in cyberbullying perpetration. This result has been found in research on cyberbullying (Walrave & Heirman, 2011; Ybarra & Mitchell, 2004) as well as bullying in general (Olweus, 1997). Second, the cyber-bystander perspective was significantly and positively associated with cyberbullying perpetration. Specifically, witnessing cyberbullying episodes

enhanced the likelihood of engaging in cyberbullying behaviors, thus confirming the significant role played by the bystander perspective in shaping cyberbullying behaviors (Barlińska, Szuster, & Winiewski, 2013; Bastiaensens et al., 2016; Kowalski, 2008).

Moreover, habits regarding Smartphone and Internet use per day was positively and significantly associated with cyberbullying perpetration. Indeed, more frequent daily on-line activity, as testified to by Smartphone and Internet usage, increased the likelihood of performing cyberbullying acts (for similar results, see Mishna et al., 2012; Rice et al., 2015).

As for the demographic variables, the current research contributed to understanding the associations between participants' gender, participants' age, parents' education, the frequency of Internet/Smartphone daily and weekly usage with cyberbullying perpetration. First, compared to male adolescents, female adolescents were less likely to be involved in cyberbullying perpetration. This finding is consistent with research carried out in the Italian context (Palermi et al., 2017), and also in the European and American context (Li, 2006; Popović-Čitić, Djurić, & Cvetković, 2011; Quintana-Orts & Rey, 2018), but were at odds with research reporting no association between participant gender and cyberbullying perpetration (DeHue et al., 2008; Griesel et al., 2012; Hinduja & Patchin, 2008; Menesini et al., 2013; <https://www.sciencedirect.com/science/article/pii/S0190740911003343>, Smith et al., 2008; Williams & Guerra, 2007; Ybarra & Mitchell, 2004). Second, no significant association was found between participants' age and cyberbullying perpetration, in line with previous research showing that participants' age was not a significant predictor of cyberbullying perpetration (Steffgen, König, Pfetsch, & Melzer, 2011), but contrary to evidence suggesting a significant link between the variables in question (DeHue et al., 2008; Hinduja & Patchin, 2008; Kowalski & Limber, 2007; Ševčíková & Šmahel, 2009; Ybarra et al., 2006, 2007).

Third, and as for parents' level of education, the current result did not find that this variable was a significant predictor of cyberbullying perpetration, as already reported by Makri-Botsari and Karagianni (2014).

Some limitations of the current study should be acknowledged. First, despite the sample size of our research being relatively large and representative of the geographic area in which the research was carried out, generalization of the current results to other cultural and social contexts should be made with caution. For instance, generalization should take into account that different geographical areas might have different laws regulating web usage, which could be different from laws regarding the same issue in Italy. Future investigation should be carried out in other cultural and geographic contexts to enhance the external validity of our results. Second, although the self-reporting questionnaires were anonymous, adolescents' answers may be guided, at least in part, by social desirability and self-presentation concerns (Brewer & Kerlake, 2015; Davis, Thake, & Vilhena, 2010). For example, participants' engaging in cyberbullying behaviors may have been underreported as well as the perceived peer group's cyberbullying acts. Future studies might take into consideration additional reporters (e.g., parents' or teachers' perspectives on cyberbullying behaviors) who can provide further significant information on this phenomenon. Third, and although the social influence mechanisms we investigated in the present research stemmed from consolidating theoretical and empirical efforts, the cross-sectional nature of our study fails to clearly identify the causal direction of the reported effects. Future studies should rely on longitudinal research to corroborate the pattern of associations observed in the present study.

## 5. Conclusion

In line with our results, the diffusion of the cyberbullying phenomenon in the context under investigation appears to be worrisome, as more than one-third of the participants reported that they bullied someone, and more than one-third of participants responded that they

were bullied at least sometimes. Together, these findings signal the need of interventions aimed at counter-acting and preventing cyberbullying behaviors. First, and in line with our findings, schools and educational services should work together to strengthen knowledge regarding online security and the responsible use of new technologies. Informative training could be scheduled in schools involving web security experts. However, our study also demonstrates that the knowledge about the appropriate behaviors in cyberspace is not effective enough to prevent/reduce cyberbullying behaviors. Hence, parallel to interventions aimed at enhancing knowledge on the appropriate use of cyberspace, interventions based on peer education would be highly relevant. Indeed, as cyberbullying can be framed as a product of intragroup dynamics, interventions that take advantage of central members to promote *anti*-cyberbullying behaviors (i.e., peer education) could be successful in revising the peer norms regarding cyberbullying, and

ultimately deflect the likelihood of engaging in such behaviors. Finally, given the higher gains of the latter over the former intervention, and the larger loss of not taking the latter over the former intervention, preventive strategies aimed at intervening in cyberbullying by targeting social identity dynamics are highly recommended, at least, by the current results.

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chb.2019.09.001>.

### Appendix

#### Cyberbullying perpetration

How often in the last year, via Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social networks (e.g., Facebook, Instagram, Snapchat):

- CYB\_P1 you sent offensive and/or vulgar messages to somebody?  
 CYB\_P2 you published someone's personal details without consent?  
 CYB\_P3 you purposely excluded somebody from an online group?  
 CYB\_P4 you distributed someone's private pictures without consent?  
 CYB\_P5 you hacked into someone's account and pretended to be that person?

#### Cyber-victim perspective

How often in the last year, via Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social networks (e.g., Facebook, Instagram, Snapchat):

- CYB\_V1 you received offensive and/or vulgar messages from someone?  
 CYB\_V2 someone published your personal details without your consent?  
 CYB\_V3 you were excluded and/or marginalized by someone from an online group?  
 CYB\_V4 someone distributed your private pictures without your consent?  
 CYB\_V5 someone hacked your account and pretended to be you?

#### Cyber-bystander perspective

How often in the last year, via Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social networks (e.g., Facebook, Instagram, Snapchat):

- CYB\_B1 you have read offensive and/or vulgar messages addressed to someone who was not you?  
 CYB\_B2 you have read details on the private life of someone who was not you?  
 CYB\_B3 you have seen someone who was not you deliberately excluded and/or marginalized from an online group?  
 CYB\_B4 you have seen private images published about someone without his/her consent?  
 CYB\_B5 you know that someone who was not you hacked another person's account and pretended to be that person, who was also not you?

#### Perceived peer-norm

How many of your friends approve of/tolerate someone:

- NORM1 who distributes someone's private pictures without consent using a Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social network (e.g., Facebook, Instagram, Snapchat)?  
 NORM2 who posts personal details online of someone else using a Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social network (e.g., Facebook, Instagram, Snapchat)?  
 NORM3 who sends offensive and vulgar messages to somebody using a Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social network (e.g., Facebook, Instagram, Snapchat)?  
 NORM4 who excludes somebody from a group using a Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social network (e.g., Facebook, Instagram, Snapchat)?  
 NORM5 who pretends to be someone else using a Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social network (e.g., Facebook, Instagram, Snapchat)?

#### Cyberspace regulations

##### Legal knowledge of cyberbullying behaviors - legal/illegal

- REGCYB\_L1 Gaining access to the credentials of someone without permission and acquiring their profiles  
 REGCYB\_L2 Harassing someone with repeated threats and insults on social networks  
 REGCYB\_L3 Posting falsehoods on a social network about someone that affects their reputation

##### Legal knowledge of Internet behaviors - legal/illegal

- REGINT\_L1 Downloading books from the Internet without paying royalties  
 REGINT\_L2 Downloading music and videos from the Internet without paying royalties  
 REGINT\_L3 Sending unauthorized advertising material via e-mail

##### Filler items - legal/illegal

- REGFIL\_L1 Writing a slur word on social networks  
 REGFIL\_L2 Openly declaring a political orientation on the Internet/social networks  
 REGFIL\_L3 Emailing a strongly worded complaint upon receiving a damaged and/or wrong product

##### Legal knowledge of cyberbullying behaviors - anticipated seriousness

- REGCYB\_S1 Gaining access to the credentials of someone without permission and acquiring their profiles  
 REGCYB\_S2 Harassing someone with repeated threats and insults on social networks  
 REGCYB\_S3 Posting falsehoods on a social network about someone that affects their reputation

##### Legal knowledge of Internet behaviors - anticipated seriousness

- REGINT\_S1 Downloading books from the Internet without paying royalties  
 REGINT\_S2 Downloading music and videos from the Internet without paying royalties  
 REGINT\_S3 Sending unauthorized advertising material via e-mail

**Filler items - anticipated seriousness**

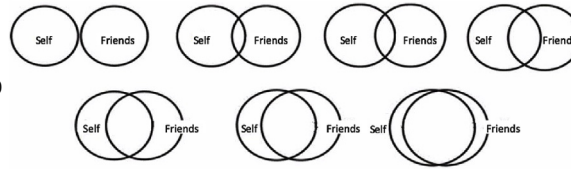
- REGFIL\_S1 Writing a slur word on social networks  
 REGFIL\_S2 Openly declaring a political orientation on the Internet/social networks  
 REGFIL\_S3 Emailing a strongly worded complaint upon receiving a damaged and/or wrong product

**Ingroup prototypicality**

- PROT1 Think of your group of friends with whom you are in contact through Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social networks (e.g., Facebook, Instagram, Snapchat). How much do you feel typical (i.e., characteristic) of this group of friends with whom you are in contact through Smartphone (e.g., SMS, WhatsApp), email (e.g., mailing list) and social networks (e.g., Facebook, Instagram, Snapchat)?

**Ingroup identification***Cognitive identification*

IDENT\_IIS



Inclusion of the Ingroup in the Self ("self" and "friends")

*Affective identification (Kiesner et al., 2002)*

- IDENT\_A1 Is it important for you to be a part of this group of friends?  
 IDENT\_A2 If you are not a part of this group of friends, would you feel lonely?  
 IDENT\_A3 Are you happy to be a part of this group of friends?  
 IDENT\_A4 Are you proud to be a part of this group of friends?  
 IDENT\_A5 If you weren't a part of this group of friends, would you be unhappy?  
 IDENT\_A6 Are you happy to be described as a member of this group of friends?  
 IDENT\_A7 Would you feel insecure if you were not a part of this group of friends?  
 IDENT\_A8 Do you feel connected to the other members of this group of friends?

*Habits regarding Smartphone/Internet use.*

- HAB1 Do you have a smartphone?  
 HAB2 Do you send or receive messages using a Smartphone?  
 HAB3 Do you send or receive messages using Internet?  
 HAB4 Are you part of a group via Smartphone?  
 HAB5 Are you part of a group via Internet?  
 HAB\_SW During the week, how often do you use a Smartphone to send or receive messages?  
 HAB\_IW During the week, how often do you use Internet to send or receive messages?  
 HAB\_SD During the day, how often do you use a Smartphone to send or receive messages?  
 HAB\_ID During the day, how often do you use Internet to send or receive messages?

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